2023-2024 Blueprint for Health Improvement and Health-Enabled Prosperity

HEALTHY APPALACHIA INSTITUTE
The University of Virginia's College at Wise

29 December 2023

Dear Reader,

The 2023-2024 iteration of the *Blueprint for Health Improvement and Health-Enabled Prosperity* represents a timely update to the first *Blueprint* drafted in 2009. It is the latest strategic plan for improving the health of our region. This document combines the thoughts and recommendations of many people who worked for over a year on its creation. Crucial input was gathered from key leaders and citizens of the LENOWISCO, Cumberland Plateau, and Mount Rogers Health Districts.

In this *Blueprint,* you will find a summary of the demographic and health challenges facing residents of southwest Virginia and a detailed assessment of the underlying contextual drivers that influence our regional population's health. More importantly, you will see a comprehensive list of priorities developed by and for the residents of our region to modify these drivers and improve our health and the quality of our lives. Because the factors are complex, the strategic plan delineates evidence-based programs and actions for implementation in key contextual drivers of health prioritized by our contributors.

We offer these recommendations in the hope that they can help align the health and social service resources in our region and promote innovative solutions to the challenges identified by the residents who speak through these pages. We recognize and applaud the work already ongoing in these areas and welcome additional stakeholders interested in supporting a strategic plan integrating these regional efforts.

Sincerely,

David L. Driscoll, PhD, MPH
Director, Healthy Appalachia Institute
University of Virginia, College at Wise

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THE HEALTHY APPALACHIA INSTITUTE

Mission

The Healthy Appalachia Institute provides policymakers, health care systems, educators, the business community, and the region's citizens with resources, ideas, and strategies to foster a healthier citizenry in Central Appalachia.

Vision

The vision of the Healthy Appalachia Institute is to transform the Central Appalachia region into a leading model of rural community health throughout the world.

Regional Health Blueprint

In 2006, the region's political, educational, and health care leaders began meeting to explore ways to improve population health in far Southwest Virginia. These meetings resulted in the creation of the Southwest Virginia Health Facilities Authority by the Virginia General Assembly, renamed the Southwest Virginia Health Authority (SVHA) in February 2009, and the Wise County dental clinic project with Virginia Commonwealth University. In addition, the University of Virginia's College at Wise received funds from the Appalachian Regional Commission to initiate a project entitled Healthy Appalachia. In October 2008 the University of Virginia's College at Wise Board approved creation of the Healthy Appalachia Institute (HAI).

The HAI leadership worked closely with health leaders and stakeholders throughout the region in 2008 to conduct a SWOT analysis (strengths, weaknesses, opportunities, and threats), goal development, and strategic planning for the first regional strategic Health Blueprint. The results of the process were supported by the SVHA, and published as the *Blueprint for Health Improvement and Health-Enabled Prosperity* (*Blueprint*), which was adopted as a strategic plan for future programs and projects by the SVHA and HAI on May 13, 2009.

2023-2024 BLUEPRINT PLANNING PROCESS

As part of the Emergency Rural Health Care (EHRC) initiative, a nationwide program to expand critical health services in rural communities across the nation, the U.S. Department of Agriculture provided the University of Virginia (UVA) with a grant to support the long-term sustainability of rural health care through the Virginia Consortium to Advance Health Care in Appalachia (Consortium). The Consortium consisted of the UVA Center for Telehealth, the HAI, the SVHA, the Health Wagon, Tri-Area Community Health, and Ballad Health. The Consortium proposed to expand access to health care and telemedicine, and to grow regional networks for resource sharing, training, education, and communications in rural southwest Virginia.

As a first step in this process, the HAI was charged with developing an updated version of the initial *Blueprint* to identify priority health issues and develop strategic planning to enhance the long-term sustainability of rural health care in Virginia's three westernmost regional health districts: Lenowisco, Cumberland Plateau, and Mount Rogers.

This latest *Blueprint* planning process was conducted in three phases:

1. An assessment of the leading demographic and health issues among residents of the three regional health districts (January - February 2023);
2. A scoping review of the health literature to understand the context and evidence-based programs mitigating these issues and determinants of Appalachian population health (February – June 2023); and,
3. Community outreach to assess local perceptions of community strengths and priority health problems, contextual areas for improvement, and strategic plans (June – December 2023).

The results of this process were discussed with the Consortium members and other health leaders and stakeholders throughout the region to develop a prioritized list of health programs for implementation and evaluation. They were approved by the SVHA on April 3, 2024, almost exactly fifteen years after the adoption of the first *Blueprint* as a strategic plan for future programs and projects by the SVHA and HAI in 2009.

RESULTS

PHASE 1: ASSESSING THE STATUS OF THE STUDY REGION

A summary of the demographics and health status of the study region is presented below. Regional data are compared to the statewide average unless specified.

Demographics

Approximately five (5) percent of Virginia's population of 8.6 million or 400,777 individuals reside in the three westernmost health districts (HDs): Lenowisco, Cumberland Plateau, and Mount Rogers (Figure 1).[1]

Figure 1. Map of Virginia Health districts.[2]

Between the 2010 and 2020 censuses, there was a decrease of 7.5% in the total population in this region. This compared to an increase of 7.9% statewide for the same period. The rate of population loss was most acute for ages under five and 35-44. The population is less densely distributed, with 62 residents per square mile compared to the state average of 218.6.[3]

Race and Place of Birth

In this region, 93.1% of the population is White or Caucasian; the rate for the whole of the Commonwealth is 68.5%. Only 1.4% of residents of the region were born outside of the United States.[1]

Education, Poverty, and Income

From 2018 to 2022, 84.3% of the region's population completed high school and 16.4% college, compared to 91.1% and 41% for Virginia. Roughly 19% of the residents of the three districts live below the poverty level compared to 10.6% for Virginia. Per-capita income levels in the region are a little more than half of the levels of the state. From 2018 to 2022, the average median household income for the region was $46,258 (2022 dollars) versus the state median of $87,249.[1]

Employment

For 2018 to 2022, the average percentage of civilians in the labor force (age 16+) across HDs I, II, and III was 47.9% versus an overall percentage of 63.1% for the state.[1] Unemployment averages 4.4% in the region compared to 3.9% for the state.[4] The region's labor force participation rate (LFPR) was 51.7% compared to the state average of 61% in 2020. The LFPR includes both employed and unemployed but actively seeking work individuals.[5]

Households with Computers and Broadband

From 2018 to 2022, the average percentage of households in the region with a computer was 84.9% compared to the state average of 94%. The average percentage of households in the region with broadband internet subscriptions was 74.5% versus the state average of 88.7 %.[1]

Food Insecurity

The USDA describes food insecurity as "a household-level economic and social condition of limited or uncertain access to adequate food".[6] In 2021, the average food insecurity rate for the region was 14% compared to the state rate of 8.1%.[7]

