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Tennessee's Older Population and Vision Loss: A Briefing

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This briefing is designed to assist policy makers and service providers better understand the characteristics and circumstances of older people with vision impairment in **Tennessee**.

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EXECUTIVE SUMMARY

This briefing is designed to assist policy makers and service providers better understand the characteristics and circumstances of older people with vision impairment in Tennessee. Data from the Behavioral Risk Factor Surveillance System and the Census provide considerable insight into the population of people experiencing vision loss. An estimated 9% of older people in Tennessee report severe vision impairment or blindness. Men are slightly more likely than women experience about the same prevalence of vision impairment (8.5% and 9.4% respectively), but women with vision impairment comprise 57% of the older population, and the prevalence increases with age. Vision impairment is not evenly distributed across the state. The prevalence of vision impairment among people aged 65 years and older by county ranges from 2.6% to 21.7%.

Older people with vision impairment have lower levels of education and are poorer than older people without vision loss. Thirty-seven percent of older people with vision impairment have not graduated from high school, and 42% have annual incomes below \$20,000. In addition, older people with vision impairment report higher prevalence of chronic conditions, particularly stroke, arthritis, diabetes, kidney disease, and depression. Not surprisingly, then, 60% of older people with vision impairment in Tennessee compared to 27% among older people without vision impairment report fair or poor health. Moreover, 50% of older people with vision impairment report 14 or more days of poor physical health in the past 30 days compared to 19% of those without vision impairment. Similarly, 29% of people with vision impairment report 14 or

more days of poor mental health compared to 9% of those without vision loss. This disparity in quality of life is repeated in activity limitation days, where 38% of people with vision impairment report 14 or more days of activity limitation compared to 22% among those without vision impairment.

Upstream factors including poverty and less education have the potential to contribute to higher prevalence of chronic conditions and poorer health-related quality of life. These factors may lead to increased disability, including increased difficulty walking, dressing/bathing, and doing errands.

Data from state and national surveys provide quantitative information regarding health, chronic conditions, and quality of life factors associated with vision impairment

in Tennessee. These data, when informed by the personal experiences of people who have lost vision, serve to define policy decisions and interventions to preserve the independence, dignity, and autonomy of older people with vision impairment.

By aligning aging service providers, public health initiatives, transportation resources, and vision rehabilitation programs to meet the needs of older people with vision impairment, there is potential to improve health, quality of life, and function.

Tennessee's Older Population and Vision Loss: A Briefing

PURPOSE

This briefing provides estimates of the prevalence of vision impairment among older people in the state of Tennessee at the state and county level. Using state and national data systems, this report describes self-reported health, prevalence of chronic conditions, and quality of life among older people with and without vision impairment. The findings show that an estimated 9% of older people in the state report vision impairment, and they report

substantial health and social disparities compared to older people without vision impairment, differences that potentially compromise function and quality of life. By better understanding the circumstances of older people with vision impairment in Tennessee, policy makers and providers can tailor services in aging, public health, transportation, and vision rehabilitation to preserve the dignity, independence, and quality of life of older people.

INTRODUCTION

Vision impairment and blindness often have profound effects upon older people and those who care for and about them. Vision impairment can make common activities difficult or impossible; for example, climbing stairs, crossing a street, driving, using public transportation, preparing meals, and performing household activities may be compromised. Older people experiencing vision impairment may have difficulty managing accounts, paying bills, and identifying prescribed medications. Falls or fear of falling may further compromise their independence. Vision impairment is often isolating, keeping people at home when they prefer to be with family and

friends. Many older people with vision loss do not interact with others who are going through the same experience, creating further isolation and depression.

An estimated 9% of older people in Tennessee report vision impairment or blindness. Those most at risk for vision impairment are African Americans and Hispanics. Older people with vision impairment are more likely to report less education and to experience poverty. They are also more likely to have age-related chronic conditions compared to older people without vision impairment. As Tennessee's population continues to

age, the number of people experiencing vision impairment will likely increase.

While the circumstances and risk factors associated with aging and vision loss are serious, much can be done to ameliorate the effects of vision impairment. For example, improved access and utilization

of vision and eye health, as well as the availability of comprehensive vision rehabilitation service providers, promoting independence and autonomy, are effective strategies often enabling older people in Tennessee to live independently and remain in their community.

NATIONAL PERSPECTIVE

A recent study estimated that 12.5 million people over the age of 40 years in the United States experienced vision impairment. Of those, 1.02 million were blind (visual acuity 20/200 or worse), 3.22 million had vision impairment (visual acuity of 20/40 to less than 20/200), and 8.2 million had uncorrected refractive error. By 2050, the population of people with vision impairment is expected to increase by 118%. The greatest increases will be among women, older people, African Americans, and Hispanics.¹

In addition to representing a large and growing population, older people with vision impairment generally have a greater likelihood of reporting other medical conditions, such as, diabetes, stroke, hypertension, heart disease, and hearing impairment than people without vision impairment.² They are twice as likely to fall as people without vision impairment.³ Moreover, people with vision impairment

are more likely to report oral health problems.⁴ Perhaps because of these circumstances, older people with vision impairment are more likely to report higher levels of depression,⁵ poor quality of life (QOL),⁶ and overall poorer health than people without vision impairment.²

Vision impairment is not evenly distributed across the United States.¹ States with higher proportions of older people and racial/ethnic minorities tend to have higher prevalence of vision problems.¹

Additional research shows that people with vision impairment are less likely to access routine medical care, and they are less likely to have access to and utilize eye care.⁷

Responding to this complex set of circumstances requires thoughtful, innovative, well-integrated strategies by multiple entities to address the varied

health and rehabilitation needs of older people with vision impairment. Among those entities are eye care providers, the aging

network, public health, transportation, and housing, as well as comprehensive vision rehabilitation services.

VISION REHABILITATION PROGRAMS

A central component of supports for older people with vision impairment is a network of public and private agencies providing vision rehabilitation services addressing communication, activities of daily living, personal care, self-advocacy, travel and mobility skills, diabetes, and medication management, as well as access to assistive technology (e.g., smart phones, tablets, and computers). Services often include counseling, information, and referrals to community resources and supports. Vision rehabilitation service providers generally include low vision evaluations and the provision of adapted vision devices. Moreover, older people with vision impairment benefit from peer support groups where older people share common experiences and exchange information about successful management strategies. These services are often provided in the client's home or in an agency setting. The sum of vision rehabilitation services improves independence, self-esteem, health, and quality of life.

Despite the best effort of these agencies, only about 3% of older people with vision

impairment nationally receive vision rehabilitation services ([see *healthypeople.gov* here](#)). This gap between need and response represents a major public health and public policy concern recently addressed by a National Academies of Science, Engineering, and Medicine (NASEM, formerly the Institute of Medicine) seminal report *Making Eye Health A Population Health Imperative: Vision for Tomorrow*.⁸ The NASEM report asserted, "Vision rehabilitation is essential to maximizing the independence, function, participation, safety, and overall QOL of people with chronic vision impairment. Yet there are numerous barriers to high quality and universally accessible vision rehabilitation services" (p. 414).⁸ A goal of Healthy People 2030 is to increase access to vision rehabilitation services by only 10%, to 3.3% over a ten year period ([see *Healthy People 2030* here](#)).

