The Organization of Post-Stroke to Mitigate Health Disparities: A Learning Healthcare System Approach

NIH StrokeNet Grand Rounds Webinar Series

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Disclosures

- National Institute of Health, Research Funding (R01)
- Abbott Cardiovascular, Speaker

Objectives

- Upon completion of the lecture, participants will be able to:
  - Describe inequities in stroke outcomes related to social determinants of health
  - Engage in an interdisciplinary approach to the care of stroke patients with from diverse backgrounds
  - Develop health equity-based clinical care initiatives utilizing a learning healthcare system approach

Outline

- Health Inequities Along the Continuum of Stroke Care
- Social Determinants of Health as Drivers of Health Inequities
- A Tale of Two Patients
- The STEPS Clinical Program - A Learning Healthcare System Approach to Addressing Inequities in Post-stroke Care

Terminology

- **Social Determinants of Health:** The conditions in the environment where people are born, live, learn, work, play, worship, and age that impact health outcomes and risks.

- **Health Inequities:** Systematic differences in the health status of different population groups. These inequities have significant social and economic costs to both individuals and societies.

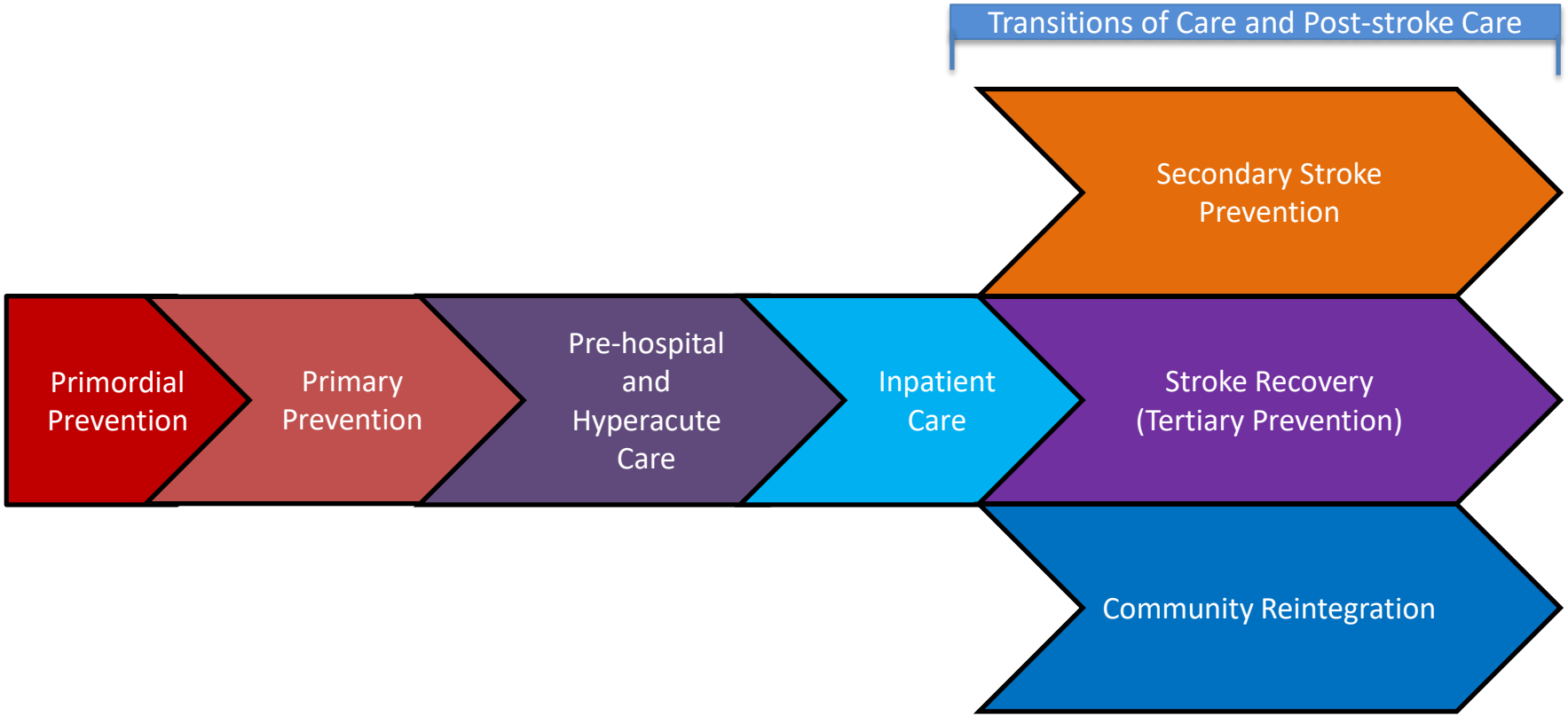
- **Health Disparities:** Differences in health that are closely linked to social, economic, or environmental disadvantage. Health disparities adversely impact groups who have systematically experienced greater obstacles to health based on characteristics historically linked to discrimination or exclusion

Terminology

- **Race:** A social construct primarily based on phenotype, ethnicity, and other indicators of social differentiation that results in varying access to power and social and economic resources.

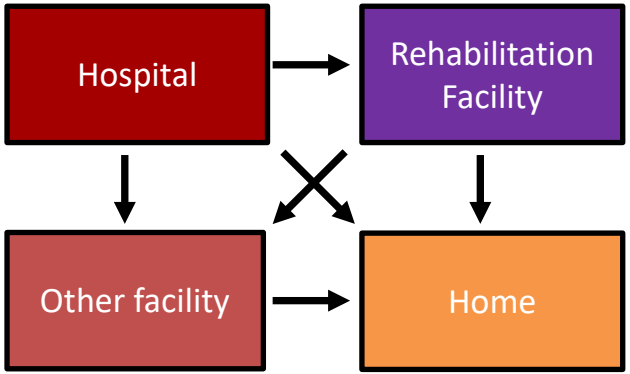
- **Structural racism:** The normalization and legitimization of an array of dynamics (historical, cultural, institutional and interpersonal) that routinely advantage one race while producing cumulative and chronic adverse outcomes for people of color.