Health Issues

Health Insurance

According to the 2020 Census, 10% of the region's residents, under 65, did not have health insurance.[1] In 2018, Virginia expanded Medicaid coverage to include low-income adults without children. Enrollment for these individuals began on January 1, 2019, and by December 2022, 52,062 residents of the region had joined the Medicaid expansion, or a 276% increase.[8,9]

Health Risk Factors

Residents of the region have higher rates of health risks, which include high cholesterol and blood pressure, smoking, obesity, and diabetes. In 2019, 38% of adults screened in the region had high cholesterol in the past five years compared to the state average of 34.7%. 41.5% of adults screened in the region had high blood pressure compared to 36.7% of the state in 2019.[10] In 2020, 22.1% of the region identified as current smokers compared to 13.6% of the state.[11] In 2021, 77.1% of the population in HDs I, II, and III were either overweight or obese in comparison to the state percentage of 68.1. Roughly 18% of the population in the region had diabetes versus 11.5% of the state population.[12]

Adverse Childhood Experiences (ACEs)

Residents of the region report higher rates of ACEs than the statewide average. In 2022, Virginia's Office of Child Protective Services reported 534 founded cases of child abuse and neglect in the region. "Founded" means that a review of the facts gathered during an investigation met the preponderance of the evidence standard. This represents nearly 17% of the 3,161 founded cases of child abuse and neglect statewide in a region with 5% of the state population.[13]

Mental Health

In 2021, 42.2% of the residents of the Mount Rogers and Cumberland Plateau health districts reported having one or more days of poor mental health within the past 30 days. In 2020, it was estimated that 42.5% of the residents of the Lenowisco health district likewise experienced poor mental health. In 2021, the state average was 41.8% for poor mental health. The rate of

depressive disorders, which include depression, major depression, dysthymia, and minor depression, are higher in the region. Roughly 30% of the Mount Rogers and Cumberland Plateau populations reported a depressive disorder in 2021. In 2020, 20.5% of the Lenowisco population was estimated to have a depressive disorder. In 2021, the state average was 19.6% for depressive disorders.[14]

Depression and other psychiatric illnesses are major risk factors for suicidal behaviors (self-inflicted harm with or without concurrent suicidal ideation) and suicide. The average rate for intentional self-harm injury hospitalizations is 20.3 per 100,000 in the region, compared to 29.1 per 100,000 for the state.[15] However, the adjusted suicide rate for the region is over 23.6 per 100,000,[16] compared to 13.2 per 100,000 in the state.[17] Mental health is associated with substance use. In 2022, the average death rate per 100,000 residents was 37.8 for all-drug related drug overdose deaths in the region compared to the state average of 29.[18]

Leading Causes of Death

The leading causes of death in the region are:[19]

1. Heart disease
2. Malignant neoplasms
3. COVID-19
4. Chronic respiratory disease (including black lung and silicosis)
5. Unintentional injuries
6. Diabetes mellitus
7. Cerebrovascular diseases
8. Alzheimer's disease
9. Influenza and pneumonia
10. Diseases of Despair:

- Chronic liver disease and cirrhosis
- Intentional self-harm (suicide)
- Poisoning/drug overdose

The mortality rate for all causes in Virginia's three westernmost health districts, or the study region, was 1859.7 per 100,000 in 2021. This is 94.5 percent higher than the mortality rate elsewhere in the Commonwealth.[19]

Details on five leading causes of death

- Heart disease remains the number one cause of death in the region and the state. In 2021, there were 16,654 deaths in Virginia, representing 192.7 deaths per 100,000. Residents of the region account for 8.2% of these cases, with a combined death rate of 373.7 deaths per 100,000.[19]

- The statewide death rate for malignant neoplasm is 181.9 deaths per 100,000. In the region, the death rate was 315.5 per 100,000 in 2021, or approximately 7.4% of the total deaths in the state from cancer.[19]

- The statewide death rate for Covid-19 was 104 per 100,000 while the death rate for the region was 241.4 per 100,000 in 2021. This is approximately 10% of the total deaths in the state from COVID-19.[19]

- Residents of this area are nearly three times as likely to die of Chronic Lower Respiratory Disease (CLRD) compared to the statewide average. In 2021, there were 374 deaths in the region, or 101.8 per 100,000 residents compared to the statewide death rate of 37 per 100,000.[19]

- In 2021, the total number of deaths from unintentional injury was 358 cases, which corresponds to 6.7% of the state total. The region's death rate is 97.4 per 100,000 versus the state's death rate of 62 per 100,000. [19]

YPPL describes regional mortality by assessing how many deaths occur in younger people. According to this measure, residents of the three westernmost health districts die at a much younger age than elsewhere in Virginia.[20]

Years of Potential Life Lost per 100,000
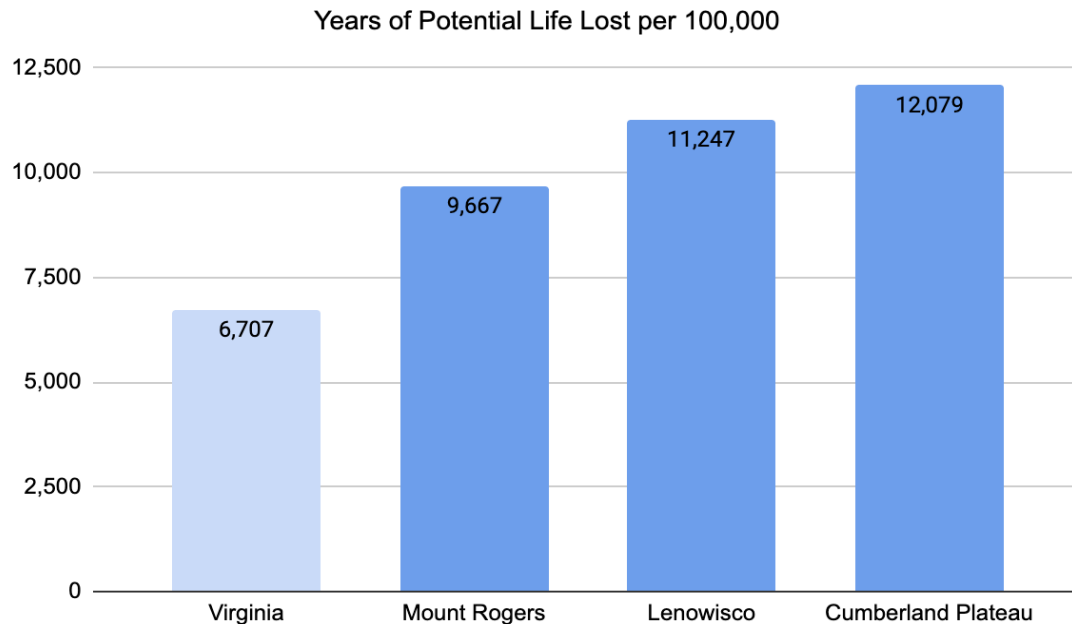
Virginia's three westernmost health districts have a declining population with lower education and income levels than the state. Residents of the region experience significant health disparities, with higher rates of heart disease, cancer, respiratory disease, injuries, adverse childhood experiences, mental health problems, and substance use compared to the state average. This has led to a higher mortality rate and a younger average age of death, highlighting the need for comprehensive health interventions and policy efforts to address these disparities and improve the overall health and well-being of the region's residents.