This report examines data from the 2019 Behavioral Risk Factor Surveillance System (BRFSS) and the 2019 American Community Survey to characterize older people with vision impairment at the population level in Tennessee. [See Appendix A](#) for methods.

VISION IMPAIRMENT IN TENNESSEE

DEMOGRAPHIC CHARACTERISTICS

An analysis of 2019 Behavioral Risk Factor Surveillance System data reveals that 9% of people 65 years of age and older report vision impairment in response to the question, “Are you blind or do you have serious difficulty seeing, even when wearing glasses?” ([See Appendix A.](#))

While 9.4% of older women over age 65 years report vision impairment, 8.5% of men do so. Women, however, comprise 57% of the older population of people with vision impairment. In Tennessee, vision impairment varies among racial/ethnic populations: 9% of whites report vision impairment compared to 8.1% among African Americans. ([See Table 1.](#))

Table 1. Prevalence of Vision Impairment by Age, Sex, and Race/Ethnicity among People Aged 65 Years and Older, Tennessee, 2019 BRFSS

CHARACTERISTIC

Tennessee Prevalence 9.0%

SEX

Male 8.5%

Female 9.4%

AGE

65-74 Years 7.5%

75-79 Years 8.2%

80 + Years 14.5%

RACE/ETHNICITY¹

White non-Hispanic 9.0%

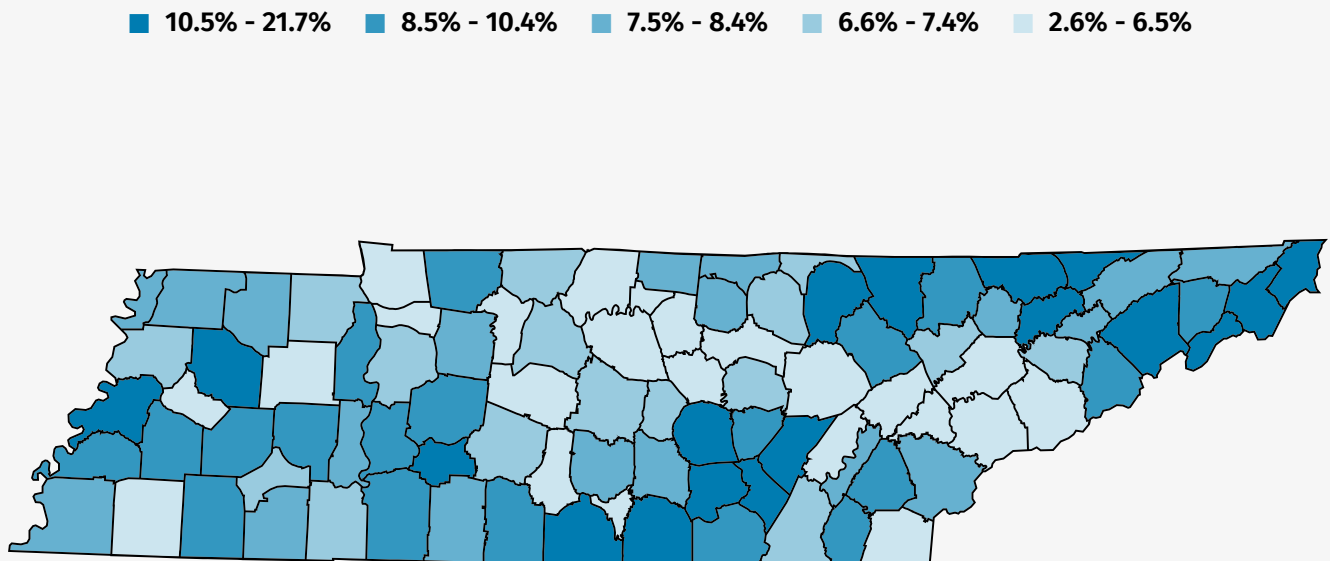
Black non-Hispanic 8.1%

GEOGRAPHIC DISTRIBUTION

Vision impairment is not evenly distributed across the United States or within states. Figure 1 shows the prevalence of vision impairment among people aged 65 years and older by county in Tennessee. Five categories of prevalence are presented, ranging from 2.6% to 21.7%. Higher prevalence of vision impairments tends to occur in more rural counties where resources and care providers may be scarce. Scott County

(21.5%), Grundy County (17.1%), Hancock County (15.2%), Lewis County (14.0%), and Warren County (13.2%) report the highest prevalence of vision impairment among older people, while Stewart County (2.6%), Smith County (3.6%), Williamson County (4.1%), Blount County (4.4%) and Houston County (5.0%) report the lowest prevalence. The prevalence of vision impairment by county is presented in [Appendix B, Table 2](#).

Figure 1. County Level Estimated Prevalence of Vision Impairment and Blindness by County, Tennessee, American Community Survey, 2019.



Note: [See Appendix C](#) for tabular representation of Figure 1.

CHRONIC CONDITIONS

Older people with vision impairment in Tennessee are more likely to experience age-related chronic health conditions compared to people without vision impairment.

See Figure 2. For example, 14% of people with vision impairment report having had a stroke compared to 7% among those without vision impairment. A stroke often compromises vision, but the effects of vision impairment from stroke are often unrecognized and under-appreciated. Diabetes is a known cause of vision impairment, and Tennessee data show that 34% of older people with vision impairment report diabetes compared to 22% of those without vision impairment. Because vision impairment often leads to compromised daily activities, older people with vision impairment more frequently report depression: 35% compared to 12% among older people without vision impairment. Moreover, people with vision impairment report more frequent hearing problems, with 22% reporting hearing impairment compared to 13% of people without vision impairment. Dual sensory impairment often has a compounding effect that leads to