Stroke Care Continuum



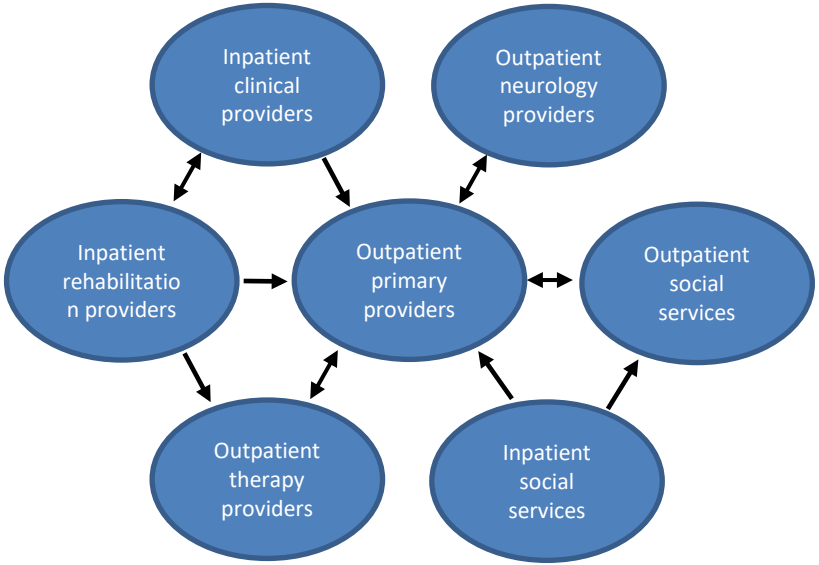
Care Transitions

Care Locations

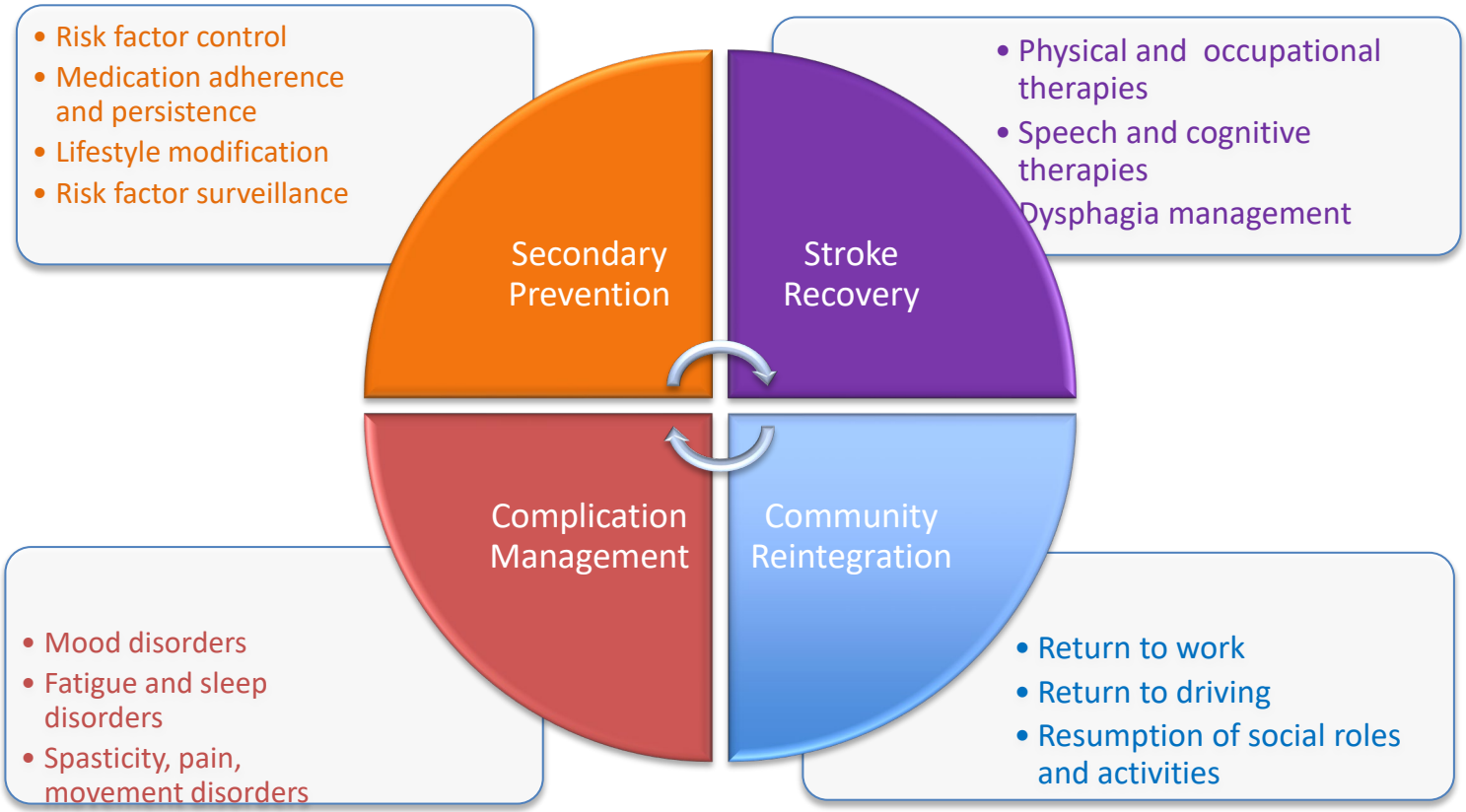


Components of Effective Transitions of Care:
Discharge planning
Patient and caregiver engagement and education
Care coordination between providers

Care Providers



Post-Stroke Care



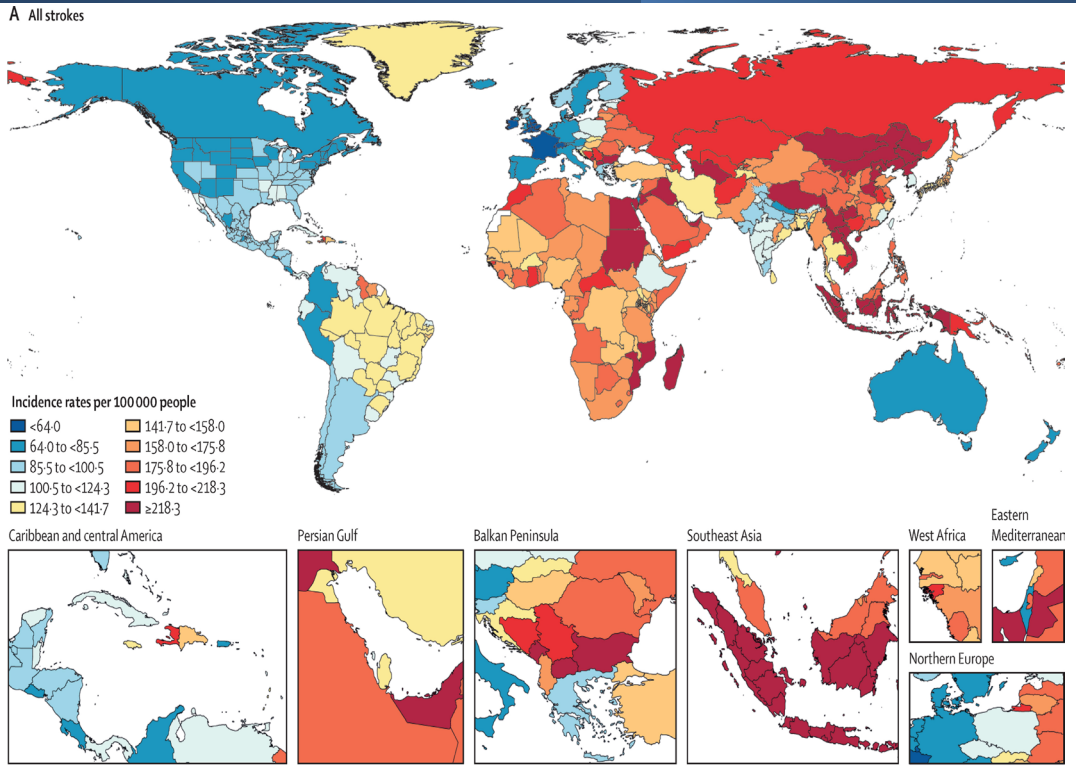
Global Burden of Stroke

2nd leading cause of death in the world

89% of stroke mortality in low and low-middle income countries

Nearly 50% of stroke related deaths are related to modifiable behavioral and environmental factors

Socioeconomic factors may explain up to 30% of excess stroke risk



Global, regional, and national burden of stroke and its risk factors, 1990–2019: a systematic analysis for the Global Burden of Disease Study 2019. Lancet Neurology. 2021.

Social determinants of health (SDoH) 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

Healthy People 2030, U.S. Department of Health and Human Services, Office of Disease Prevention and Health Promotion. Retrieved [Accessed 10/1/2021], from https://health.gov/healthypeople/objectives-and-data/social-determinants-health

Social Determinants of Health Impact Care and Outcomes Along the Stroke Care Continuum

STROKE AS A SOCIAL DISEASE

Healthcare Access and Quality

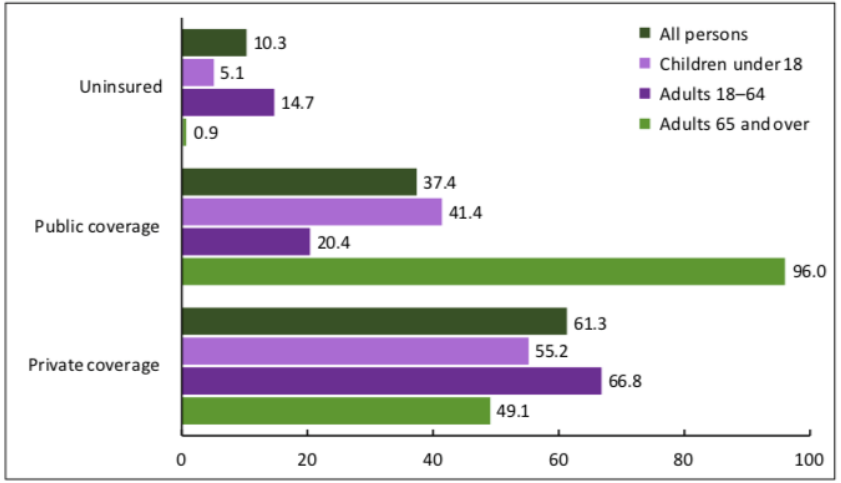
- Affordability of health insurance
- Quality of insurance
- Medication coverage
- Access to primary care
- Access to specialist care
- Access to rehabilitation
- Access support services

Healthcare Access and Post-Stroke Care

Lack of insurance associated with the following:

- 44% lower utilization of post-acute care services
- Lower likelihood of medication persistence three months after stroke
- Increased risk for cost-related medication non-adherence
- Decline in functional status 5 years following stroke
- Increased risk of long-term stroke mortality

Figure 1. Percentages of persons who were uninsured or had public or private coverage at the time of interview, by age group: United States, 2019