PHASE 2: SCOPING REVIEW OF THE HEALTH LITERATURE

Our assessment of the leading demographic and health issues in the study region raised questions about the factors creating these disparities. Understanding these factors is crucial for developing programs to reduce health disparities[21], and so we conducted a scoping review of the scientific literature focused on studies linking health determinants in Appalachia to the region's main causes of death and illness, and inventoried recent evidence-based interventions addressing these challenges. Additional information on the methods and results of this review can be found in an article published in the *Journal of Appalachian Health*: https://uknowledge.uky.edu/jah/vol5/iss3/6/.

Review Methods

We used the Web of Science database, incorporating Appalachian geographical terms and primary health issues. Studies selected were from the past five years, involved Appalachian populations, and detailed the link between health determinants and regional health issues.

We selected the initial list of health determinants from the University of Wisconsin's County Health Rankings[22], the 2008 ARC Report[23], and data from previous *Blueprints* [24], and input from local leaders and stakeholders. We refined and augmented this list during the review.

Review Results

We identified 221 research articles, including 30 interventional studies. We did not identify any studies related to influenza and pneumonia during our scoping review, so we removed them from the list for the infographic. Oral Health was added to the list of leading causes of illness given its importance as a health risk in the region as evidenced through articles in our scoping review. We summarized recent assessments of factors affecting population health in the Appalachian region. The key determinants and their definitions are listed below by frequency of citations:

- *Access to care* (27%): Adequate and timely access to comprehensive personal health services, including preventive; dental; and primary, secondary, and tertiary health care, necessary to achieve the best possible health outcomes. This includes adequate health insurance coverage.

- *Rurality* (19%): Geographic distance; topographical barriers; and social, economic, and political factors that result in persistent isolation and disenfranchisement from social support services and programs for rural residents.

- *Education* (15%): Any form of instruction and training. These included educational programs necessary to achieve safe, high-paying jobs as well as programs to promote informed health decision-making.

- *Employment/Income* (12.7%): Access to employment opportunities that provide financial resources sufficient to meet basic needs, a sense of purpose, and hope for advancement. This included studies on the lack of such resources and attendant levels of poverty.

- *Substance use disorder* (12.1%): A problematic pattern of use of substances, including alcohol, tobacco products, drugs, inhalants, and other substances which lead to impairments in health, social function, and control over the substance or substances used.

- *Diet, exercise, and nutrition* (8%): Consumption of a nutritious diet and participation in physical activities sufficient to prevent obesity, maintain a healthy body mass index, and achieve physical fitness.

- *Occupational conditions* (2.7%): Any aspect of the occupational environment, which included negative aspects such as hazards, demands, or risks, as well as positive aspects such as prestige, social networks, and other training.

- *Environmental conditions* (2.5%): Effects of the environment on health (including inhalations, and toxic exposures).

- *Traumatic stress* (1.1%): Effects of exposure to traumatic experiences such as violence or neglect both in childhood and later in life.

The interventional studies were categorized by program types: education, technology, partnerships, and multi-level interventions. We used the following definitions for the program types:

- *Educational programs* demonstrated successful techniques for promoting informed health decision-making among Appalachian residents.
- *Technological applications* showed the effectiveness of a variety of telehealth programs, machine learning solutions, and innovative screening or testing methods.
- *Collaborative partnerships* described successful combinations of investigators, health service providers, and community residents and stakeholders.
- *Multi-level programs* included some combination of all three categories of programs, such as educational programs using technological applications.

Educational programs

Educational programs promoted access to health-focused instruction and training.[25-35] One program emphasized promoting human papillomavirus vaccinations and cancer screenings to reduce cervical cancer disparities.[27] In rural West Virginia, a pharmacy-based communication model was shown to increase skin cancer screenings.[33] Other educational programs focused on healthy eating and reducing substance use. One program engaged youth advocates in Appalachian Kentucky working on tobacco control to lower tobacco usage.[34] Additionally, the Kids SIPsmartER initiative in Virginia's Appalachian area effectively reduced sugary drink consumption among children and their caregivers.[35]

Technology Programs

Programs used technological applications in population health challenges to improve access to healthcare in rural communities.[36–45]

- **Telehealth Services:** Studies used video visits to improve access to Appalachian communities' healthcare. For example, video visits for psychiatry services in emergency

departments improved access to care and reduced hospitalizations for substance use disorder patients.[36]

- **Machine Learning:** Machine learning was used to expedite processes like coding overdose death certificates in Kentucky, which improved public health response rates.[37]

- **Telemedicine During COVID-19:** There was a substantial increase in video visit usage during the COVID-19 pandemic. Video visits were a useful tool to increase access to primary care for patients in rural areas.[38] The quick implementation of an outpatient teleneurology program during the pandemic,[39] and the use of an online COVID-19 symptom checker in North Carolina,[40] were critical in expanding patient access to care and providing essential local COVID-19 surveillance data.

- **Leveraging Technology:** The use of automated reminders through a health system EMR is a valuable tool for facilities with limited resources and can be used for reminders, such as for cancer screening.[41]

Technology significantly improves access to health care in rural areas and increases efficiency in under-resourced areas.

Collaborative Partnerships

Community partnerships help promote access to health care in Appalachian communities by leveraging individuals and programs who are trusted community members.[46-49]

- **Community Engagement in Health Education and Screening**

  The use of lay navigators (LNs), who were residents of the community, helped educate women about cervical cancer screenings. They were like friendly neighbors who helped spread awareness and provided at-home screening kits.[46] In a similar program, community health workers (CHWs) were employed to visit people with chronic health issues at their homes. They helped educate them about their health conditions and improve their disease management.[47]

- **Enhancing Access to Medication for Substance Use Disorders**

  Local health departments in western North Carolina collaborated with community pharmacies to ensure a steady supply of buprenorphine in a local, comfortable, and stigma-free environment.[48] In West Virginia, the adoption of a hub-and-spoke model increased the use of buprenorphine to treat opioid use disorder (OUD). This model enabled more health professionals to be trained in medication-assisted treatment, thus increasing access to treatment for more patients.[49]

Innovative, community-centered programs help improve access to healthcare and health education in rural Appalachian regions.

