BRAINS: Building Rural Appalachian Integrative Neurology Systems

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LMU
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Brief Agenda

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Summary

Background

Less than 3% of medical students take a geriatic elective during their training.[1]

By 2030, projected to have 74 million Americans age 65 or older.[2]

By 2050, Alzheimer's and other dementias will cost $1.1 trillion dollars.[2]

Rural Appalachia

20.1% of people in Rural Appalachia have a disability.[4]

42.3% of persons over 65 living in rural appalachian counties have a disability.[4]

Only 16.1% of other non-appalachian rural individuals have a disability.[4]

37.3% of persons over 65 living in other non-appalachian rural counties have a disability.[4]

Aims

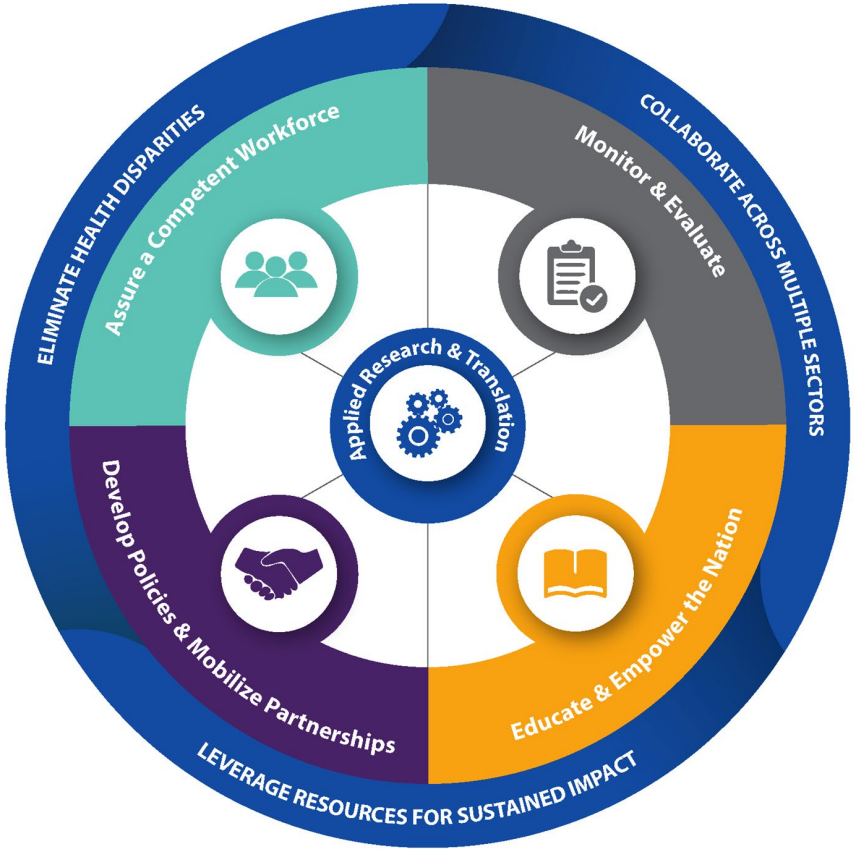
This project aims to assess the health and neuroprotective outcomes of a ten-week interventional educational health program called the BRAINS: Big 10. This program is based on the American Heart Association's (AHA) "Life's Essential 8". It includes the following health behaviors: a balanced diet, physical activity, abstinence from nicotine, adequate amount of sleep, healthy body mass index, and healthy levels of blood lipids, blood glucose, and blood pressure.[5] The BRAINS: Big 10 adds the two additional health behaviors of hydration and mindfulness.

Cardiovascular health and neurology are deeply intertwined, this study begins the exploration into whether a preventive program such as the BRAINS: Big 10 produces a similar improvement in brain health outcomes as the AHA's "Life's Essential 8" does for cardiovascular disease.[5]

Additional Specific Aims of This Project Include:

- Assess and quantify whether the BRAINS: Big 10 program has an impact on the neurofilament light chain which has been demonstrated in prior literature to be linked to neurodegenerative diseases.
- Quantify change in cardiovascular health (CVH) scores following the implementation of the 10 week BRAINS program.
- Determine if adherence to the BRAINS: Big 10 program leads to any significant change in cognition.
- Elucidate the value of the osteopathic tenets as it relates to patient health.