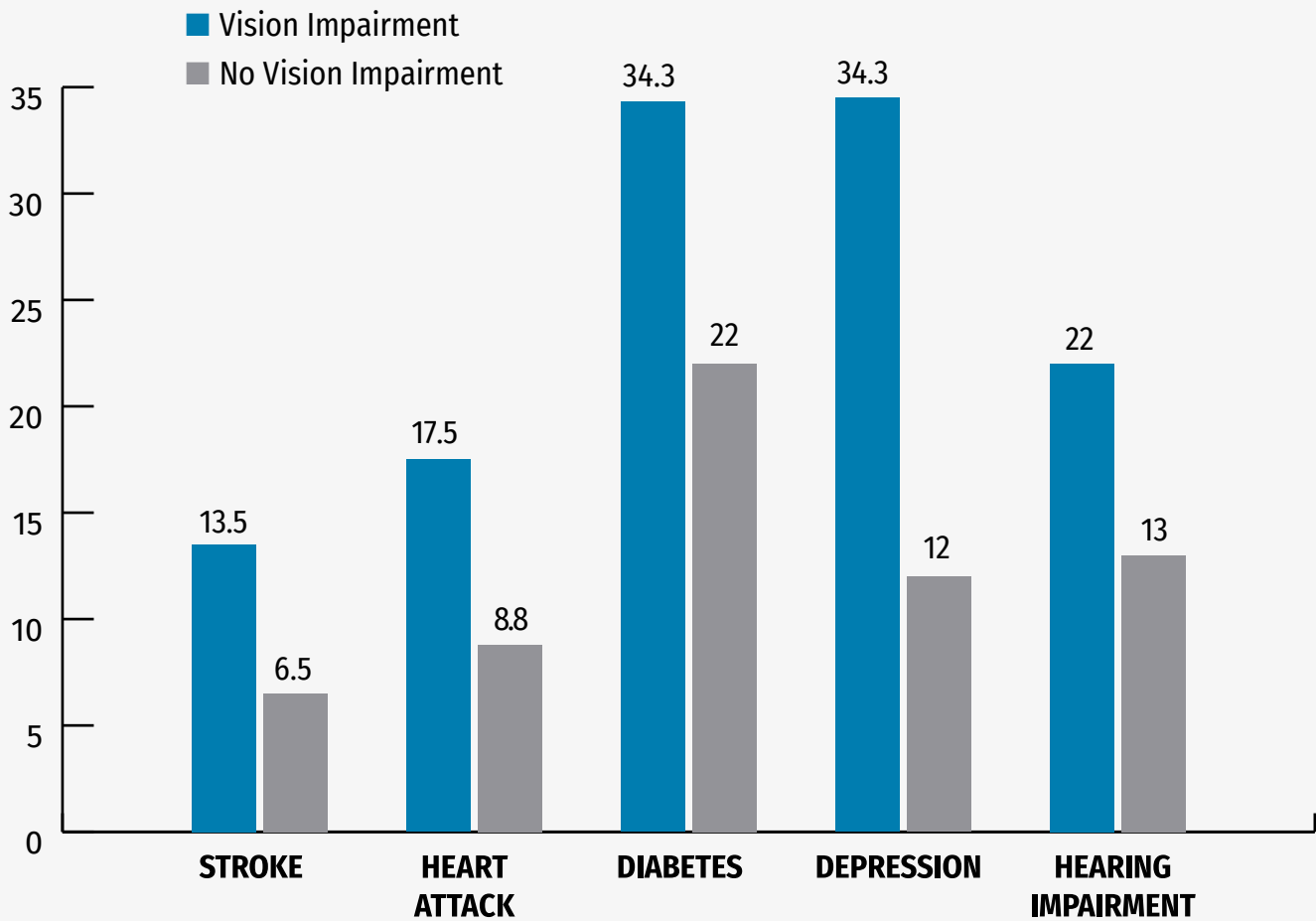
complex healthcare and rehabilitation needs. Vision and hearing are often addressed independently instead of in combination where interventions could be more effective.

Because vision is frequently required to recognize obstacles and trip hazards, 42% of older people with vision impairment in Tennessee report falling, compared to 23% of older people without vision impairment.⁹ Addressing falls risk among those with vision impairment could prevent complications of broken hip and functional decline.

In addition to heart attack, stroke, diabetes, and depression, the BRFSS asks about seven additional chronic conditions (asthma, cancer, COPD, arthritis, kidney disease, high cholesterol, and hypertension). In all cases, older people with vision impairment are more likely to report having these chronic conditions ([Appendix B, Table 3](#)).

The sum of all these factors means that older people with vision impairment are at greater risk for losing independence.

Figure 2. Chronic Conditions among People with and without Vision Impairment, Tennessee, 2019, BRFSS



Note: [See Appendix C](#) for tabular representation of Figure 2.

HEALTH-RELATED QUALITY OF LIFE

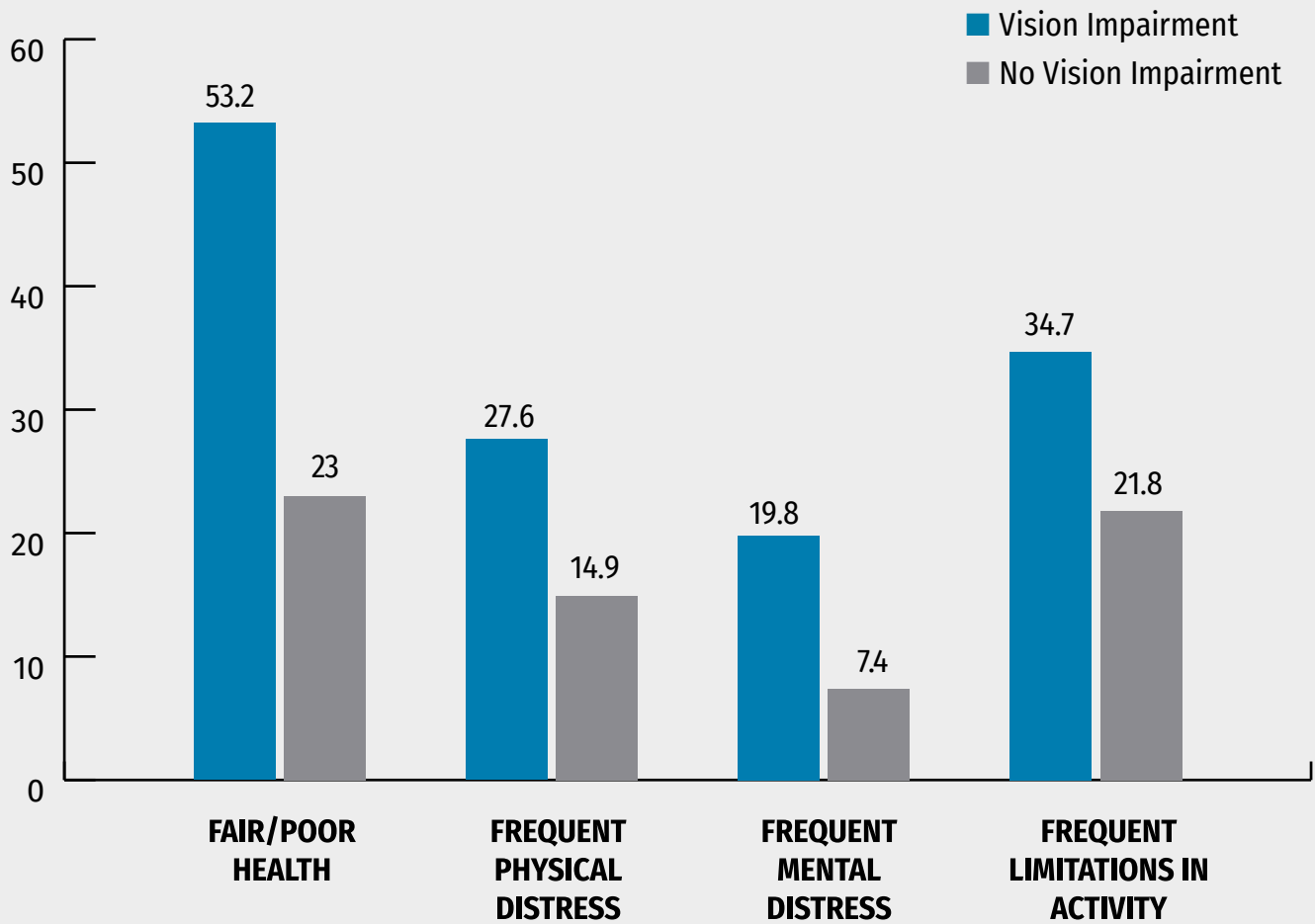
BRFSS data show that older people with vision impairment compared to people without vision impairment are more likely to report poorer health-related quality of life. Four questions address health, physical distress, mental distress, and activity limitation in the Behavioral Risk Factor Surveillance System. This survey asks about self-reported health (excellent, very good, good, fair, and poor), how many days in the last 30 did the respondent report “health not good,” “mental health not good,” and “limitations in physical activity.” Figure 3 below illustrates the percent of people reporting 14 or more days out of the last 30 in which they experienced poor health, poor mental health, and activity limitations.