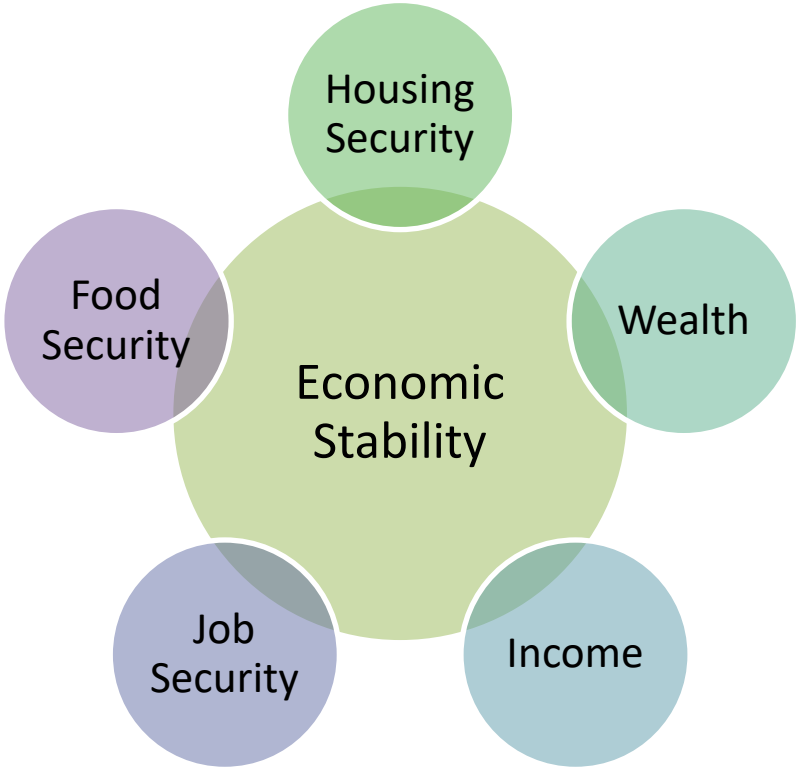


NOTES: Persons were defined as uninsured if they did not have any private health insurance, Medicare, Medicaid, Children's Health Insurance Program (CHIP), state-sponsored or other government plan, or military plan. Persons were also defined as uninsured if they had only Indian Health Service coverage or had only a private plan that paid for one type of service, such as accidents or dental care. Public coverage includes Medicaid, CHIP, state-sponsored or other government-sponsored health plan, Medicare, and military plans. Private coverage includes any comprehensive private insurance plan (including health maintenance and preferred provider organizations). These plans include those obtained through an employer, purchased directly, purchased through local or community programs, or purchased through the Health Insurance Marketplace or a state-based exchange. Private coverage excludes plans that pay for only one type of service, such as accidents or dental care. A small number of persons were covered by both public and private plans and were included in both categories. Data are based on household interviews of a sample of the civilian noninstitutionalized population.

SOURCE: National Center for Health Statistics, National Health Interview Survey, 2019.

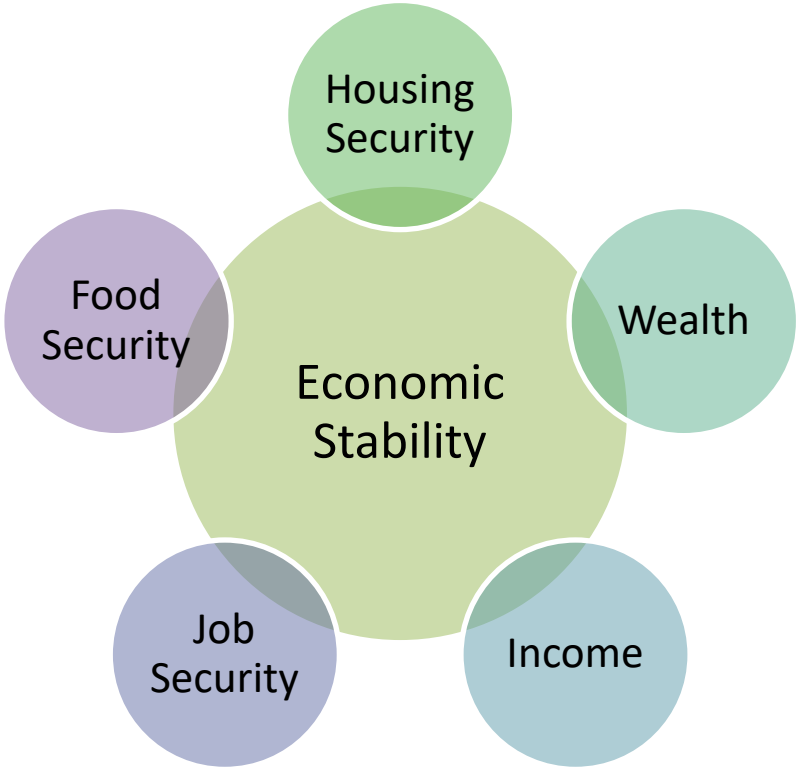
Economic Stability

- “Socioeconomic Status”
- More than income
- Impacts health and outcomes through multiple pathways
- Inconsistent capture and use of measures in studies



Economic Stability

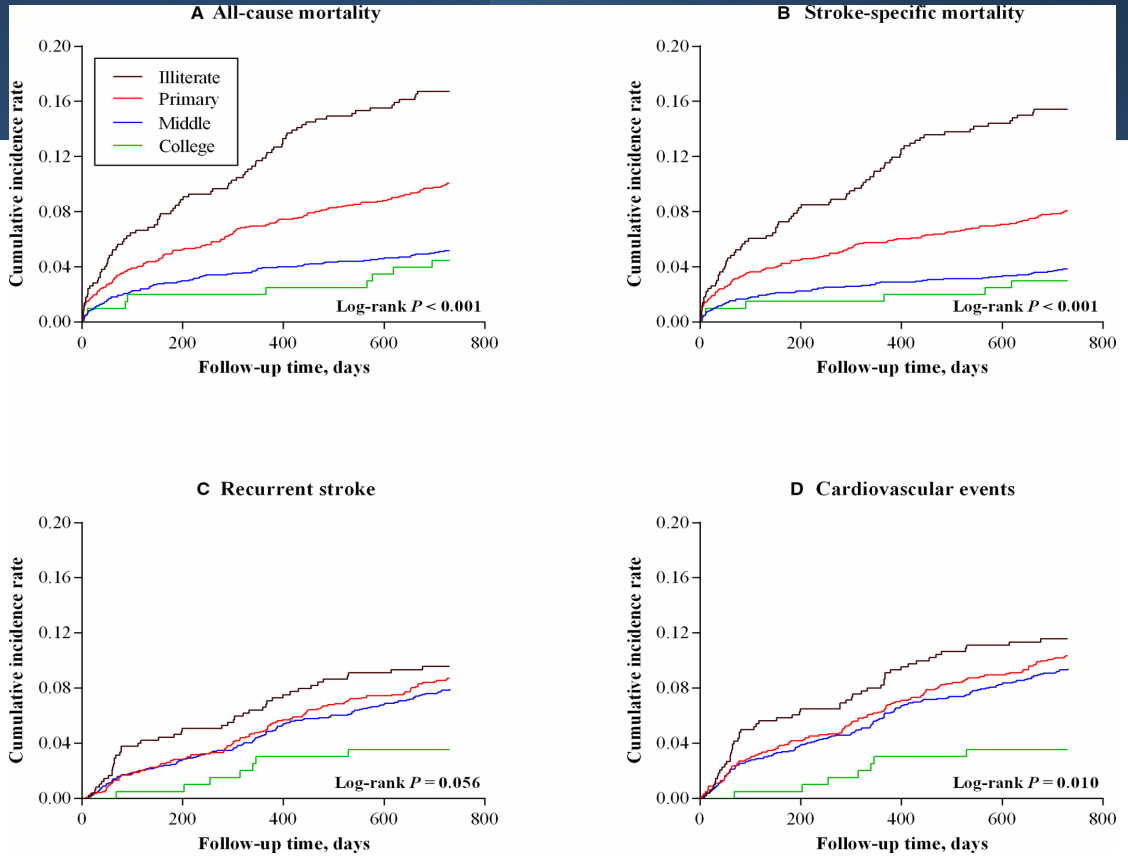
- Economic stability is associated with the following:
  - Medication non-adherence and non-persistence after stroke
  - 30-day readmission
  - Lower likelihood of vascular risk factor treatment
  - Lower likelihood of hypertension control
  - Lower access to and quality of rehabilitation
  - Poorer functional outcome after stroke