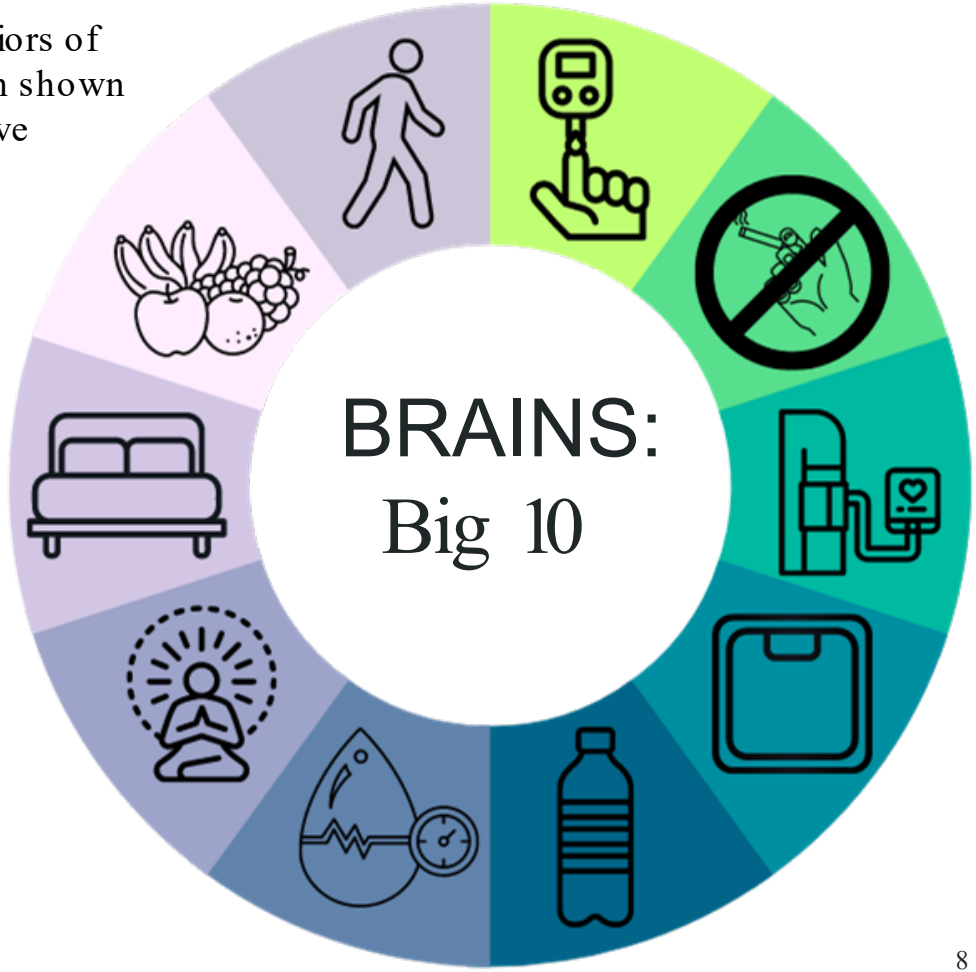
The Healthy Brain Initiative Road Map



8 key measures defined by the American Heart Association for the improvement and maintenance of cardiovascular health

1.Eat better
2.Be More Active
3.Quit Tobacco
4.Get Healthy Sleep
5.Manage Weight
6.Control Cholesterol
7.Manage Blood Sugar
8.Manage Blood Pressure

The BRAINS: Big 10 adds the additional health behaviors of adequate hydration and mindfulness. Both have been shown to have an impact on cognition and neurodegenerative diseases.[7-8]



Study Design

Recruitment

Informational Sessions will be held to discuss the research in depth with potential participants

Study Visit 1

Blood Draw, Cognitive Assessment using NIH toolbox, Measurement of Blood Pressure and Weight

Assignment of Groups

Participants randomly assigned to either control or experimental group

Study Visit 2-11

Participants in experimental group will return weekly for informational session on each of the Brains:Big 10 Health Behaviors

Study Visit 12

Both Groups return for final blood draw, cognitive assessment, and blood pressure/weight measurement.