While 53% of people with vision impairment report fair or poor health, only 23% of older people without vision impairment report

the same health status. Similarly, 28% of people with vision impairment report 14 or more days of physical health not good compared to 15% of those without vision impairment. Great differences are also found in frequent days of poor mental health; 20% of older people with vision impairment report frequent mentally unhealthy days compared to 7% among those without vision impairment. Not surprisingly, then, 35% of older people with vision impairment report frequent (14 or more) days of activity limitation compared to 22% among those without vision impairment.

Poorer health-related quality of life for older people with vision impairment in Tennessee likely results from many factors, including the effects of chronic conditions and the lack of vision rehabilitation services.

Figure 3. Health-Related Quality of Life among People Aged ≥ 65 Years, with and without Vision Impairment, Tennessee, 2019, BRFSS



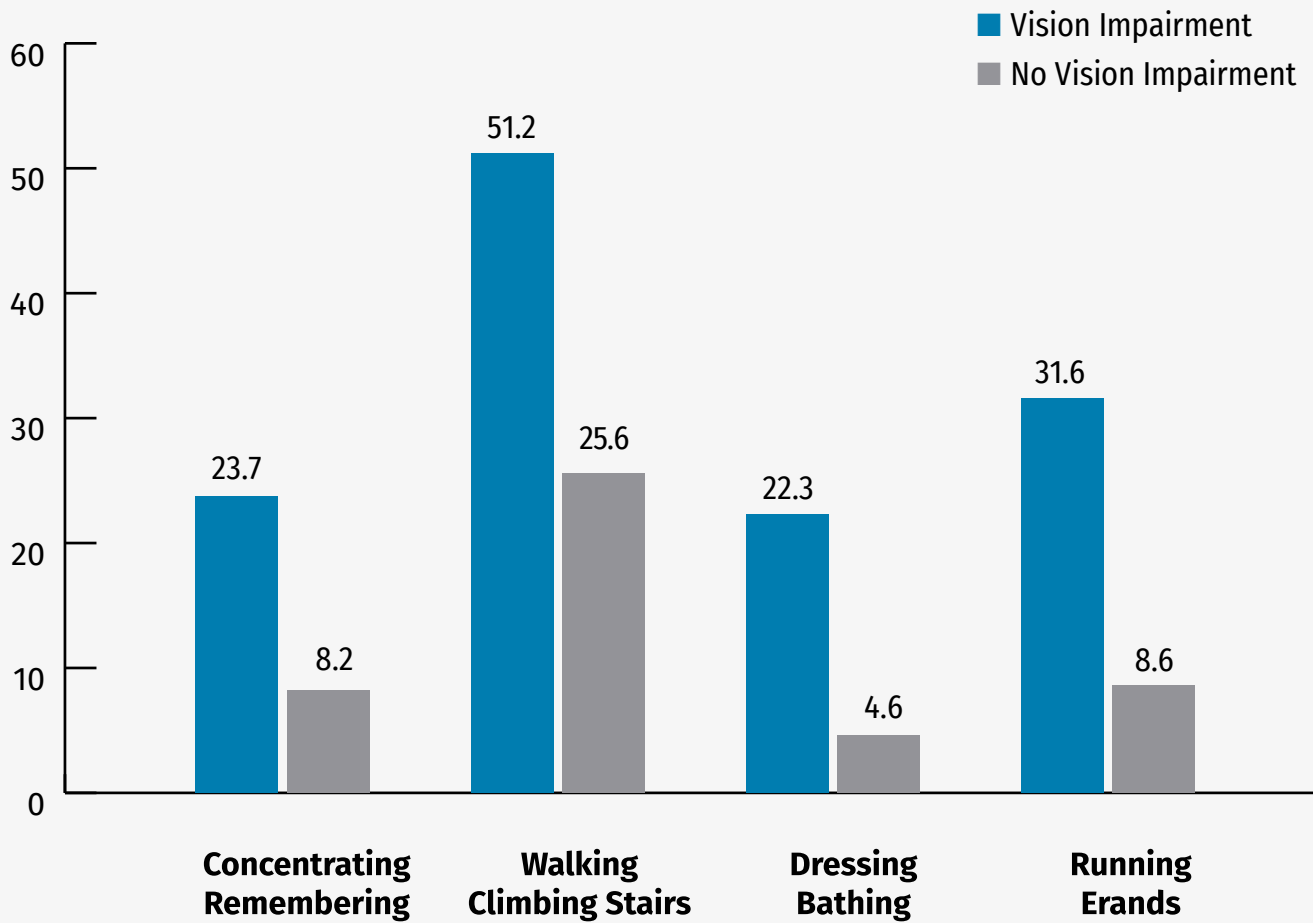
Note: [See Appendix C](#) for tabular representation of Figure 3.

DISABILITY STATUS

For many older people with vision impairment, multiple factors converge to threaten independence and quality of life. This report demonstrates that some groups are at greater risk of vision impairment than others, particularly African Americans and Hispanics, and those who are poorer and have less education. These upstream demographic factors may contribute to older people with vision impairment reporting higher prevalence of chronic conditions, including higher rates of diabetes, stroke, hearing impairment, and depression. These chronic health conditions in turn contribute to older people with vision impairment reporting poorer overall health and poorer health-related quality of life, including more frequent physically unhealthy days, more frequent mentally unhealthy days, and more frequent days of activity limitation. The convergence of these factors results in older people with vision impairment reporting greater disabilities, including limitations in cognitive function, walking and mobility, running errands, and dressing/bathing.

For older people, the effects of upstream factors appear to have dramatic effects on measures of disability. See Figure 4. While 26% of older people with vision impairment report difficulty concentrating and remembering, 8% of people without vision impairment report problems with cognition. Substantial declines in cognitive function have been reported among people with vision impairment.¹⁰ Other measures of disability may represent the effects of the lack of vision rehabilitation services. Older people with vision impairment are about twice as likely to report difficulty walking and climbing stairs (51% compared to 26%) compared to people without vision impairment. That limitation could be attributed to a lack of orientation and mobility training or a lack of low vision services and low vision aids. More dramatically, older people with vision impairment are three- and one-half times more likely to report difficulty running errands (32% compared to 9%). That measure may reflect the combined effects of the lack of vision rehabilitation services that address travel skills and low vision services.