Access to Education

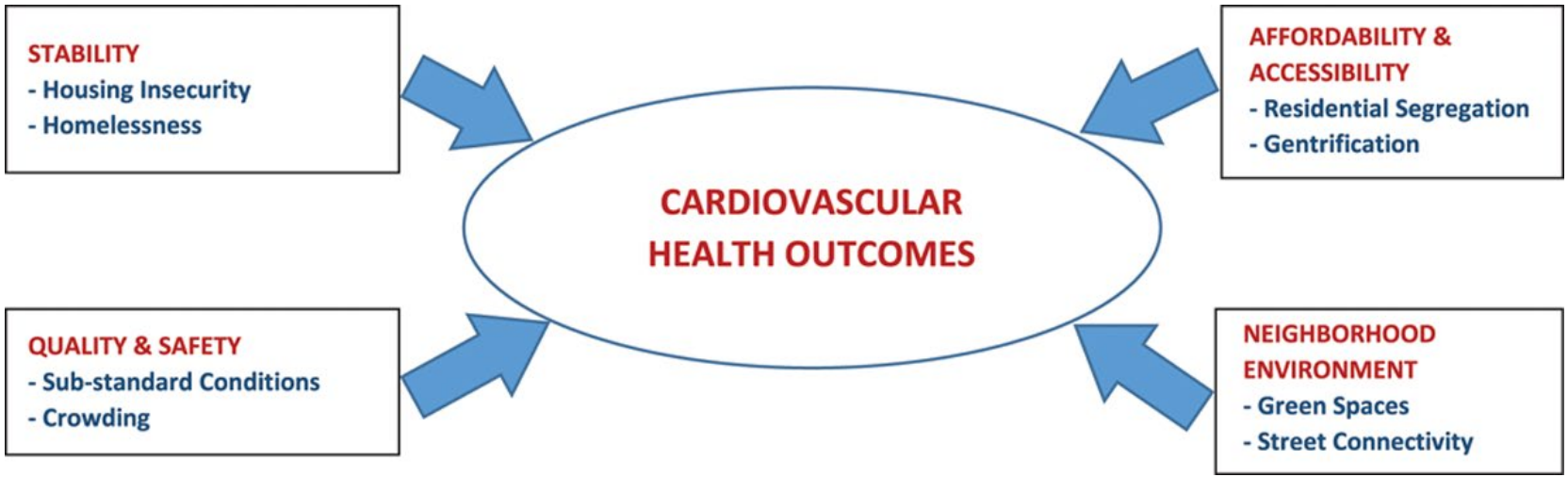
- Educational attainment
- Health literacy
- Ability to retain educational information following stroke
- Vascular risk factor control
- Recurrent cardiovascular events after stroke
- Stroke-specific mortality
- All cause mortality after stroke

Education Level and Cardiovascular and Stroke Mortality



Bizhong Che. Journal of the American Heart Association. Education Level and Long-term Mortality, Recurrent Stroke, and Cardiovascular Events in Patients With Ischemic Stroke, Volume: 9, Issue: 16, DOI: (10.1161/JAHA.120.016671)

Neighborhood and Built Environment



Mario Sims. Circulation: Cardiovascular Quality and Outcomes. Importance of Housing and Cardiovascular Health and Well-Being: A Scientific Statement From the American Heart Association, Volume: 13, Issue: 8, DOI: (10.1161/HCQ.0000000000000089)

Neighborhood and Built Environment

Location, Location, Location: How Where We Live Affects Stroke Outcomes

Erica Jones and Anjail Sharrief

Association of Neighborhood Socioeconomic Status With Outcomes in Patients Surviving Stroke

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Neurology® 2021;96:e2599-e2610. doi:10.1212/WNL.0000000000011988

ARTICLES

Neighborhood socioeconomic disadvantage and mortality after stroke

Arleen F. Brown, MD, PhD
Li-Jung Liang, PhD
Stefanie D. Vassar, MS
Sharon Stein Merkin, PhD
W.T. Longstreth, Jr., MD
Bruce Ovbiagele, MD
Tingjian Yan, PhD
José J. Escarce, MD, PhD

ABSTRACT

Objective: Residence in a socioeconomically disadvantaged community is associated with mortality, but the mechanisms are not well understood. We examined whether socioeconomic features of the res-
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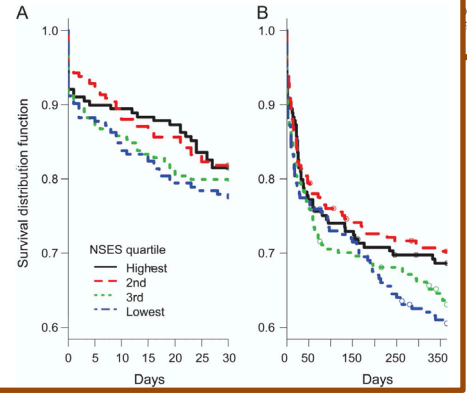
Figure **Kaplan-Meier curves of death after incident stroke in 806 Cardiovascular Health Study participants at (A) 30 days and (B) 1 year poststroke event**



August 18, 2021 RESEARCH ARTICLE

Association of Neighborhood-Level Material Deprivation With Health Care Costs and Outcome After Stroke

Amy Y. X. Yu, Eric E. Smith, Murray Krahn, Peter C Austin, Mohammed Rashid, Jiming Fang, Joan Porter, Manav V. Vyas, Susan E. Bronskill, Richard H. Swartz, Moira K. Kapral

First published August 18, 2021, DOI: https://doi.org/10.1212/WNL.0000000000012676

Social and Community Context

Factors

- Social support
- Community resources
- Community cohesion
- Racism and discrimination
- Safety and Crime
- Incarceration rates
- Substance abuse

Impact

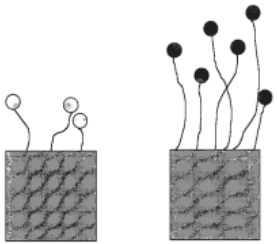
- Patient support and advocacy
- Community engagement
- Trust in healthcare systems
- Toxic stress and allostatic load
- Treatment by physicians and hospital staff

Racism and Discrimination

Camera Phyliss-Jones, MD, MPH

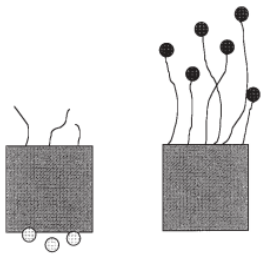
Levels of Racism: A Theoretical Framework and a Gardener's Tale

Institutionalized racism



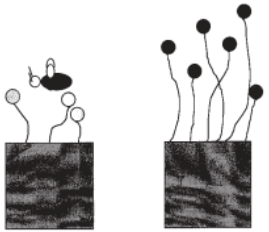
- Initial historical insult
- Structural barriers
- Inaction in face of need
- Societal norms
- Biological determinism
- Unearned privilege

Personally mediated racism



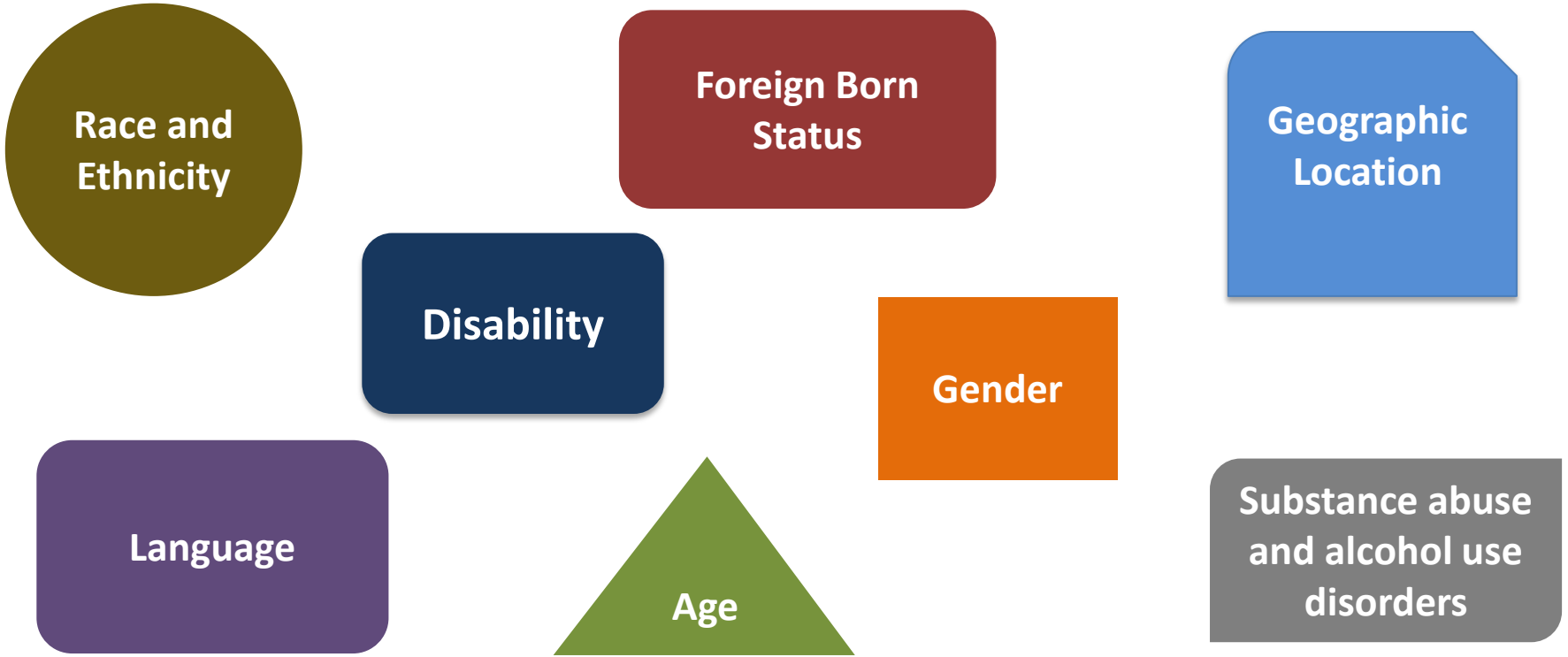
- Intentional
- Unintentional
- Acts of commission
- Acts of omission
- Maintains structural barriers
- Condoned by societal norms