Data Analysis

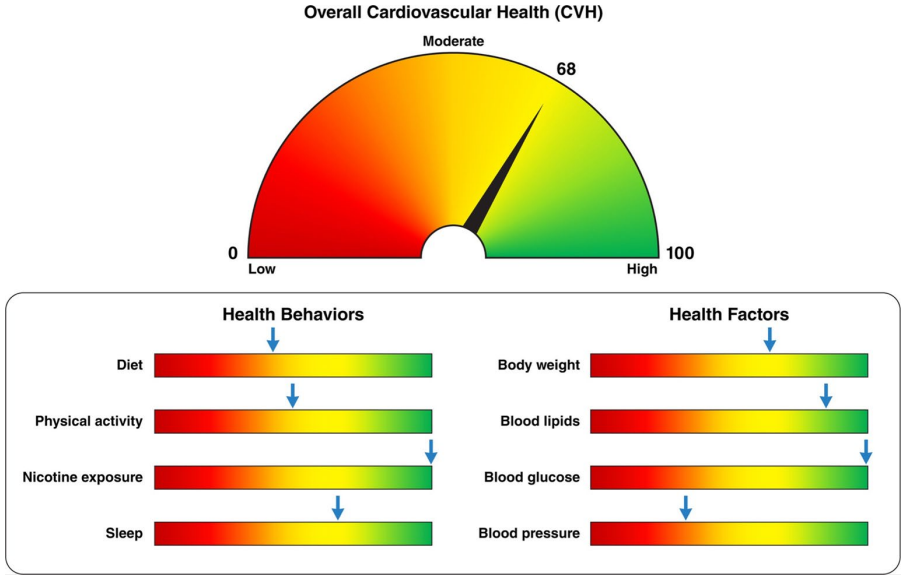
Cholesterol Assay, Hemoglobin A1c Assay, Neurofilament Light Chain Assay, and CVH score

In the Loyd-Jones et. al study of AHA's "Life's Essential 8", the authors state that a difference of 7% in the cardiovascular health score (CVH) produces a significant difference in cardiovascular disease outcomes.[5] With this in mind, we then can calculate the needed sample size to be 18. However, we used the data from the parent study which was conducted already in rural Appalachia to further assess a more realistic sample size for the target population. Using the data from participants indicating a preference for DfPD® classes over other activities and therefore a higher likelihood to continue, we can use a confidence interval of 90% and effect size of 10% to calculate a needed sample size of 24.

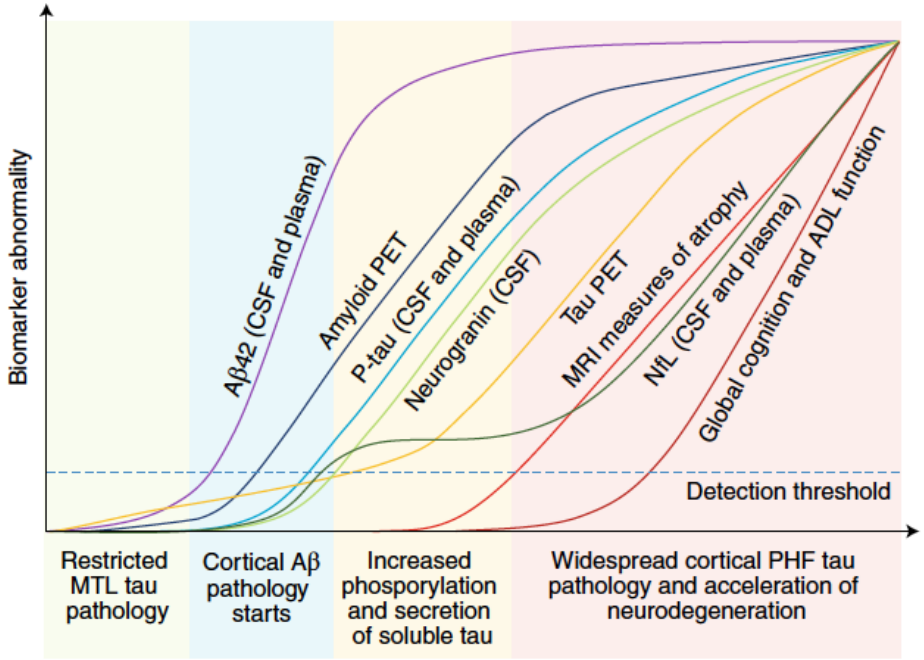
Measurable Outcomes

Table 1. New and Updated Metrics for Measurement and Quantitative Assessment of CVH (see Notes for implementation of each metric; See Supplemental Material for additional information on scoring of the Diet Metric, scoring in children at different ages, and examples of overall CVH scores in diverse scenarios)