Figure 4. Disability Status among People Age ≥65 Years with and without Vision Impairment, Tennessee, 2019, BRFSS



Note: [See Appendix C](#) for tabular representation of Figure 4.

SOCIAL DETERMINANTS OF HEALTH AND HEALTH EQUITY

Health inequities are shown to be related to social determinants of health based on sex, socio-economic status, race, ethnicity, and specific health conditions.¹¹ Overall, people with vision impairment, as this report demonstrates, are disadvantaged in multiple domains of poorer health, decreased quality of life, and increased disability. See Appendix B, Table 2.

One social determinant of health is defined by educational level which often predicts career and economic well-being. Among older people with vision impairment, 29% did not complete high school compared to 14% of people without vision impairment.

In addition, older people with vision impairment are much more likely to experience poverty and lower incomes than people without vision impairment. For example, 10% of older people with

vision impairment report annual incomes of less than \$10,000 compared to 3% of older people without vision impairment. Eight percent of older people with vision impairment report annual incomes between \$10,000 and less than \$15,000, compared to 4% of people without vision impairment. Fourteen percent of older people with vision impairment have incomes between \$15,000 and less than \$20,000 compared 8% among older people without vision impairment. Lower socio-economic status has also been shown to represent a substantial barrier to access to care for those with vision loss—those with the most need for care.

While people with or without vision impairment are likely to have health insurance and a regular doctor, more people with vision impairment report having to delay health care because of cost, 18% compared to 6% of people without vision impairment.

DISCUSSION

The experience of vision impairment for older people is complex and multidimensional. This report estimates the population and distribution of older people with vision impairment in Tennessee, and it characterizes the population in terms of health, chronic conditions, health-related quality of life, and disability status—variables available from the Behavioral Risk Factor Surveillance System and the American Community Survey. These findings reveal that upstream circumstances related to poverty and poorer education reveal the potential of downstream outcomes in poorer overall health and quality of

life as well as increased disability.

While this briefing provides considerable insight into health, chronic conditions, and quality of life factors at the population level, the report does not tell the personal stories of older people who have lost vision. It does not chronicle the isolation or struggle to find eye care or vision rehabilitation service providers. It does not describe the positive effects of vision rehabilitation or the power that older people feel when participating with peers to share their stories or solve common problems. That gap will be filled by others.

CONCLUSION

About 8.2% of people aged 65 years and older respond yes to the question “Are you blind or do you have severe difficulty seeing even when wearing glasses.” African Americans, Hispanics, and people who are poorer and less educated report higher prevalence of vision impairment. People who are older and visually impaired report higher prevalence of chronic conditions, poorer overall health, and poorer health-related quality of life. These factors appear associated with higher

prevalence of disability indicators. These findings reveal that people with vision impairment are disadvantaged in multiple ways that place them at greater risk for compromised independence and autonomy. The findings in this report are designed to inform policy makers and providers about the circumstances of older people with vision impairment so that decisions and programs can be designed to better support older people with vision loss.

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APPENDIX A: METHODS

The Behavioral Risk Factor Surveillance System conducted by the U.S. Centers for Disease Control and Prevention (CDC) gathers health and health behavior data in each of the states and territories. Conducted since 1984, the BRFSS represents the world's largest telephone survey, sampling over 440,000 people annually. For additional details, [see BRFSS here](#). Data are collected from January to December using standard methods, and data are made publicly available about five months after data collection is completed. In 2013 the BRFSS added a standard set of disability questions to the core. The vision question asks, "Are you blind or do you have serious difficulty seeing even while wearing glasses?" This question serves as the case definition of vision impairment for this study, and is the same question used by the American Community Survey in the Census data.

Using BRFSS data, it is possible to construct a profile of each state addressing demographic characteristics (age, sex, race/ethnicity, and education), reported chronic conditions (heart attack, coronary heart disease, stroke, COPD, diabetes, and arthritis), health-related quality of life (HRQoL), disability, and factors related to Social Determinants of Health among people with and without vision impairment. An analysis of these

factors identifies the magnitude of within state disparities between people with and without vision impairment. Moreover, an analysis of aggregated national level BRFSS data allows for an understanding of how each state compares with national averages across these factors.

To account for the complex sampling weights used in the 2019 BRFSS survey, all analysis was run in SAS callable SUDAAN. To be included in the analysis subjects must be at least 65 years old and respond to both the vision impairment and age question. The response rate was 97.4%. The final sample size is 145,322. This includes 135,566 subjects without vision impairment and 9,756 subjects with vision impairment.

The American Community Survey (ACS) from the U.S. Census collects data on social, economic, and demographic characteristics, including housing, employment status, income/poverty, and level of education. In addition, the ACS collects data on race/ethnicity, sex, marital status, and living arrangements. Although the ACS does not collect information about health and health behaviors, it asks the same six disability questions as the BRFSS, including vision, hearing, cognition, walking, bathing, and doing errands. The function of the ACS is to

provide information for decision makers to allocate federal resources. The granularity of the data makes it possible to construct county, state, and national profiles regarding social, economic, and demographic factors ([see more ACS information here](#)). The unique feature of the ACS is that the prevalence of vision impairment can be estimated at the county level, and maps can be constructed to illustrate the distribution of vision impairment within and across states.

The descriptive tables in the appendices show the estimated point prevalence as well as the 95% Confidence Interval (CI) for each variable. Ninety-five percent CI means that we are 95% certain that the true value resides within the estimated perimeters. Confidence intervals for many of the variables are wide in large part because the sample size is small. By combining multiple years of data, the CI would likely be reduced. Caution should be exercised in interpreting these findings.

Most all large population-based surveys are limited because they rely on self-reported information from survey respondents.

Multiple questions regarding vision have been employed in national surveys, and each question yields a different population estimate.¹ The American Community Survey, for example, asks the question “Are you blind or do you have serious difficulty seeing even when wearing glasses?” The narrow focus of this question yields a low prevalence of vision impairment—about 7.3% among older people in the US. Another large population-based survey, the National Health Interview Survey, asks “Do you have any trouble seeing, even when wearing glasses or contact lenses?” That question yields an estimated prevalence of 13.5% among older people.² There is no widely accepted gold standard vision question used in national surveys. However, the BRFSS and ACS are the only surveys that provide state and county level estimates.

This report was prepared by the VanNasdale Lab at The Ohio State University College of Optometry. Questions regarding the methods and findings for this study should be directed to John E. Crews, DPA (johncrews@bellsouth.net) or Dean VanNasdale, OD, PhD (vannasdale.1@osu.edu).