Multi-level Programs

Programs that mix education, technology, and community partnerships work well for long-term health improvements in communities.[50-54] A Facebook-based education program focused on healthy nutrition, exercise, and overcoming financial barriers to health screening to help reduce colorectal cancer risk factors.[50] By using iPads and an online curriculum, pastors in Tennessee learned about cancer care and management to help their congregations.[51]

PHASE 3: COMMUNITY OUTREACH

We recognized that reviews of the literature may reveal more about the interests of investigators and funders than residents. Thus, the third and last phase of the study was to discuss the results of the scoping review with residents, and collect their perspectives on local health problems, the determinants of these health problems, and their recommendations as to possible responses.

The process began with a meeting of Consortium members and local community stakeholders, including public health, clinical, and social service providers, to discuss the scoping review findings and develop next steps for the outreach process. These discussions resulted in two methodological recommendations; first that a snowball sampling methodology be used to

identify and engage a broad variety of community residents, and second that outreach events take place at local events and venues rather than in clinical or academic settings.

A study protocol and associated structured survey were developed in July 2023 (Appendix A). The protocol consisted of community listening sessions involving discussion of the SWVA Health *Blueprint*-planning process and the scoping review findings using a graphic entitled *Seeing the Forest: Appalachian Health (Figure 2)*, followed by completion of a structured survey.
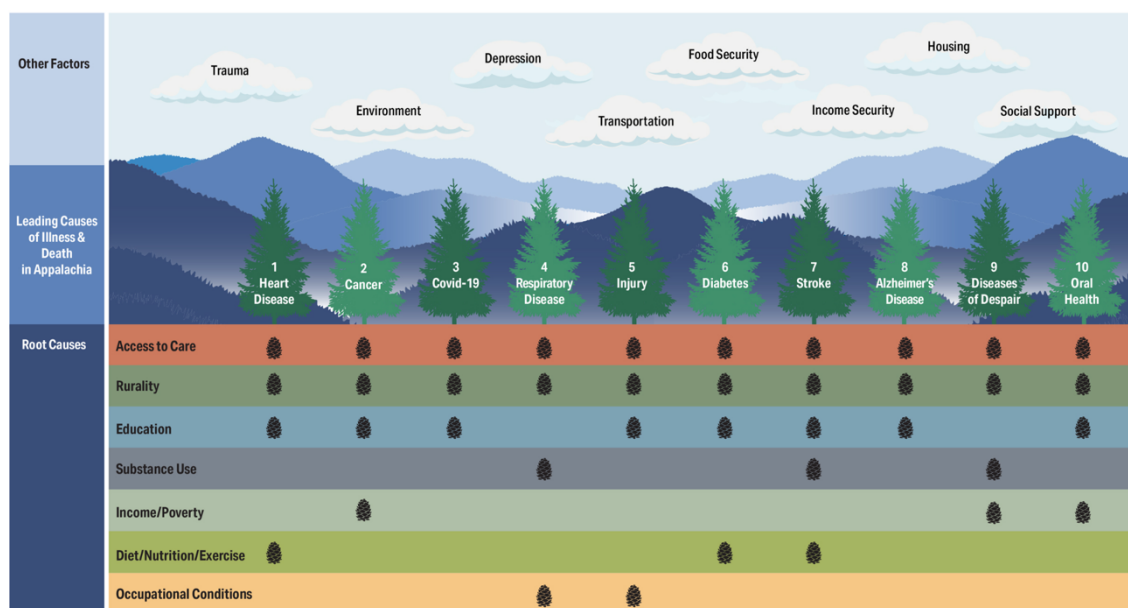

Figure 2. Seeing the Forest: Appalachian Health.

The leading causes of illness and death in Appalachia are represented by the pine trees (CDC Wonder Database). The root causes are listed in order of frequency of appearance in the literature. The pinecones represent an association between a leading illness/death and a root cause. The number of pinecones per illness/death was determined by the number of citations associated with the corresponding root cause. The clouds represent additional drivers of Appalachian population health identified by residents. These drivers were added to the graphic throughout the community outreach process to promote informed discussions.

The survey was derived from the instrument employed in the initial *Blueprint*, which collected information on community strengths and resources to be leveraged, health status and concerns, strategic areas for improvement, and ideas for goals and a strategic health improvement plan. The instrument was updated to reflect the current morbidity and mortality rates, drivers of Appalachian population health from the literature, and a list of evidence-based exemplar programs from the scoping review. The study protocol and survey were approved for implementation by the UVA Social and Behavioral Science Institutional Review Board in August 2023.

Community Participants

We convened community-based listening sessions, and collected survey data, with 272 residents of, and/or health care providers at organizations serving, all 13 counties in Lenowisco, Cumberland Plateau, and Mount Rogers Health districts between August and December 2023.

Most of the self-selected sample identified as female (80%), married or with a domestic partner (71%), and White or Caucasian (95%). Most had lived in their community for more than ten years (77%), received health care in a medical provider's office (85%), and were employed (84%). Of those employed participants, 37% worked in a health-related field, which suggests that the study was of more-than-average interest to these residents.

The participants represented a variety of age categories (25% were under 34, 41% between 35 and 54, and 34% over 54 years of age). They also had a variety of educational backgrounds (4% had no high school diploma or GED, 15% had graduated high school and/or vocational school, 20% had some college with no degree, 37% had either an associate or bachelor's degree, and 24% had a graduate or professional degree). Not surprising, they had a wide range of annual incomes. Nearly 6% of participants had an annual income of less than $10,000 annually, 28% earned between $10,000 and $49,999, 38% earned between $50,000 and $99,999, and 27% earned more than $100,000.

Unstructured Discussion Results

One of the first findings from our community discussions was a widespread preference for the terms "root causes" or "drivers" of regional population health problems rather than "determinants." Some study participants described this as recognizing that residents have some degree of control over these factors, and thus that their health was not predetermined by them.

Rurality and Access to Quality Health Care

In the community listening sessions, local residents perceived these root causes of Appalachian population health as so intertwined as to be indivisible. The literature described "Rurality" as the variety of geographic, transportation, topographic, economic, and cultural factors that result in isolation and disenfranchisement from social and health care services and programs for rural residents. "Access to Health Care" is a commonly studied subcategory of such services and is often focused on components of the clinical infrastructure allowing adequate and timely access to specific categories of care, including preventive, dental, primary, secondary, and tertiary care.

One possible reason that access to health care services receive so much attention in the literature as a subcategory of rurality may be the relatively elegant nature of the research designs differentiating the role of such services in reducing the relative rates of certain adverse health outcomes between patients. Such designs compare adverse health outcomes among those who either do or do not receive certain types of screening or treatment. Similar study designs differentiating relative rates of adverse health outcomes for residents of rural, remote, or disenfranchised communities are rarely as straightforward or elegant, and are therefore not conducted as frequently. In our discussions, community members see no difference between these factors, and thus any programs intended to promote access to health care services should seek to recognize and respond to the full array of barriers to care beyond the fundamental presence or absence of clinical infrastructure.