Internalized racism

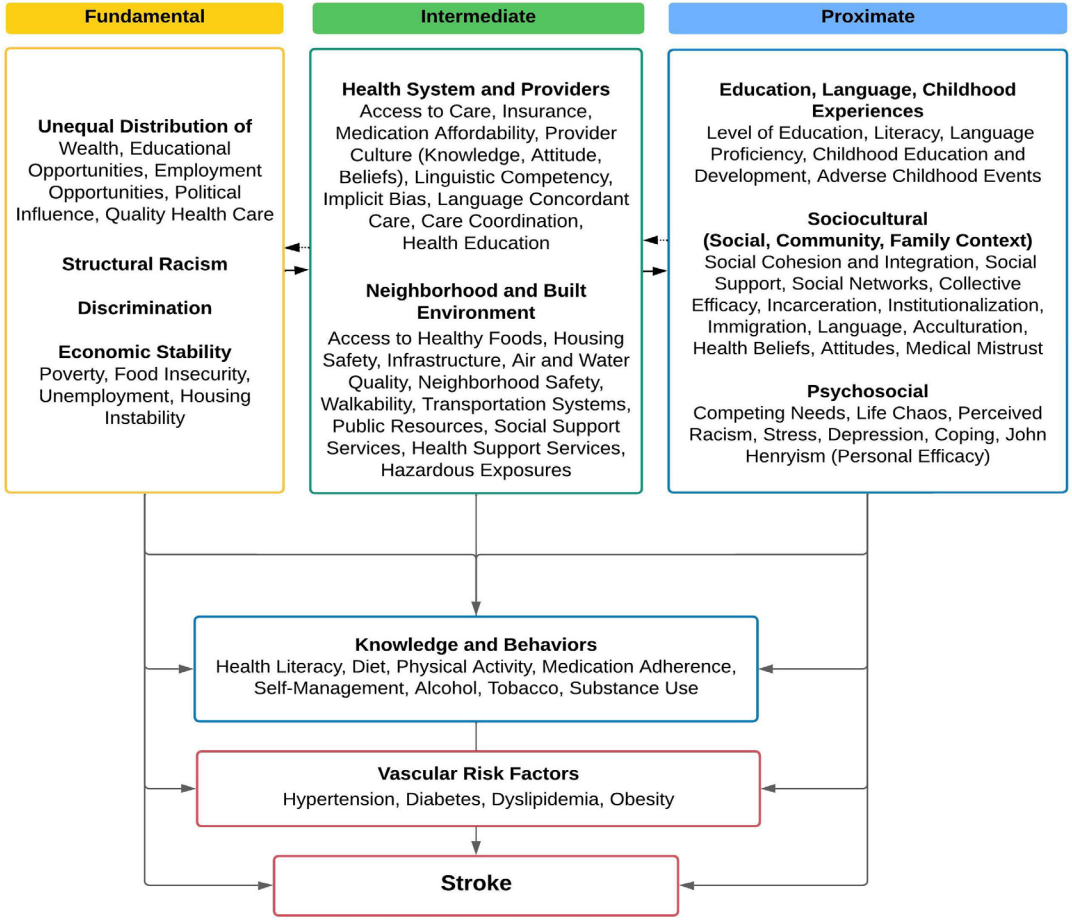


- Reflects systems of privilege
- Reflects societal values
- Erodes individual sense of value
- Undermines collective action

Social factors associated with inequitable stroke care and outcomes



Theoretical Framework

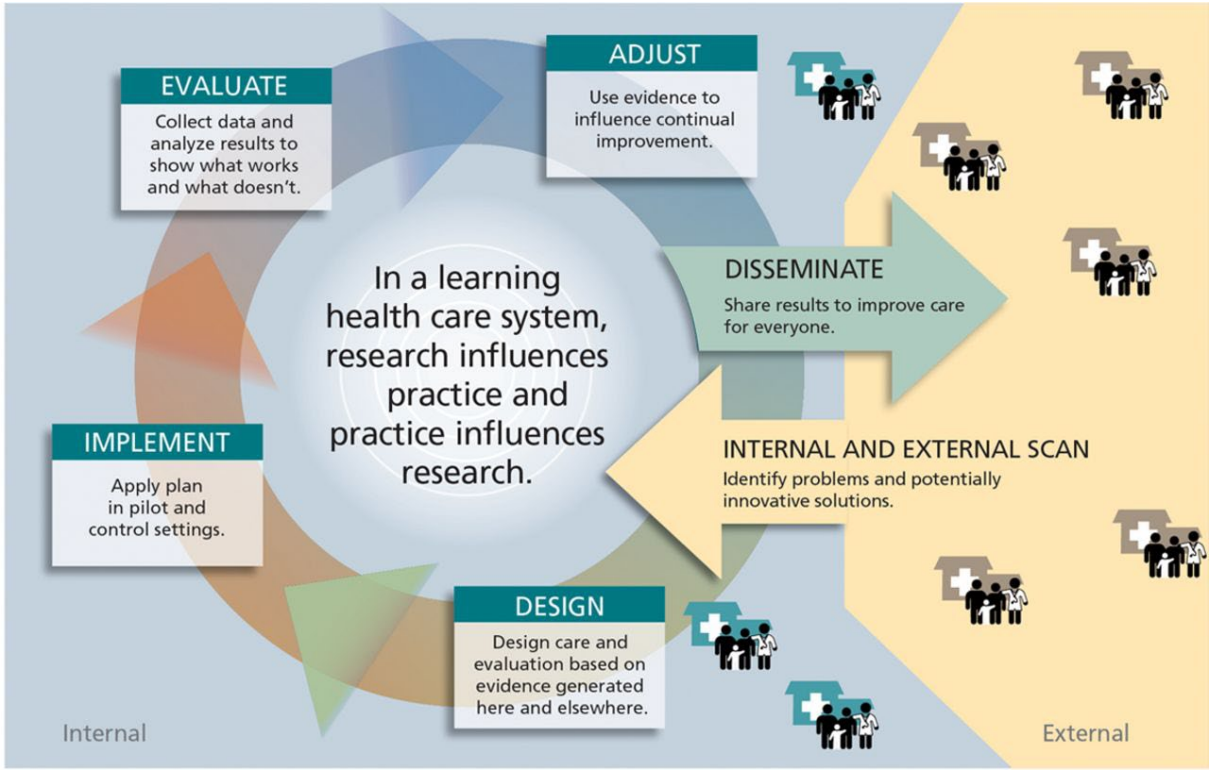


Towfighi et ak. *Stroke*. Strategies to Reduce Racial and Ethnic Inequities in Stroke Preparedness, Care, Recovery, and Risk Factor Control: A Scientific Statement From the American Heart Association, Volume: 54, Issue: 7, Pages: e371-e388, DOI: (10.1161/STR.0000000000000437)

The STEPS Clinical Program:

A Learning Healthcare System Approach to Addressing Inequities in Post-stroke Care

Learning Healthcare Systems



Maddox et al. The Learning Healthcare System and Cardiovascular Care: A Scientific Statement From the American Heart Association. Circulation. 2017

Key Components:

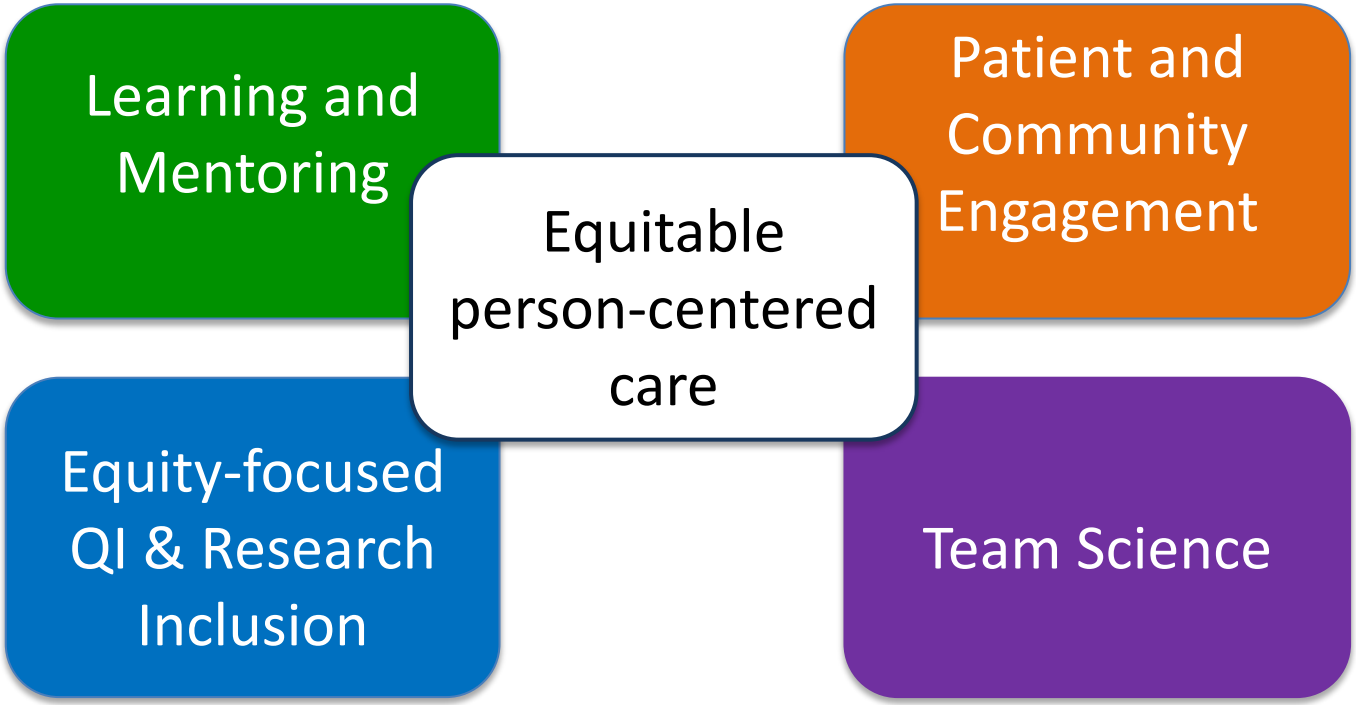
1. Effective use of science and informatics to support optimal care delivery
2. Engagement of patient (community)- physician contracts
3. Development and maintenance of a continuous learning culture
4. Alignment of healthcare delivery incentives to support the LHS goals

Centering Equity

Seven Core Practices for the Pursuit of Equity through a Learning Health System
Establish principle. Position equity as an essential focus of the learning health system
Measure for equity. Track data that matter to drive and sustain success
Lead from lived experience. Ensure people with lived experience are leading the work
Co-produce. Design, create, learn, act, and sustain together
Redistribute power. Reallocate power and leadership across the system
Practice a growth mindset. Cultivate an environment and expectation for growth
Engage beyond the healthcare system. Catalyze change across systems that produce health

Parsons A, et al. Seven practices for pursuing equity through learning health systems. Learn Health Syst. 2021 Jun 22;5(3):

Health Equity-Centered LHS Components



Clinical Care

- Stroke Prevention Clinic
- Person-centered approach
- Free outpatient visits for uninsured patients discharged from hospital
- Outpatient social work collaboration
- Resource book for uninsured patient care
- Language equity initiative

Stroke Transitions Education and Prevention (STEP) Clinic

- Developed as a comprehensive post-stroke clinic in 06/2014
- Registry initiated in 10/2014
- Initial focus on risk factor control and disparities in BP control
- Long-term goal to develop a clinical care model to improve outcomes in stroke survivors

- Patient-centered
- Protocol-supported
- Partnership building
- Provider communication
- Prospective data collection
- Process improvement

STEP Clinic

- STEP Clinic patient folder
  - Clinic Brochure
  - BP measurement Brochure
  - Risk factor form
  - Educational materials at appropriate literacy levels
  - English and Spanish
  - Clinic Newsletter
- Advanced automated BP machine
- BP monitors for uninsured/ under-resourced patients

Quality Improvement and Research

- Clinical Trials
- Recruitment of diverse patient population
- Language Equity Projects
- CONNECT (**C**ollaboration to Improve **O**utcomes, Preve**N**tive care and **C**are **T**ransitions after Stroke) Consortium

STEPs for Blood Pressure Reduction

A Randomized Trial to Compare the Stroke Transitions Education and Prevention (STEP) Clinic to Usual Care for Post-stroke Blood Pressure Reduction

Study Design

Inclusion

- Age ≥ 18
- Ischemic stroke, ICH, or TIA
- Discharge home after stroke
- One of the following: History of hypertension; hospital BP≥ 140/90 on two or more occasions during hospitalization; or discharge home on BP medication
- Residence within 60 miles of the clinic
- 2 week, sitting automated office BP ≥135/85 mm hg

Exclusion

- Severe disability: modified Rankin > 3
- Pregnancy at time of stroke
- Advanced CKD (GFR < 30)
- Short life expectancy (terminal cancer, end-stage COPD)
- Severe carotid or intracranial stenosis precluding aggressive blood pressure control
- Rare etiology (amyloid angiopathy, vasculitis) or stroke unrelated to vascular RFs

Study Design

Randomization

- Occurs at 2 week follow-up after sitting BP assessment confirms eligibility
  - to randomization
- Computerized random sequence 1:11 allocation
- Permuted blocks, block sizes 4 – 8
- Stratification
  - Insurance status at time of randomization
    - Insured vs Uninsured
  - Systolic Blood Pressure at randomization

Outcomes

Primary: Mean daytime 12-hour ambulatory blood pressure 6 months after randomization

Secondary:

- Other ABPM / BP outcomes
- Behavioral outcomes
- Safety outcomes

Treatment Arms

STEP

Stroke NP or Attending

- Education about BP goals
- Promote BP self-monitoring; provide BP cuff; educate patients about proper way to monitor (pamphlet)
- Medication adherence assessment and counseling
- Promotion of Mediterranean diet
- Screening for sleep apnea
- BP medication titration using home BP monitoring
    - Assessment and titration every 2 – 4 weeks

Usual Care

Neurology Fellow or Attending Visit

- Discussions about risk factors and goals
- Encourage BP self-monitoring
- Recommendations about BP goals provided to PCP
- Variable follow-up according to patient specific needs related to stroke care (i.e. repeat imaging, cognitive impairment, anticoagulation, etc)

PCP follow-up for BP management

Results

- 115/ 200 target patients enrolled of 404 consented at two sites over 2 years
  - More than 70% non-White
  - 29% uninsured
  - Baseline BP similar between groups
- 89 patient retained

	STEP (n=59)	Usual Care (n=56)
Demographic Data		
Age (mean, SD)	58 (15)	59 (13)
Sex (N, % male)	32 (56)	37 (66)
Race		
Non Hispanic White	15 (25)	16 (29)
Non-Hispanic Black/ AA	42 (71)	29 (52)
Hispanic	2 (3)	11 (20)
% Insured	42 (71)	40 (71)
Level of Education		
Less than High School	12 (20)	10 (18)
High School/GED	19 (32)	18 (32)
Completed College	24 (41)	21 (38)
Advanced Degree	1 (2)	3 (5)
Other	3 (5)	4 (7)
Clinical History		
Stroke Type		
TIA	3 (5)	1 (2)
Ischemic	43 (73)	44 (79)
Hemorrhagic	11 (19)	10 (18)
Ischemic with hemorrhagic transformation	2 (3)	1 (2)
Baseline Attended BpTRU Systolic	144 (19)	146 (20)
Baseline Attended BpTRU Diastolic	87 (11)	88 (11)

STEP Randomized Clinical Trial – Main Findings				
	STEP arm N=48	Usual Care N = 41	Adjusted Difference (95% CI)	P-value
Daytime Systolic ABP*	129.2 mmHg (19.2)	136.5 mmHg (15.9)	-7.2 (-14.5 – 0.2)**	
24 hour Systolic ABP	124.9 mmHg (17.8)	133.1 mmHg (17.1)	-8.0 (-15.3 – -0.7)**	
Proportion Controlled (Day BP <130/80 mmHg)	19 (40%)	9 (22%)		0.06
Medication Adherence (Morisky) Score	7 (6.6 - 8)	7 (5.8 - 8)		0.99
Medication Adherence Self Efficacy Score	4 (3.8 - 4)	4 (3.6 - 4)		0.99
Regular BP Monitoring (most days of week)	40 (83%)	20 (48%)		<0.01
PHQ-9 (depression) median	4 (1.5 - 10)	5.5 (3 - 9)		0.03
*Primary outcome. **Adjusted for insurance status, baseline systolic blood pressure, and site. Abbreviations: ABP (Ambulatory Blood Pressure); PHQ-9 (Patient Health Questionnaire-9)				