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APPENDIX B: BRFSS AND ACS TABLES

Appendix B, Table 1. Prevalence of Visual Impairment by Age and Race/Ethnicity in People Aged 65 and Older, BRFSS, United States and Tennessee, 2017, 2019

Category	U.S. %	U.S. 95% CI	TN %	TN 95% CI
Age				
65+ years	7.3%	7.0- 7.6	8.2%	6.7- 9.9
65-74 years	6.3%	6.0- 6.7	7.9%	5.9- 10.4
75-79 years	7.4%	6.7- 8.1	6.5%	3.9- 10.8
80+ years	9.8%	9.2- 10.5	10.0%	7.5- 13.2
Sex				
Male	7.0%	6.6- 7.5	8.1%	6.0- 10.8
Female	7.5%	7.1- 7.9	8.3%	6.4- 10.6
Marital Status				
Married	5.7%	5.3- 6.1	7.8%	5.7- 10.4
Not Married/Separated	9.3%	8.8- 9.8	8.7%	6.8- 11.1
Education				
Did not graduate High School	15.4%	14.0- 17.0	17.1%	10.4- 26.8
Graduated High School	7.4%	6.9- 7.9	8.9%	6.8- 11.5
Attended College or Technical School	6.6%	6.1- 7.1	7.4%	5.0- 10.9
Graduated from College or Technical	4.0%	3.6- 4.4	4.3%	3.0- 6.0
Race/Ethnicity				
White only, non-Hispanic	6.1%	5.8- 6.4	6.4%	5.2- 7.8
Black only, non-Hispanic	10.5%	9.4- 11.7	11.4%	7.2- 17.6
American Indian or Alaskan Native only, non-Hispanic	14.2%	10.0- 19.8	6.4%	1.1- 29.4
Asian only, non-Hispanic	8.8%	6.0- 12.8	16.7%	7.2- 34.3
Hispanic	13.9%	11.9- 16.2	13.7%	7.2- 24.5

*Sample size is too small to make state level estimates regarding some racial/ethnic populations.

Appendix B, Table 2. Prevalence of Vision Impairment among People Age ≥65 Years by County, Tennessee, American Community Survey, 2019

Anderson County, Tennessee	7.3	Grundy County, Tennessee	17.1
Bedford County, Tennessee	7.7	Hamblen County, Tennessee	7.7
Benton County, Tennessee	9.7	Hamilton County, Tennessee	6.9
Bledsoe County, Tennessee	11.7	Hancock County, Tennessee	15.2
Blount County, Tennessee	4.4	Hardeman County, Tennessee	9.5
Bradley County, Tennessee	8.5	Hardin County, Tennessee	7.1
Campbell County, Tennessee	10.2	Hawkins County, Tennessee	7.9
Cannon County, Tennessee	7.4	Haywood County, Tennessee	10.1
Carroll County, Tennessee	6.5	Henderson County, Tennessee	9.8
Carter County, Tennessee	12.1	Henry County, Tennessee	7.2
Cheatham County, Tennessee	5.9	Hickman County, Tennessee	10.4
Chester County, Tennessee	6.8	Houston County, Tennessee	5
Claiborne County, Tennessee	10.6	Humphreys County, Tennessee	7
Clay County, Tennessee	8	Jackson County, Tennessee	8.3
Cocke County, Tennessee	9.8	Jefferson County, Tennessee	6.9
Coffee County, Tennessee	7.7	Johnson County, Tennessee	11.6
Crockett County, Tennessee	5.8	Knox County, Tennessee	5.6
Cumberland County, Tennessee	6.2	Lake County, Tennessee	7.8
Davidson County, Tennessee	7.4	Lauderdale County, Tennessee	12
Decatur County, Tennessee	8.4	Lawrence County, Tennessee	8.4
DeKalb County, Tennessee	6.5	Lewis County, Tennessee	14
Dickson County, Tennessee	8.2	Lincoln County, Tennessee	10.7
Dyer County, Tennessee	7	Loudon County, Tennessee	5.4
Fayette County, Tennessee	6.5	McMinn County, Tennessee	8.9
Fentress County, Tennessee	12.4	McNairy County, Tennessee	8.4
Franklin County, Tennessee	11	Macon County, Tennessee	8.4
Gibson County, Tennessee	11.7	Madison County, Tennessee	9.2
Giles County, Tennessee	8.9	Marion County, Tennessee	9.5
Grainger County, Tennessee	11.8	Marshall County, Tennessee	5.7
Greene County, Tennessee	11.6	Maury County, Tennessee	6.6

Meigs County, Tennessee	8
Monroe County, Tennessee	7.6
Montgomery County, Tennessee	9.2
Moore County, Tennessee	6.2
Morgan County, Tennessee	10.1
Obion County, Tennessee	8.1
Overton County, Tennessee	7.3
Perry County, Tennessee	8.5
Pickett County, Tennessee	7.1
Polk County, Tennessee	6.5
Putnam County, Tennessee	5.3
Rhea County, Tennessee	6.4
Roane County, Tennessee	5.1
Robertson County, Tennessee	6.9
Rutherford County, Tennessee	6.8
Scott County, Tennessee	21.7
Sequatchie County, Tennessee	12.4
Sevier County, Tennessee	6.5

Shelby County, Tennessee	7.5
Smith County, Tennessee	3.6
Stewart County, Tennessee	2.6
Sullivan County, Tennessee	8.2
Sumner County, Tennessee	6.3
Tipton County, Tennessee	9.6
Trousdale County, Tennessee	6.4
Unicoi County, Tennessee	10.5
Union County, Tennessee	8.2
Van Buren County, Tennessee	8.7
Warren County, Tennessee	13.2
Washington County, Tennessee	10.1
Wayne County, Tennessee	9.7
Weakley County, Tennessee	7.5
White County, Tennessee	6.6
Williamson County, Tennessee	4.1
Wilson County, Tennessee	5.3

Distribution of Population of People Aged ≥65 Years with Vision Impairment by County by Quintiles, Tennessee, American Community Survey, 2019.

5th Quintile			
Scott County, Tennessee	21.7	Tipton County, Tennessee	9.6
Grundy County, Tennessee	17.1	Hardeman County, Tennessee	9.5
Hancock County, Tennessee	15.2	Marion County, Tennessee	9.5
Lewis County, Tennessee	14.0	Madison County, Tennessee	9.2
Warren County, Tennessee	13.2	Montgomery County, Tennessee	9.2
Fentress County, Tennessee	12.4	Giles County, Tennessee	8.9
Sequatchie County, Tennessee	12.4	McMinn County, Tennessee	8.9
Carter County, Tennessee	12.1	Van Buren County, Tennessee	8.7
Lauderdale County, Tennessee	12.0	Bradley County, Tennessee	8.5
Grainger County, Tennessee	11.8	Perry County, Tennessee	8.5
Bledsoe County, Tennessee	11.7	3rd Quintile	
Gibson County, Tennessee	11.7	Decatur County, Tennessee	8.4
Greene County, Tennessee	11.6	Lawrence County, Tennessee	8.4
Johnson County, Tennessee	11.6	McNairy County, Tennessee	8.4
Franklin County, Tennessee	11.0	Macon County, Tennessee	8.4
Lincoln County, Tennessee	10.7	Jackson County, Tennessee	8.3
Claiborne County, Tennessee	10.6	Dickson County, Tennessee	8.2
Unicoi County, Tennessee	10.5	Sullivan County, Tennessee	8.2
4th Quintile		Union County, Tennessee	8.2
Hickman County, Tennessee	10.4	Obion County, Tennessee	8.1
Campbell County, Tennessee	10.2	Clay County, Tennessee	8.0
Haywood County, Tennessee	10.1	Meigs County, Tennessee	8.0
Morgan County, Tennessee	10.1	Hawkins County, Tennessee	7.9
Washington County, Tennessee	10.1	Lake County, Tennessee	7.8
Cocke County, Tennessee	9.8	Bedford County, Tennessee	7.7
Henderson County, Tennessee	9.8	Coffee County, Tennessee	7.7
Benton County, Tennessee	9.7	Hamblen County, Tennessee	7.7
Wayne County, Tennessee	9.7	Monroe County, Tennessee	7.6
		Shelby County, Tennessee	7.5
		Weakley County, Tennessee	7.5