Traumatic Stress, Employment/Income, and Substance Use

Study participants consistently described a causal association between the high prevalence of regional mental health challenges, including widespread childhood trauma, poverty, and stress from these factors, as drivers of the high prevalence of substance use disorder (SUD) in Central Appalachia. This perspective is supported by the scientific literature, including a report from the National Academy of Medicine recommending a more inclusive socioecological framework for substance use treatment recognizing that SUD is the result of complex interactions between people and their social environment.[55] Community residents were also likely to list SUD as a primary health concern because it was seen as a root cause of many other adverse health outcomes in Appalachia. This association is also reinforced by the scientific literature, which describes patterns of substance use as both a common health problem and a contextual driver of many other common health problems in Appalachia. Thus, residents often suggested that effective prevention, early intervention, and treatment of SUD should integrate a trauma-informed approach to mental health and resiliency, stigma reduction, social welfare (e.g., housing, food security, transportation), and employment support services.

Education and Family Health, particularly Diet/Nutrition/Exercise

Community residents described a direct association between education and many of the other drivers of population health influencing families, particularly related to a healthy diet and exercise. Many residents described a historical lack of interventions to promote informed health decision-making for families with children as a key driver of behavioral health choices with inter-generational consequences. Some of the educational programs described were intended to break this cycle, and included increased access to prenatal and postnatal education for mothers, improved educational and social services for young families to promote a nutritious diet and exercise. Other educational programs described our local community residents were intended to promote successful transitions into and out of the public school system.

Survey Results

Participants were asked to describe the top three good things about their community. The most-commonly selected response options were "friendly community" (26%), "safe neighborhoods" (14%), and either "good access to parks and recreation" or "a clean and healthy environment" (10%). Many of these positive attributes appear to lend themselves to the implementation of interventions promoting outdoor physical activities.

What are the top THREE good things about your community?
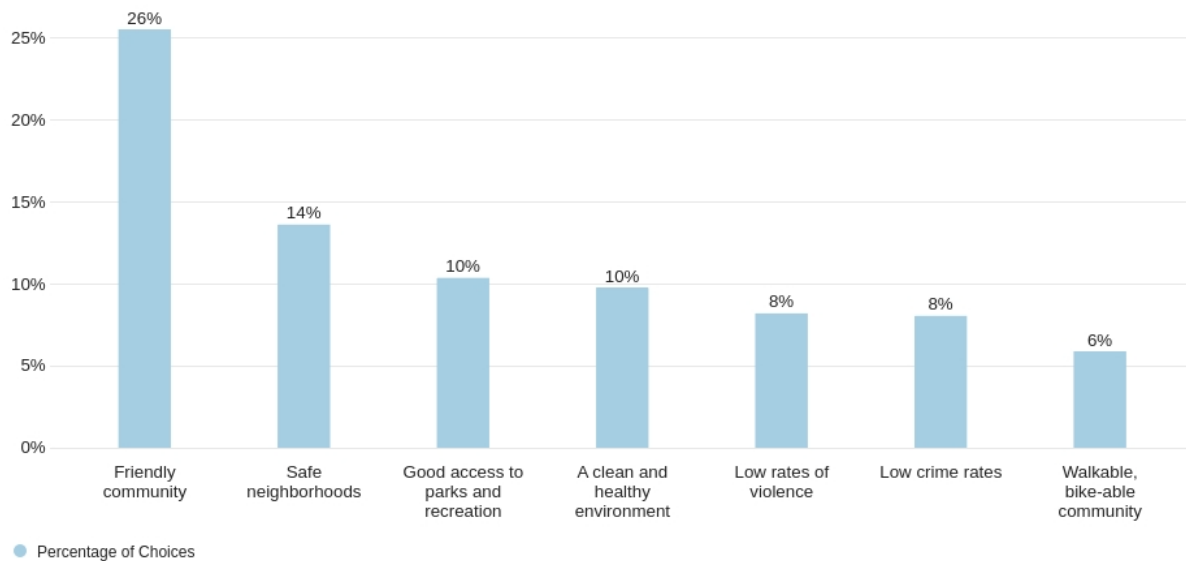
Participants were asked to describe the top three health problems in their community. The most common response options were "diabetes" (20%), "cancer" (18%), and either "heart disease" or "substance overdose" (17%). Participants selected these priority problems after having reviewed the leading causes of mortality in the region, which ranks diabetes sixth, indicating that the epidemiological data underestimates the importance of this chronic disease in the lived experiences of residents.

What are the top THREE health problems in your community?
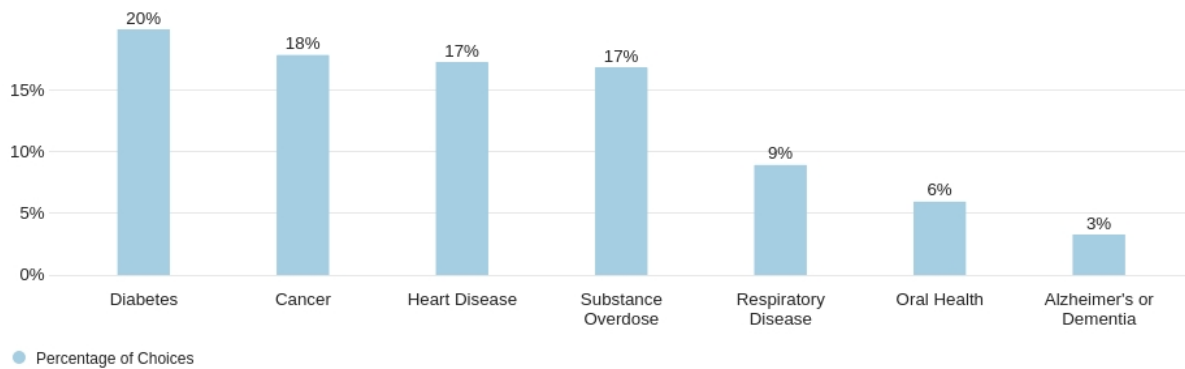
Participants were then asked to describe the top three health-related concerns in their community and provided with the list of drivers identified in the scoping review and listed in the graphic. For this analysis, we combined those determinant categories described as interconnected by community residents in unstructured discussions. The most commonly-selected response options were the combination of "Income/Poverty", "Substance use", and "Traumatic Stress (44%), followed by "Access to quality health care and other services" and "Geographic distance and other barriers to services" (37%), and finally "Diet/Nutrition/Exercise" and "Education" (15%). Other, participant-provided responses included four entries related to mental or behavioral health; and two entries related to a lack of affordable, healthy housing; and one related to a lack of community connectedness.