Team Science

- Advance Practice Providers, Pharmacists, Social workers, Nursing leaders, Nutritionists
- Rehabilitation Medicine, Physical Therapists, Occupational Therapists
- Cardiology, Internal Medicine, Obstetrics and Gynecology
- Schools of Bioinformatics, Public Health, Nursing, Engineering
- Institutions Across U.S: Stroke Prevention Clinic Consortium

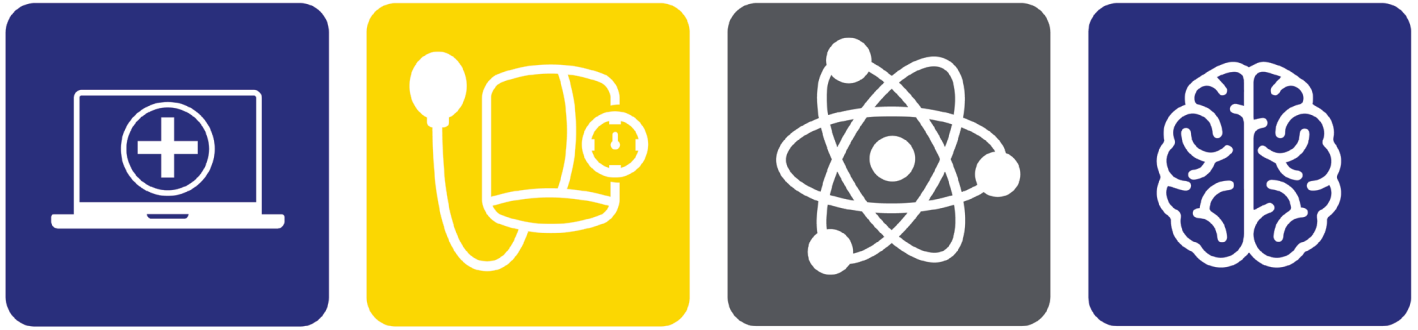
STOP

A Randomized Pilot Trial to Compare the Stroke Telemedicine Outpatient Program (STOP) Clinic to Usual Care for Post-stroke Blood Pressure Reduction

- In-home video telemedicine visits with a MD/NP, social worker, and pharmacist for 6 months after stroke
- Wearable BP monitor with blue tooth technology that allows automatic transmission of BP to the care team
- Smart device for video visits and BP monitoring
- Social worker to assist with resources/ insurance acquisition
- BP review and medication titration by a clinical pharmacist

Lessons learned from STOP

- Simple digital technology tools are better
- Blood pressure monitoring portal would need to be built to accommodate provider needs
- Social workers needed throughout duration of intervention
- Outcome visits could be achieved with TM



V-I-R-T-U-A-L STUDY

VIDEO-BASED INTERVENTION TO REDUCE TREATMENT AND OUTCOME DISPARITIES IN ADULTS LIVING WITH STROKE

Theoretical Framework

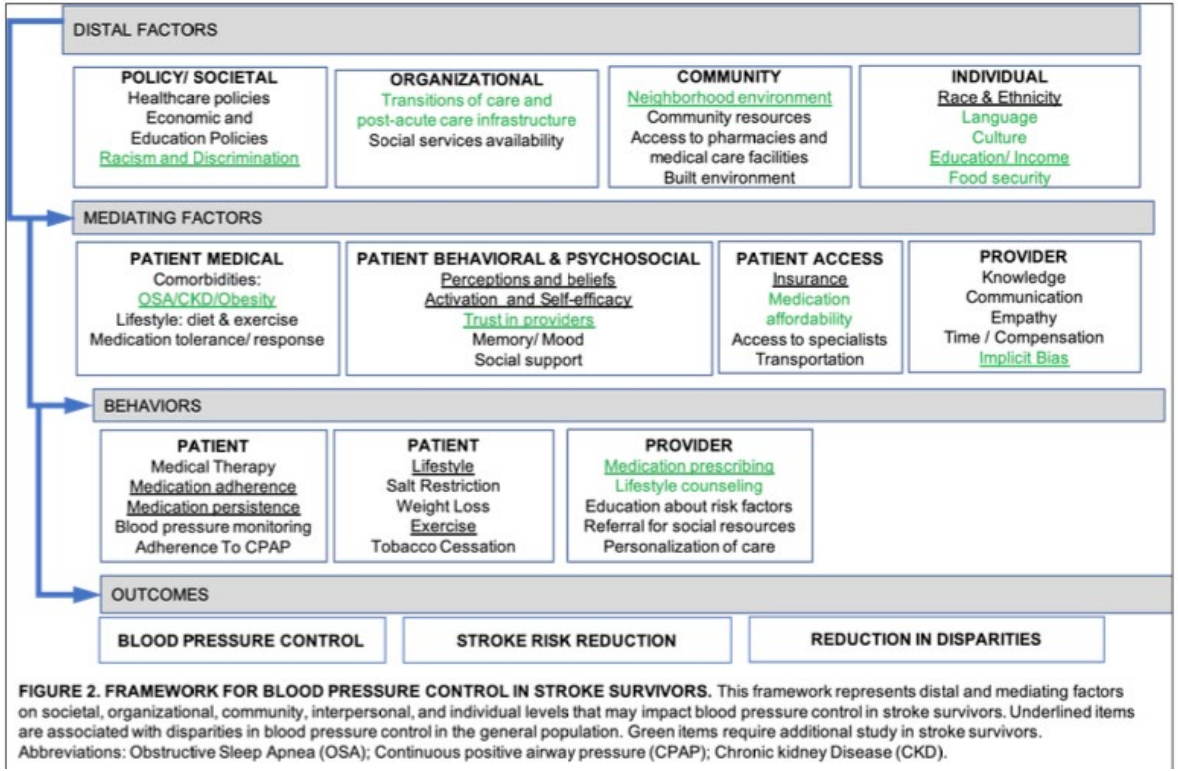


FIGURE 2. FRAMEWORK FOR BLOOD PRESSURE CONTROL IN STROKE SURVIVORS. This framework represents distal and mediating factors on societal, organizational, community, interpersonal, and individual levels that may impact blood pressure control in stroke survivors. Underlined items are associated with disparities in blood pressure control in the general population. Green items require additional study in stroke survivors. Abbreviations: Obstructive Sleep Apnea (OSA); Continuous positive airway pressure (CPAP); Chronic kidney Disease (CKD).

Study Aims – Primary Aim

We will enroll **534** stroke survivors in a randomized comparative effectiveness trial of a 6-month multidisciplinary telehealth intervention to test the impact of the intervention on key clinical outcomes, relative to standard care.

- Primary outcome: 24-hour ambulatory BP < 125/75 mmHg 6 months after hospital discharge.
- Secondary outcomes:

  Heterogeneity of effects on the primary clinical outcome according to race(Black) and ethnicity (Hispanic)

  BP control 12 months after hospital discharge

  Composite recurrent vascular events (ischemic or hemorrhagic stroke, myocardial infarction or coronary revascularization, acute cardiac death, heart failure hospitalization) 12 months after hospital discharge

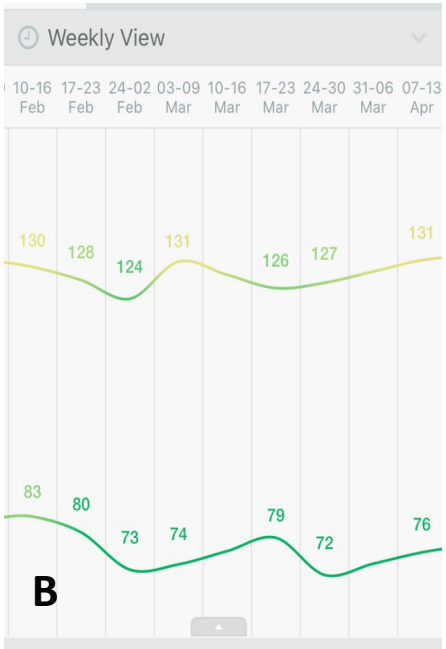
Approach to Care

Social Risk-Informed Care

- Information about social risk factors (lack of insurance or drug coverage, food insecurity, etc) is used during encounters to inform care decisions.
- Example 1: Provider prescribes blood pressure medications that are on a low-cost medication list from a specific pharmacy.
- Example 2: Provider educates patients on low-cost healthy food options.