2nd Quintile	
Cannon County, Tennessee	7.4
Davidson County, Tennessee	7.4
Anderson County, Tennessee	7.3
Overton County, Tennessee	7.3
Henry County, Tennessee	7.2
Hardin County, Tennessee	7.1
Pickett County, Tennessee	7.1
Dyer County, Tennessee	7
Humphreys County, Tennessee	7
Hamilton County, Tennessee	6.9
Jefferson County, Tennessee	6.9
Robertson County, Tennessee	6.9
Chester County, Tennessee	6.8
Rutherford County, Tennessee	6.8
Maury County, Tennessee	6.6
White County, Tennessee	6.6
1st Quintile	
Carroll County, Tennessee	6.5
DeKalb County, Tennessee	6.5
Fayette County, Tennessee	6.5
Polk County, Tennessee	6.5
Sevier County, Tennessee	6.5
Rhea County, Tennessee	6.4
Trousdale County, Tennessee	6.4
Sumner County, Tennessee	6.3
Cumberland County, Tennessee	6.2
Moore County, Tennessee	6.2
Cheatham County, Tennessee	5.9
Crockett County, Tennessee	5.8
Marshall County, Tennessee	5.7
Knox County, Tennessee	5.6
Loudon County, Tennessee	5.4
Putnam County, Tennessee	5.3
Wilson County, Tennessee	5.3
Roane County, Tennessee	5.1
Houston County, Tennessee	5
Blount County, Tennessee	4.4
Williamson County, Tennessee	4.1
Smith County, Tennessee	3.6
Stewart County, Tennessee	2.6

Appendix B, Table 3. Social, Economic, and Health Characteristics of People Age ≥65 Years United States and Tennessee, 2019, BRFSS

	United States Blind N=9756		United States Not Blind N=135566		Tennessee Blind N=227		Tennessee Not Blind N=2137	
	%	95% CI	%	95% CI	%	95% CI	%	95% CI
Age Group								
65-74 years	51.3	49.1- 53.4	59.6	59.0- 60.1	55.4	45.5- 64.8	57.6	55.0- 60.1
75-79 years	19.6	17.9- 21.5	19.4	18.9- 19.8	13.9	8.3- 22.4	17.8	15.9- 19.7
80+ years	29.1	27.3- 31.0	21	20.6- 21.5	30.8	23.1- 39.7	24.6	22.5- 26.9
Sex								
Male	43.4	41.2- 45.6	45.1	44.5- 45.6	42.3	32.8- 52.4	43	40.4- 45.6
Female	56.6	54.4- 58.8	54.9	54.4- 55.5	57.7	47.6- 67.2	57	54.4- 59.6
Marital Status								
Married	42.9	40.7- 45.1	56.3	55.7- 56.8	48.2	38.3- 58.2	51.3	48.7- 53.9
Not Married/Separated	57.1	54.9- 59.3	43.7	43.2- 44.3	51.8	41.8- 61.7	48.7	46.1- 51.3
Education								
Did not graduate High School	28.7	26.4- 31.1	12.4	11.9- 12.8	26.3	16.8- 38.5	11.3	9.3- 13.7
Graduated High School	28.5	26.7- 30.3	28.2	27.7- 28.7	36.7	28.2- 46.0	33.6	31.1- 36.2
Attended College or Technical School	27.9	26.0- 29.8	31.1	30.6- 31.6	21.7	14.8- 30.8	24.4	22.3- 26.5
Graduated from College or Technical	15	13.7- 16.4	28.4	27.9- 28.8	15.3	10.6- 21.6	30.7	28.6- 32.9

Race/Ethnicity								
White only, non-Hispanic	65	62.5-67.3	79	78.4-79.6	56.5	45.8-66.7	73.7	70.7-76.5
Black only, non-Hispanic	12.8	11.5-14.3	8.6	8.3-9.0	13.3	8.3-20.8	9.3	8.0-10.8
American Indian or Alaskan Native only, non-Hispanic	1.9	1.3-2.7	0.9	0.8-1.0	0.3	0.0-1.4	0.3	0.2-0.6
Asian only, non-Hispanic	3	2.0-4.4	2.4	2.1-2.8	12.4	5.6-25.3	5.5	3.6-8.2
Hispanic	15.3	13.1-17.6	7.4	7.0-7.9	16.1	8.7-27.8	9	7.1-11.4
Annual Income								
Less than \$10,000	10.6	9.1-12.3	3.6	3.3-3.9	9.8	4.1-21.6	3	2.0-4.3
\$10,000 to less than \$15,000	11.7	10.3-13.3	5.4	5.1-5.7	8.3	3.8-17.3	4.3	3.1-6.0
\$15,000 to less than \$20,000	14.8	13.2-16.5	7.9	7.6-8.3	13.7	6.9-25.5	7.6	6.3-9.2
\$20,000 to less than \$25,000	13.5	12.0-15.2	10.7	10.3-11.1	15.2	8.3-26.2	11.5	9.4-14.1
\$25,000 to less than \$35,000	14.4	12.8-16.0	12.7	12.3-13.1	18.9	10.9-30.9	11.7	9.9-13.7
\$35,000 to less than \$50,000	12.8	11.4-14.5	15.9	15.4-16.3	9	5.4-14.4	15.7	13.6-18.0
\$50,000 to less than \$75,000	9.8	8.5-11.2	16.5	16.1-17.0	15.9	9.5-25.5	15.2	13.4-17.2
\$75,000 or more	12.4	10.7-14.3	27.3	26.7-27.8	9.2	5.4-15.4	31.1	28.6-33.7
Health Behaviors								
BMI								
Underweight	2.6	2.1-3.3	1.8	1.7-2.0	3.6	1.1-11.3	1.2	0.9-1.7
Normal weight	27.3	25.5-29.2	30.5	30.0-31.1	27.2	20.0-35.8	30.1	27.7-32.7