Top Health-Related Concerns in the Community

Occupational Conditions 2%

Environmental Conditions 2%

Diet/Nutrition/Exercise and Education 15%

Income/Poverty, Substance Use, and Traumatic Stress 44%

Access to Health Care and Geographic Distance 37%
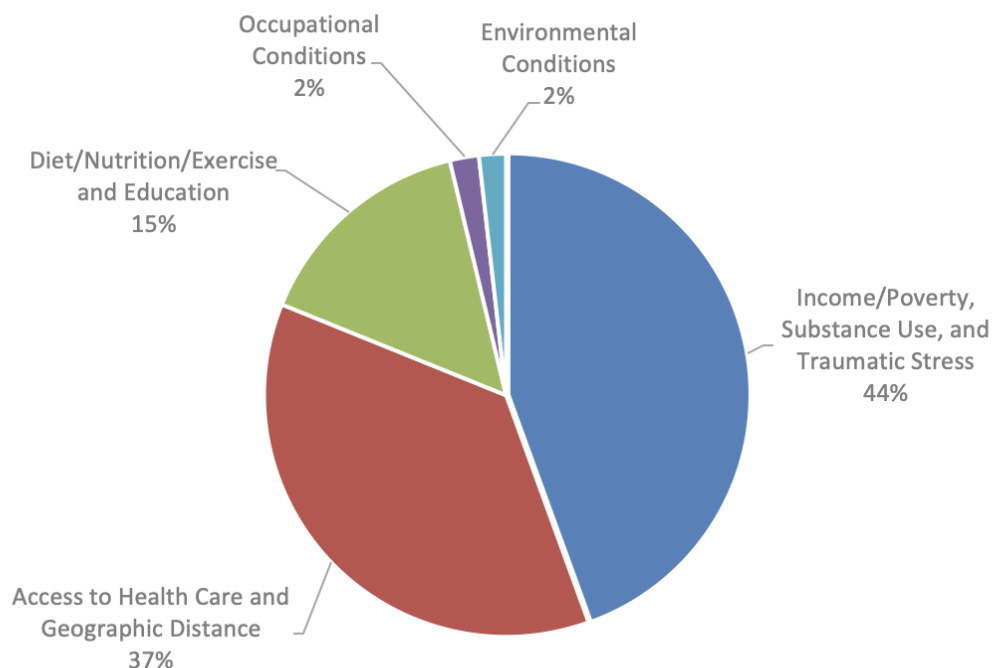
Participants were next asked to select three programs that are, or could, improve the health of their community the most. The response options included categories of evidence-based programs identified in the scoping review as well as an "Other" category in which participants could enter their recommendations. The most frequently selected options included "Community partnerships providing substance use treatment, including opioid use disorder medications and residential care" (15%), "providing mental health treatment using video visits" (13%), "Community partnerships providing health services for children and families" (13%), and "Informing people about how to prevent and manage diabetes" (12%). Other participant-provided responses included six entries related to improving medical services by increasing interdisciplinary and specialty care for low-income patients, women, and seniors, and one for promoting pharmacy acceptance of MAT treatment for OUD.

15%

14%

12%

10%

8%

6%

4%

2%

0%

Community partnerships providing substance use treatment, OUD medications, and residential care	Providing mental health treatment using video visits	Community partnerships providing health services for children and families	Informing people about how to prevent and manage diabetes	Providing substance use treatment using video visits	Community partnerships providing local cancer screening	Informing people about how to prevent and manage heart attacks and stroke
15%	13%	13%	12%	9%	7%	7%

● Percentage of Choices

Finally, participants were asked to describe the first step to improve health in their community, or if they had suggestions for programs to be implemented. This was an open-ended question, and no response options were provided. Most responses called for some variation of transportation assistance, peer outreach, or other services to overcome the barriers to access to health care and other services for rural residents. A substantial portion of those comments related to increasing accessibility of health care services focused on specialty care providers of mental health and substance use treatment. We compared the content of these free response answers between community members who worked in health care and those that did not and consolidated responses into topic areas. Participants across both groups mentioned that a priority for their community was increasing the supply of providers, including specialty providers (n=5), improving mental health treatment (n=2), transportation support (n=4), and improving awareness about available health programs and resources (n=2).

Multiple participants who worked in health care (n = 4) identified improving health education as a first step in improving the health of the community. This included general health education as well as education on chronic disease, nutrition and physical activity, and substance abuse and overdose prevention. One community member not involved in health care mentioned education around sexual assault awareness as a priority for their community.

Some participants who worked outside of health care (n=3) identified housing insecurity issues and the need to address economically disadvantaged individuals as the first steps in improving the health of the community, this was not a topic area identified by health care workers.

The absence of a topic does not mean it is not important to that group. We conducted these comparisons to highlight the importance of broad community engagement in setting goals for health improvement in SWVA. This facilitates prioritization and development of programs that are responsive to needs of all community members in SWVA. Additional actions were community-based meetings to promote health literacy in the region, improving internet access, and promoting access to healthy dietary choices and opportunities for physical activity. The combined responses from this question are presented as a word-cloud below.

DISCUSSION

This iterative, mixed method Blueprint Planning Process was intended to inform the identification and prioritization of health issues and develop strategic planning to address them and enhance the long-term sustainability of rural health care in Virginia's three westernmost regional health districts: Lenowisco, Cumberland Plateau, and Mount Rogers.

The first component, an assessment of the health status in these health districts revealed some of the demographic and health challenges in the region, and perhaps more importantly, that residents of Appalachian Virginia are more likely to die of all these causes, and at younger ages, than residents of other regions of the Commonwealth.

The second component, a scoping review of the literature, identified recent studies of associations between the leading causes of sickness and death among residents of the region and their contextual drivers. These findings also identified interventions that may successfully modify these drivers, and how they can be organized into one or more of three broad programmatic categories; those that provide educational materials to promote informed health decisions on the part of patients and/or their providers, those that employ innovative technological applications, and those that enhance collaborations with strategic community stakeholders and partners.

The third component, community discussions and data collection, informed our understanding of priority health issues in the region, and refined the list of key population health drivers and associated priority strategies to address them. Such efforts will be crucial to the development and evaluation of effective and sustainable interventions in the region.

This report is intended to support the alignment of regional health and social service resources to addressing the drivers of population health in Central Appalachia. We offer the following two tables to inform implementation of such programs. The first table, Alignment of 2009 and 2023 Goals, demonstrates the alignment of the goals from the 2009 blueprint with recommendations for programs and initiatives identified by community members in the 2023 needs assessment.