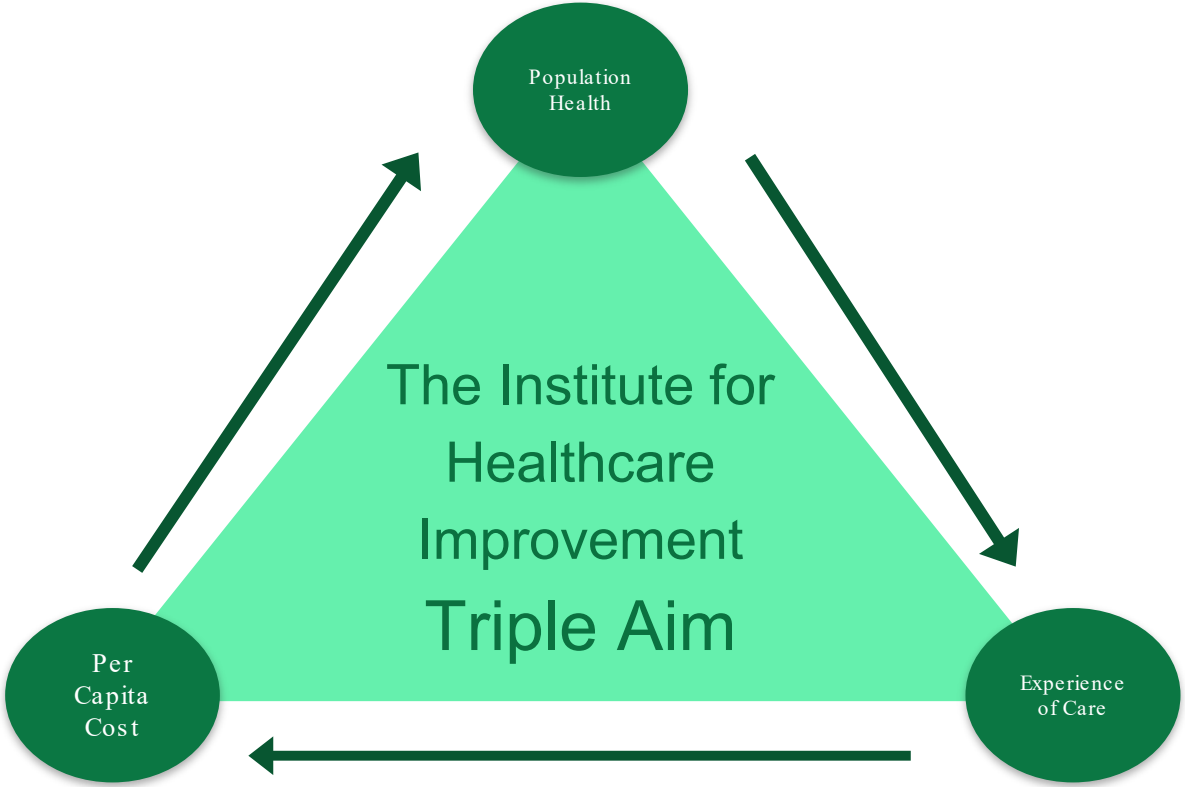
Domain	CVH metric	Method of measurement	Quantification of CVH metric: adults (≥20 y of age)	Quantification of CVH metric: children (up to 19 y of age)
Health behaviors	Diet	Measurement: Self-reported daily intake of a DASH-style eating pattern Example tools for measurement: DASH diet score[130,131] (populations); MEPA[132] (individuals)	Quantiles of DASH-style diet adherence or HEI-2015 (population) Scoring (population): Points Quantile 100 ≥95th percentile (top/ideal diet) 80 75th–94th percentile 50 50th–74th percentile 25 25th–49th percentile 0 1st–24th percentile (bottom/ least ideal quartile) Scoring (individual): Points MEPA score (points) 100 15–16 80 12–14 50 8–11 25 4–7 0 0–3	Quantiles of DASH-style diet adherence or HEI-2015 (population) or MEPA (individuals)*; ages 2–19 y (see Supplemental Material for younger ages) Scoring (population): Points Quantile 100 ≥95th percentile (top/ideal diet) 80 75th–94th percentile 50 50th–74th percentile 25 25th–49th percentile 0 1st–24th percentile (bottom/least ideal quartile) Scoring (individual): Points MEPA score (points) 100 9–10 80 7–8 50 5–6 25 3–4 0 0–2
	PA	Measurement: Self-reported minutes of moderate or vigorous PA per week Example tools for measurement: NHANES PAQ-K questionnaire[133]	Metric: Minutes of moderate- (or greater) intensity activity per week Scoring: Points Minutes 100 ≥150 90 120–149 80 90–119 60 60–89 40 30–59 20 1–29 0 0	Metric: Minutes of moderate- (or greater) intensity activity per week; ages 6–19 y (see notes and Supplemental Material for younger ages) Scoring: Points Minutes 100 ≥420 90 360–419 80 300–359 60 240–299 40 120–239 20 1–119 0 0
	Nicotine exposure	Measurement: Self-reported use of cigarettes or inhaled NDS Example tools for measurement: NHANES SMQ[134]	Metric: Combustible tobacco use or inhaled NDS use; or secondhand smoke exposure Scoring: Points Status 100 Never smoker 75 Former smoker, quit ≥5 y 50 Former smoker, quit 1–<5 y 25 Former smoker, quit <1 y, or currently using inhaled NDS 0 Current smoker Subtract 20 points (unless score is 0) for living with active indoor smoker in home	Metric: Combustible tobacco use or inhaled NDS use at any age (per clinician discretion); or secondhand smoke exposure Scoring: Points Status 100 Never tried 50 Tried any nicotine product, but >30 d ago 25 Currently using inhaled NDS 0 Current combustible use (any within 30 d) Subtract 20 points (unless score is 0) for living with active indoor smoker in home