Overweight	37.2	35.0-39.5	38.6	38.1-39.2	33.1	24.1-43.4	43.1	40.4-45.9
Obese	32.9	30.8-35.1	29	28.5-29.6	36.1	26.7-46.8	25.5	23.4-27.8
Physical Exercise	53.6	51.4-55.8	70.2	69.7-70.7	47	37.2-56.9	64.3	61.6-66.8
Smoking Status								
Current smoker	13.4	12.0-14.9	8.8	8.4-9.1	12.3	6.0-23.8	7.6	6.3-9.2
Former smoker	40.8	38.6-43.0	39.8	39.2-40.3	45.2	35.4-55.3	41.2	38.7-43.9
Never smoked	45.8	43.6-48.0	51.5	50.9-52.0	42.5	33.0-52.6	51.2	48.5-53.8
Health Care Access								
Have Health Insurance	96	95.0-96.8	98.1	97.9-98.2	93.9	79.1-98.4	99.2	98.8-99.5
Have Personal Doctor	92.4	91.0-93.6	93.8	93.5-94.1	92.4	81.7-97.0	94.1	92.9-95.2
Could not see doctor because of cost.	11.5	10.2-12.9	4.2	4.0-4.5	17.9	10.7-28.4	5.8	4.2-8.0
Health-Related Quality of Life								
Adults with fair/poor health status	51.4	49.2-53.6	23.3	22.8-23.8	53.2	43.5-62.7	23	20.8-25.4
14 or more days during past 30 when physical health not good.	35.6	33.5-37.8	15.9	15.5-16.4	27.6	20.3-36.5	14.9	13.1-16.8
14 or more days during past 30 when mental health not good.	17.9	16.3-19.6	7.3	7.0-7.6	19.8	12.9-29.3	7.4	5.9-9.2
14 or more days of activity limitation.	34.3	31.8-36.9	18.9	18.3-19.5	34.7	24.1-47.0	21.8	18.3-25.8
Chronic Conditions								
High Blood Pressure	68.6	66.5-70.7	59.7	59.1-60.2	68.4	57.6-77.5	62.5	59.9-64.9

High Cholesterol	56.6	54.4-58.8	50.5	49.9-51.1	51.3	41.1-61.3	50.4	47.8-53.1
Myocardial Infarction	17.2	15.8-18.7	10.2	9.9-10.6	17.5	10.6-27.6	8.8	7.5-10.2
Angina or coronary heart disease	18.2	16.4-20.0	10.1	9.8-10.5	20.6	13.4-30.2	9.1	7.8-10.5
Stroke	16.9	15.3-18.6	7.3	7.0-7.6	13.5	7.4-23.4	6.5	5.4-7.9
Asthma	18.2	16.6-20.1	11.8	11.4-12.1	13.3	8.0-21.2	10.9	9.2-12.8
Cancer	32.7	30.7-34.7	31.8	31.3-32.4	23.9	16.8-32.9	28.1	26.0-30.2
COPD	22.9	21.3-24.7	12.2	11.8-12.5	17.8	11.0-27.5	10.6	9.3-12.1
Arthritis	61.3	59.1-63.4	49.5	48.9-50.1	60	50.0-69.2	45.9	43.4-48.5
Depression	26.9	25.0-29.0	13.9	13.5-14.3	34.5	24.8-45.7	12	10.4-13.7
Kidney disease	13.6	12.1-15.3	6.4	6.1-6.7	11.7	6.7-19.6	4.2	3.4-5.2
Diabetes	36.4	34.2-38.6	22.1	21.6-22.6	34.3	25.5-44.3	22	19.8-24.4
Disability Status								
Serious difficulty concentrating, remembering, or making decisions	29.3	27.3-31.4	8.2	7.9-8.5	25.7	17.0-36.8	8.2	6.9-9.8
Serious difficulty walking or climbing stairs	56.9	54.7-59.0	25.4	24.9-25.9	51.2	41.1-61.2	25.6	23.3-28.0
Difficulty dressing or bathing	19.1	17.4-20.8	5	4.8-5.3	22.3	15.0-31.9	4.6	3.5-6.0
Difficulty doing errands alone	35.3	33.3-37.5	7.7	7.4-8.0	31.6	23.0-41.6	8.6	7.0-10.4
Deaf or do you have serious difficulty hearing	33.3	31.3-35.3	15	14.6-15.4	22	15.9-29.8	13	11.5-14.7

APPENDIX C: TABULAR REPRESENTATIONS OF FIGURES 1-4

Figure 1. Estimated Prevalence of Vision Impairment among People Aged ≥65 Years by County, Tennessee, American Community Survey, 2019

Quintile	Number of Counties	Counties Included (total = 72) (listed from high to low in each quintile)
10.5-21.7%	18	Scott, Grundy, Hancock, Lewis, Warren, Sequatchie, Fentress, Carter, Lauderdale, Grainger, Gibson, Bledsoe, Johnson, Greene, Franklin, Lincoln, Claiborne, Unicoi
8.5-10.4%	19	Hickman, Campbell, Washington, Morgan, Haywood, Henderson, Cocke, Wayne, Benton, Tipton, Marion, Hardeman, Montgomery, Madison, McMinn, Giles, Van Buren, Perry, Bradley
7.5-8.4%	19	Macon, McNairy, Lawrence, Decatur, Jackson, Union, Sullivan, Dickson, Obion, Meigs, Clay, Hawkins, Lake, Hamblen, Coffee, Bedford, Monroe, Weakly, Shelby
6.6-7.4%	16	Davidson, Cannon, Overton, Anderson, Henry, Pickett, Hardin, Humphreys, Dyer, Robertson, Jefferson, Hamilton, Rutherford, Chester, White, Maury
2.6-6.5%	23	Sevier, Polk, Fayette, DeKalb, Carroll, Trousdale, Rhea, Sumner, Moore, Cumberland, Cheatham, Crockett, Marshall, Knox, Loudon, Wilson, Putnam, Roane, Houston, Blount, Williamson, Smith, Stewart

Figure 2. Chronic Conditions among People Aged ≥65 Years with and without Vision Impairment, Tennessee, 2019, BRFSS

Chronic Condition	Vision Impairment	No Vision Impairment
Stroke	19.7%	8.7%
Heart Attack	20.9%	10.9%
Diabetes	44.2%	26.0%
Depression	31.5%	17.5%
Hearing Impairment	43.7%	19.7%

Figure 3. Health-Related Quality of Life among People Aged ≥65 Years with and without Vision Impairment, Tennessee, 2019, BRFSS

Health-Related Quality of Life	Vision Impairment	No Vision Impairment
Fair/Poor Health	59.9%	26.7%
Frequent Physical Distress	50.1%	18.5%
Frequent Mental Distress	29.3%	8.6%
Frequent Limitations in Activity	37.7%	22.0%

Figure 4. Disability Status among People Aged ≥65 Years, with and without Vision Impairment, Tennessee, 2019, BRFSS

Disability Status	Vision Impairment	No Vision Impairment
Concentrating, Remembering	40.9%	9.4%
Walking, Climbing Stairs	67.2%	27.9%
Dressing, Bathing	18.2%	6.4%
Running Errands	37.4%	8.4%

APPENDIX D: VISION REHABILITATION RESOURCES

For information about vision rehabilitation services available to older individuals in Tennessee, visit [Tennessee Department of Human Services, Independent Living Services](#).