The table is organized by the overall goals and measures for regional health initiatives that were developed for the 2009 iteration of the *Blueprint,* shown in the first two columns. The third column, "2023 Community Goals," displays the community recommendations that were derived from the content analysis of survey responses and community discussions conducted during the 2023 needs assessment (as described on page 24). The purpose of this table is to provide policy makers, community partners, researchers, and others a comprehensive list of the health priorities of the region to inform future program planning and development.

In the immediate term, we recommend seven programs for priority implementation by the Consortium. These are detailed in the second table, Priority Program Recommendations, which is organized by the regional population health goals prioritized by local community residents, and detail the evidence-based response recommended by Consortium members or investigators in the UVA School of Medicine. These include:

- Increase access to local health care by:
    - Providing screening programs, telehealth, and remote patient monitoring equipment, connectivity, and training for high-risk patients and their providers.
    - Establishing telehealth access points at, and transit support to, libraries, community centers, EMS units, senior centers, pharmacies, and others for all community residents.
    - Increase access to local health care by providing integrated school-based health services, including primary, behavioral, and dental care both in-person and via telehealth for students and staff.
- Reduce substance use, trauma, and poverty by:
    - Providing integrated mental and behavioral health treatment, including trauma-informed therapy and medication management, both in-person in an outpatient capacity and via telehealth.
    - Coordinating peer recovery specialist support with a trauma informed lens to help those in active addiction and long-term recovery achieve personal goals, both in-person and via telehealth.

- - Provide evaluation and management of child abuse and neglect both in-person and via telehealth.
- Promote healthy diet/nutrition and exercise through:
  - Nutrition management and physical activity education and support, including outpatient diabetes management, both in-person in an outpatient capacity and via telehealth.

This table represents the intersection of goals that are of importance to the community with evidence-based programs that have high feasibility for rapid implementation in our region. By focusing on a discrete set of programs with established protocols and metrics, it is our goal to achieve measurable progress in aligning local health and social services to address the priority health needs identified by local community residents. It is our hope that a future Blueprint will assess this progress, and recalibrate regional efforts in response to local needs and priorities. In this way, the Blueprint becomes a living document, building a stronger and healthier future for the people of Central Appalachia.

Table 1: Alignment of 2009 and 2023 Goals

The table below presents two sets of goals: those set in the original 2009 Blueprint, and new goals identified by community members in 2023. The 2023 goals were matched with the 2009 goals wherever feasible. If a 2023 goal did not directly correspond to any of the 2009 goals, that entry in the 2009 column was left empty. Although some 2023 goals aligned with multiple 2009 goals, each was listed only once to avoid repetition. **Bolded goals** are addressed in Table 2: Priority Program Recommendations.

2009 Blueprint Goals	Types N = Near-term I = Intermediate L= Long-term	2023 Community Goals
Improve access to Oral Health Care in the region	Increase the number of children that access dental care annually (N)	
	Increase to 90 percent the percentage of children who have dental sealants applied (I)	
	Enable dental hygienists to provide preventive care independently in the region (N)	
	Increase the permanent dentist workforce in the region [dentist to population ratio to become better than national and state rate] (N, I)	
Improve access to Behavioral and Medical Health Care in the region		• **Increase local access to affordable health care generally.** • **Increase local access to behavioral and mental health care specifically.** • **Expand access points to health care through multiple avenues such as local pharmacies.** • **Integrate health care programs through access points within the community.** • Improve awareness of, and communication with, communities about programs and health care available in our region. • Improve local access to medical care through affordable insurance. • **Develop and/or bolster transportation services to access health care.** • **Build interdisciplinary care partnerships.** • Improve quality metrics of local care. • Foster trust between care providers and the community. • Expand broadband infrastructure. • **Take action to counter substance abuse through prevention and management.** • **Provide local mental and behavioral health treatment services/clinics.**
	Increase the permanent licensed behavioral health workforce in the region to parity with state ratios (N, I)	• Increasing the MD workforce in SWVA.

2009 Blueprint Goals	Types N = Near-term I = Intermediate L= Long-term	2023 Community Goals
Improve access to Behavioral and Medical Health Care in the region	Increase permanent specialty medical care workforce, particularly in endocrinology, pulmonology, psychiatry, cardiology (preventive and noninvasive) and oncology (I)	• Increase number of local specialty care providers.
	Create a model collaborative permanent bricks and mortar medical specialist training center of excellence located in the region with a dual workforce development and care mission (I)	
	Increase the permanent ancillary licensed care providers (PT, OT, ST, RD etc.) to at least parity with state ratios (I)	
	Expand the regional network of community health centers (including FQHCs – Federally Qualified Health Centers) (I)	• Increase access to health care by increasing the number of free and charitable or income-based clinics.
	Increase the percentage of at-risk children with a medical home and SCHIP enrollment above state rates (I)	
Health education to Improve and enhance quality of life and empower children and families to maintain their own health		• Address housing insecurity through development of more affordable housing opportunities, partnerships, and home repairs. • Address needs of economically disadvantaged community members. • **Develop more health education opportunities for patients and community members on topics such as chronic disease, nutrition, physical activity, substance abuse and Narcan use, and sexual assault.**
	Decrease the percentage of children in foster care to parity with the state rate and increase the regional prevalence of "kin-care" (I)	
	Increase the enrollment of eligible women and children in Women, Infants and Children (WIC) and the number of WIC retailers in the region to parity with state rates (N, I)	
	Enhance, foster, or create (as needed) fitness centers in each county in the region (N, I)	• **Provide educational programs for nutrition and physical activity.**
	Enhance, foster, or create (as needed) outdoor sporting facilities in the region for people of all ages (N, I)	
	Enhance, foster, or create connecting multi-use (non-motorized) trails in all of our communities (L)	
	Enhance, foster, or create walkability and bike-ability in all of our regional communities (I, L)	• Promote access to parks, community space and safe areas to walk.

2009 Blueprint Goals	Types N = Near-term I = Intermediate L= Long-term	2023 Community Goals
Health education to Improve and enhance quality of life and empower children and families to maintain their own health	Create or foster age-appropriate school-based, after-school athletic and arts activities, targeted at elementary and middle school children that promote lifetime fitness and athletic confidence and/or artistic development and confidence (and ensure these activities can be and are utilized by high risk and disadvantaged children and measure the results in term of subsequent academic success and high school completion rates) (N, I)	
	Pilot well-designed (in consultation with Healthy Appalachia) health literacy education initially targeted to at least 10 percent of all regional pre-K through elementary school children	
Improve workforce development related to health careers, improve retention of the health care worker, and improve healthcare work environment	Foster the establishment of academic certificates in health areas (e.g., public health, health administration, others) geared toward "in career" adult learners with or without bachelor's degrees (N)	
	Create an "Introduction to Public Health" course in the regional community colleges and universities to enhance awareness and understanding of health among ancillary health care workers and others (N)	
Enhance academic engagement in regional health	Establish a regional standard for community-based participatory research (N)	
	Establish a mechanism for operational collaboration among regional academic institutions (N)	