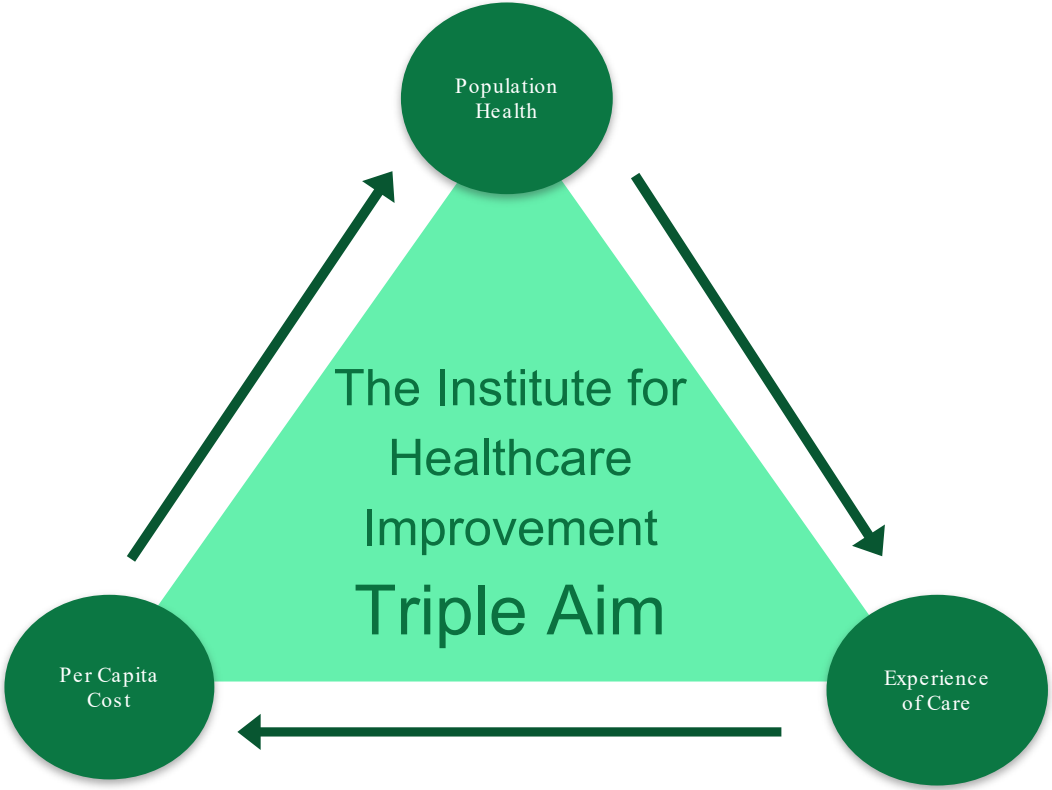
Data will be assessed for relationship between CVH scores, pre/post Neurofilament Light Chain Assay, and cognitive assessments results



Neurofilament Light Chain as a Biomarker for Neurodegenerative Changes.[10-11]


Population Health
The Institute for Healthcare Improvement
Triple Aim
Per Capita Cost
Experience of Care