Social Risk-Targeted Care

- Clinical encounters are used to directly address social risk factors and barriers to care.
- Example 1: Social worker assists patient with completing paperwork for Medicaid application during a clinical encounter.
- Example 2: Social worker connects patient to a resource for receiving free produce from a community garden.



3/14/20 10:30 AM	129/75	94
3/7/20 10:16 AM	127/71	77
3/7/20 10:15 AM	128/77	76
3/7/20 10:14 AM	129/77	82
3/4/20 10:39 AM	130/86	88
3/3/20 7:32 PM	133/82	70
3/3/20 7:32 PM	132/86	71

Social Worker
Performs social needs assessment using baseline SDOH forms and an additional patient specific questionnaire

NP/MD
Reviews hospital course, assesses patient active concerns, examines patient, and reviews stroke care plan

Pharmacist
Reviews current medications and side effects, reviews BP log, discusses changes to BP medications

Social Worker
Discusses needs based on NP/MD and pharmacist plans, provides resources, arranges follow-up for additional needs

.

VIRTUAL Study Progress

- 230 participants enrolled over 16 months
- Caregiver sub-study initiated
- Additional sub-studies proposed related to barriers to engagement with the telehealth intervention
- Additional major factors identified as barriers to post-stroke care
  - Housing insecurity
  - Caregiver changes
  - Access to rehabilitation services

Education and Mentoring

- Stroke Prevention Fellowship
- Stroke Prevention Research Group
- Resident and Fellow Training
- Medical and Public Health Student Research
- Summer training program for undergraduate students

Learning and Mentoring

Telehealth Trials to Address Health Equity in Stroke Survivors

Anjail Z. Sharrief, Amy K. Guzik, Erica Jones, Munachi Okpala, Mary F. Love, Tamra Ishan Jayenda Ranasinghe and Cheryl Bushnell

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is companion of

An Intervention Mapping Approach to Developing a Stroke Literacy Video for Recent Stroke Survivors: Development and Usability Study

Mary Carter Denny [1]; Andrea Ancer Leal [2]; Tahani Casameni Montiel [2]; Keona J Wynne [3]; Gabrielle Edquilang [4]; Kim Yen Thi Vu [4]; Farhaan Vahidy [5, 6, 7]; Beauchamp [2, 9]; Anjail Sharrief [8, 9]

Stroke Knowledge in African Americans: A Narrative Review.

Sharrief AZ, Johnson B, Abada S, Urrutia VC.

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PMID: 27103777 Free PMC article. Review.

A Person-Centered Approach Understanding Stroke Survivor and Family Caregiver Emotional Health

Varughese, Tina; Casameni Montiel, Tahani; Engebretson, Joan; Savitz, Sean I.; Sharrief, Anjail; Beauchamp, Jennifer E. S.

Author Information

Journal of Neuroscience Nursing 54(2):p 68-73, April 2022. | *DOI:* 10.1097/JNN.0000000000000640

Racial disparities in post-stroke functional outcomes in young patients with ischemic stroke.

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J Stroke Cerebrovasc Dis. 2020 Aug;29(8):104987. doi: 10.1016/j.jstrokecerebrovasdis.2020.104987. Epub 2020 Jun 14.

PMID: 32689593

The effects of racism and resilience on Black stroke- survivor quality of life: Study protocol and rationale for a mixed-methods approach

Mary F. Love[1*], Andrea Nicole Brooks[1], Sonya D. Cox[1], Munachi Okpala[2], Gail Cooksey[2], Audrey Sarah Cohen[2] and Anjail Z. Sharrief[2]

Community Outreach and Engagement

- Patient involvement in design of research and research meetings
- Stroke of Insight Community Program
- Community Health Fairs and Town Halls
- Team/ Trainee Involvement in Outreach

Community Outreach

Achieving Health Equity in Stroke Care

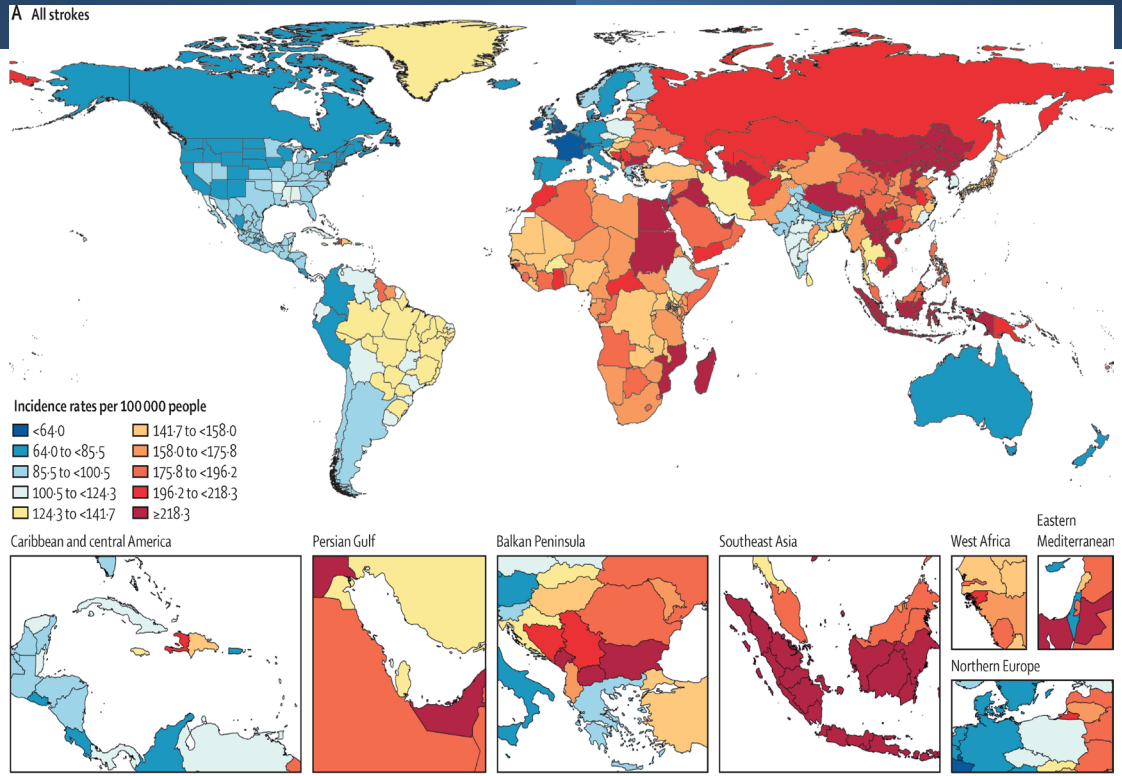
- Assessment of social determinants of health in clinical care
- Deeper understanding of the mechanisms by which social determinants of health impact care and outcomes
- Action to address inequities along the continuum of stroke care
- Team science and collaboration
- Patient and community engagement to identify and address social factors that impact outcomes

Global Burden of Stroke

2nd leading cause of death in the world

89% of stroke mortality in low and low-middle income countries

Nearly 50% of stroke deaths are related to behavioral and environmental factors



***Equity** in stroke care and outcomes will only be achieved when we begin to treat stroke as a social disease*

Stroke Prevention Team

Outpatient Clinic

- Munachi Okpala
- Christina Kim
- Shalene Amin
- Chigozirum Izeogu
- Shawanda Miller
- Kamilah Ologan
- Sylvia Zavala
- Latonya Bryant
- Alexa Vargas

Hospital Team

- Kim Vu, MSW, MBA
- Geri Hart and social work team
- Donna Escueta
- Cynthia Trizagis
- Shanequa Sostand
- Sandi Shaw
- Stroke Coordinators
- Clinical Pharmacists

Research Team and Collaborators

- Gail Cooksey
- Louis Gonzales
- Ariana Aquino Hernandez
- Mary Love
- Jennifer Beauchamp
- Abhijeet Dhoble
- Ijeoma Ekeruo
- Andrea Ancer Leal
- Erica Jones
- Carter Denny
- Imama Naqvi
- Digvijaya Navelkele
- Sean Savitz
- Chuck Green
- Elmer Bernstam
- Jose-Miguel Yamal
- Michael Gonzales
- Charlie Coton

- Post-Stroke Care Conference
- Registration
- Travel and Accommodations
- Agenda
- Submitting an Abstract

Post-Stroke Care Conference

Stroke Transitions of Care and Post-Stroke Care Conference
October 6 and 7, 2023
Cizik School of Nursing at UTHealth Houston
6901 Bertner Avenue
Houston, Texas

- Offering **FIVE** $1000 travel awards for trainees who submit abstracts with original research OR project proposals related to transitions of care or post-stroke care
- Opportunities to receive feedback from and network with senior scientists, representatives from NIH and the American Heart Association