Table 2: Priority Program Recommendations

Goals	Programs	Metrics
Improve Access to Health Care and Other Services	Increase access to local health care by providing screening programs (e.g. cancer, diabetes), telemedicine, and in-home remote patient monitoring equipment, connectivity, and training for high-risk patients and their providers.	Equipment provided. Number and types of patients supported. Clinical services provided. Reduction in travel and ED use. Patient outcomes when possible.
	Increase access to local health care by providing telehealth access points at, and transit support to, clinics, libraries, community centers, EMS units, senior centers, pharmacies, and others.	Equipment provided. Number and types of patients supported. Clinical services provided. Other services provided. Patient outcomes when possible.
	Increase access to local health care by providing integrated school-based health services, including primary, behavioral, and dental care both in-person and via telehealth for students and staff.	Equipment provided. Number and types of patients supported (children and staff). Number and types of services provided. Patient outcomes when possible.
Reduce Substance Use, Trauma, Poverty	Provide integrated primary and behavioral health treatment, including trauma-informed therapy and medication management, both in-person in an outpatient capacity and via telehealth.	Equipment provided. Number of patients served and whether they are in active addiction or recovery. Number and frequency of visits. Types of services (individual vs. group). Patient outcomes when possible.
	Provide coordinated community navigators including peer recovery specialist support with a trauma informed lens to help those in active addiction and long-term recovery achieve personal goals, both in-person and via telehealth.	Equipment provided. Number of residents served and whether they are in active addiction or recovery. Number and frequency of visits. Types of services (individual vs. group). Goals set/achieved.
	Provide evaluation and management of child abuse and neglect both in-person and via telehealth.	Equipment provided. Number facilities supporting multidisciplinary child protection teams (EDs, Child Advocacy Centers, etc.). Number of patients served and with what services. Patient outcomes when possible. Number of cases supported through Virginia judicial system.
Promote Healthy Diet/Nutrition and Exercise	Provide nutrition management and physical activity education and support, including outpatient diabetes management, both in-person in an outpatient capacity and via telehealth.	Equipment provided. Number of participants supported. Training services provided. Completion rates. Adherence rates. Participant outcomes when possible.

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Acknowledgments

Appendix A: Survey

HEALTHY APPALACHIA INSTITUTE
The University of Virginia's College at Wise

Southwest Virginia Health Blueprint Survey

What are the top THREE good things about your community?
- ☐ Friendly community
- ☐ Safe neighborhoods
- ☐ Walkable, bike-able community
- ☐ Access to arts, music, and cultural events
- ☐ Access to affordable housing for everyone
- ☐ Well-funded local 24-hour police, fire, and rescue services for emergencies
- ☐ Good access to parks and recreation
- ☐ A clean and healthy environment
- ☐ Low rates of homelessness
- ☐ Access to affordable, healthy foods in the community
- ☐ Good internet access
- ☐ Plenty of jobs and a healthy economy
- ☐ Low crime rates
- ☐ Low rates of violence
- ☐ Access to programs, activities, and support for youth and teens during non-school hours
- ☐ Access to programs, activities, and support for the senior community
- ☐ Other _____

What are the top THREE health problems in your community?
- ☐ Heart disease
- ☐ Cancer
- ☐ Covid-19
- ☐ Respiratory Disease
- ☐ Unintentional injury (for example, farming accidents)
- ☐ Diabetes
- ☐ Stroke
- ☐ Alzheimer's or dementia
- ☐ Substance overdose
- ☐ Suicide
- ☐ Oral Health
- ☐ Other _____

What are the top THREE health-related concerns in your community?

☐ Access to quality health care and other services
☐ Geographic distance and other barriers to services
☐ Education
☐ Substance use
☐ Income/Poverty
☐ Diet/Nutrition/Exercise
☐ Occupational conditions
☐ Environmental conditions
☐ Traumatic stress
☐ Other: _____

Which THREE programs are or could help improve the health of your community the most?

☐ Informing people about how to prevent and manage heart attacks and stroke
☐ Informing people about how to prevent and manage cancer
☐ Informing people about how to prevent and manage diabetes
☐ Improving access to local heart disease treatment using video visits
☐ Improving access to local cancer treatment using video visits
☐ Providing local stroke treatment using video visits
☐ Providing OB/maternity care using video visits
☐ Providing child abuse treatment using video visits
☐ Providing mental health treatment using video visits
☐ Providing substance use treatment using video visits
☐ Community partnerships providing local cancer screening
☐ Community partnerships providing local heart disease screening
☐ Community partnerships providing health services for children and families
☐ Community partnerships providing substance use treatment, including opioid use disorder medications and residential care
☐ Other: _____

What is the first step you believe should be taken to improve health in your community?

_____

_____

_____

40

Your Zip Code:_____

Gender:
- ☐ Male
- ☐ Female
- ☐ Prefer to self-describe: _____

Age:
- ☐ 18 - 24 years
- ☐ 25 - 34 years
- ☐ 35 - 44 years
- ☐ 45 - 54 years
- ☐ 55 - 64 years
- ☐ 65 - 74 years
- ☐ 75 - 84 years
- ☐ 85 + Years

Marital Status:
- ☐ Single
- ☐ Married or Domestic Partner
- ☐ Separated
- ☐ Divorced
- ☐ Widowed

Employment Status:
- ☐ Employed
- ☐ Employed - Working in a health-related field
- ☐ Unemployed or out of work
- ☐ Disabled
- ☐ Student
- ☐ Retired
- ☐ Homemaker
- ☐ Other _____

Race/Ethnicity:
- ☐ African American / Black
- ☐ Asian / Pacific Islander
- ☐ Hispanic/ Latino
- ☐ Native American
- ☐ White/ Caucasian
- ☐ Multiracial
- ☐ Other _____

How long have you been a member of your community?
- ☐ Under two years
- ☐ 2 - 5 years
- ☐ 6 - 10 years
- ☐ Over 10 years

Your highest level of education:
- ☐ Less than 9th grade
- ☐ 9th - 12th grade (no diploma)
- ☐ High school diploma or GED
- ☐ Vocational or technical school
- ☐ Some college (no degree)
- ☐ Associates, 2-year degree
- ☐ Bachelors, 4-year degree
- ☐ Graduate or professional degree

Where do you usually go for healthcare?
- ☐ Hospital/ Emergency Room
- ☐ Doctors Office
- ☐ Free or Reduced Fee Clinics
- ☐ Health fairs
- ☐ I don't get healthcare
- ☐ Other _____

Annual household income:
- ☐ Less than $10,000
- ☐ $10,000 - $49,999
- ☐ $50,000 - $99.999
- ☐ $100,000 or greater