Summary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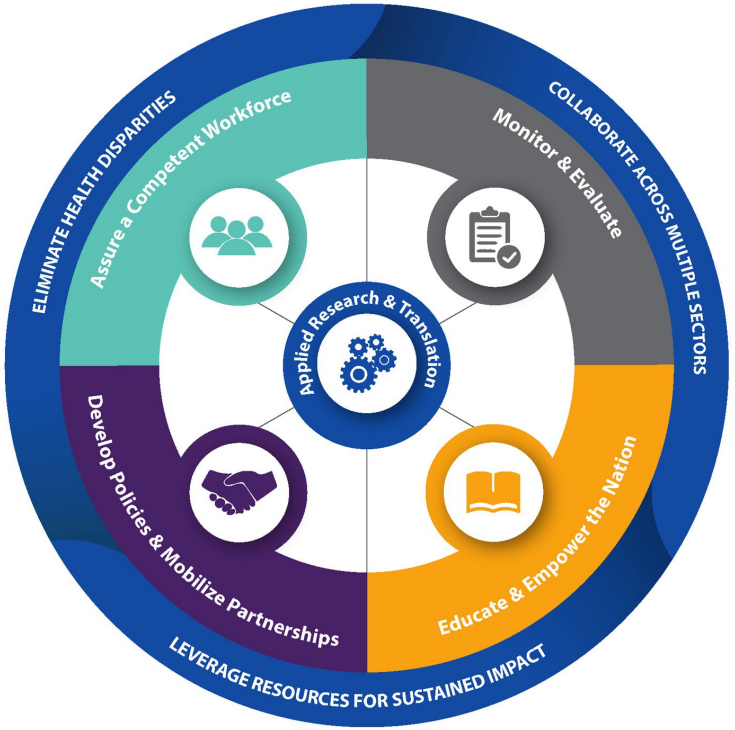
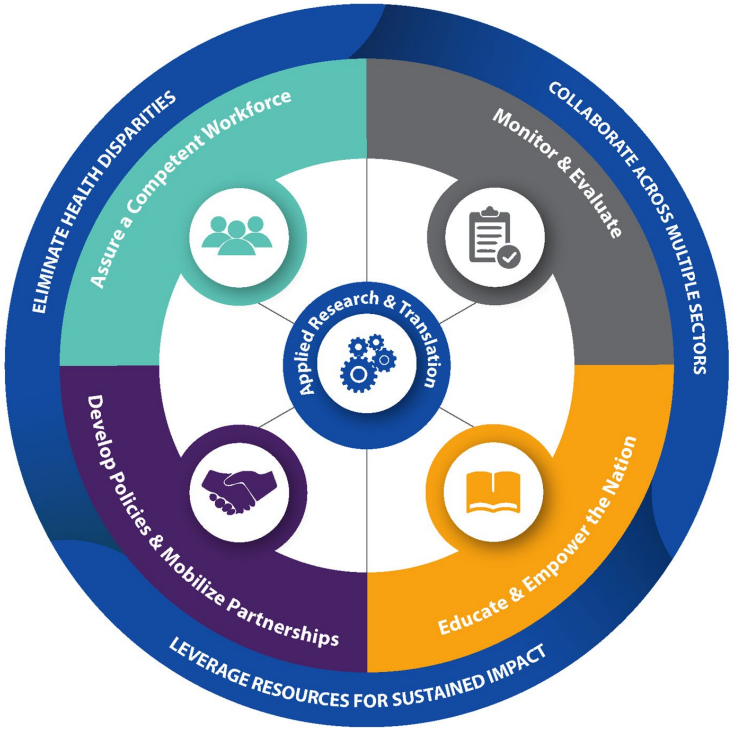

ELIMINATE HEALTH DISPARITIES
COLLABORATE ACROSS MULTIPLE SECTORS
LEVERAGE RESOURCES FOR SUSTAINED IMPACT
Assure a Competent Workforce
Monitor & Evaluate
Applied Research & Translation
Develop Policies & Mobilize Partnerships
Educate & Empower the Nation

BRAINS and The Healthy Brain Initiative

- BRAINS project seeks to educate and empower historically disadvantaged communities within rural appalachia
- Facilitate the collaboration between medical students, local senior centers/extension offices, and elderly community
- Evaluate the efficacy of the program, ability to use quantifiable data to make needed adjustments to better serve the community
- Cost effective, yet, patient-centered approach to the brain health crisis



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