

COMMENTARY

Hearing Loss: Applying the Social-Ecological Model for Change

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Submitted June 8, 2021 Accepted April 13, 2022 Published August 24, 2022 <https://doi.org/10.18061/ojph.v5i1.8386>

ABSTRACT

Introduction: The proportion of Ohioans experiencing deafness or serious difficulty hearing is higher than national estimates and is increasing over time.

Purpose: The purpose of this study is to describe the burden, risk factors, comorbidities, and financial implications of hearing loss in Ohio as well as discuss approaches to reduce the burden of hearing loss in Ohio applying the Social-Ecological Model

Methods: A narrative review was completed to summarize peer-reviewed literature on hearing loss in Ohio. The Social-Ecological Model was applied to identify approaches to reduce the burden of hearing loss in Ohio.

Results: The burden of hearing loss on health and economic well-being is substantial in Ohio. While initiatives have sought to reduce costs and increase access, barriers continue to persist impeding people's ability to obtain needed services in Ohio. Approaches were identified on all levels of the Social-Ecological Model to address the burden of hearing loss in Ohio such as creating interventions for prevention, improving access to hearing tests and hearing aids, and changing policies that expand insurance coverage for hearing aids.

Conclusion: There is a critical need for public health-initiated programs and policies that reduce barriers and increase access to hearing related services that can be implemented on all levels of the Social-Ecological Model.

Keywords: Hearing loss; Hearing aids; Comorbidities; Insurance

INTRODUCTION

In 2018, 6.4% of adult Ohioans experienced deafness or serious difficulty hearing, which was 0.5% higher than national estimates.¹ From 2016-2018 the percentage of adults with deafness or serious difficulty hearing rose from 6.1% to 6.4% in Ohio.¹ Projections estimate that hearing loss will substantially increase by 2050 because of increased risk factors and comorbidities associated with hearing loss.² Hearing aids can improve some health outcomes associated with comorbidities such as reduced mobility restrictions, cognitive decline, and health-related quality of life pertaining to perceived quality of physical health.³ However, high cost and limited coverage from insurance providers hinders the ability of individuals with hearing loss to obtain hearing aids and needed

services.⁴ This commentary aims to describe the burden of hearing loss in Ohio and describes actions that can be taken to reduce this burden by a range of audiences such as practitioners, public health professionals, community members, and other stakeholders through the Social-Ecological Model.

Burden and Risk Factors of Hearing Loss

As described previously, the proportion of adults who were deaf or had serious difficulty hearing is higher in Ohio in comparison with the United States (US) overall (6.5% versus 5.9%).¹ In the US, almost 40 million Americans over the age of 12 years have hearing loss, and it is the third most common reported chronic condition.^{5,6} Estimates suggest that by 2030 about 73 million US adults will be impacted by hearing loss.⁷ Additionally, hearing loss is one of the





most common conditions among older adults.^{6,8} Almost a third of adults between 65 and 74 years of age, and nearly 50% of adults over 75 years of age, experience hearing loss.⁹ Approximately 25% of adults between 20 and 69 years of age experience hearing loss.¹⁰ Moreover, in 2017, 10.4% of infants exhibited hearing loss.¹¹ In the US almost 2 to 3 out every 1000 children and 1 in 5 teens have some level of hearing loss.^{12,13}

Hearing loss has multiple causes and risk factors. Hearing loss can be caused by middle ear infections, genetic factors, disease, health condition, medications, ear abnormalities, or noise exposure.^{9,14} Unfortunately, some individuals are unaware that noise exposure causes hearing loss. Among adults aged 20 to 69 years who self-reported having good to excellent hearing, about 25% exhibited some level of hearing loss.⁶ Additionally, almost 53% of adults reported no noise exposure at work but exhibited signs of noise exposure hearing loss.¹⁰ Yet, other research suggests that noise exposure at work may not be the only cause of hearing loss.⁶ A study of Ohio children that live on farms indicated that children living on farms were more likely to experience hearing loss than children in the general population.¹⁵ Considering that food and agriculture is Ohio's primary industry, and over 95% of those farms are owned by families, these families are at a risk of increased exposure.¹⁶ Ohio ranks third in the US for manufacturing which includes developing materials in areas that have the potential for work-related noise exposure.¹⁶ Another potential cause of exposure that Ohioans face is traffic and/or highway noise.¹⁷ Therefore, Ohioans may have an increased risk of noise exposure, and there is a need to increase awareness and enhance programs that limit prolonged noise exposure.

Comorbidities

Individuals with hearing loss have an increased risk of comorbidities that include, but are not limited to, chronic conditions, mental health disorders, psychosocial issues, and other health outcomes.^{3,18} Comorbidities increase risk for poor outcomes among persons with hearing loss, and some states, such as Ohio, have a higher average number of comorbidities per person in contrast to other states.¹⁹ However, some studies indicate that using hearing aids can improve some health outcomes, which is discussed further in the upcoming sections. This section provides an overview of the comorbidities associated with hearing loss and implications related to hearing aids.

Chronic Conditions

Several chronic conditions are associated with hearing loss such as visual impairment, diabetes, hypertension, cardiovascular disease, arthritis, and stroke. Besser et al completed a review and estimated that between 3.1% and 18.2% of individuals with hearing loss have visual impairment.³ Individuals with prediabetes and diabetes had higher rates of hearing loss than those with normal glucose levels.³ There is an increased risk of hearing loss among patients with cardiovascular risk factors and disease.²⁰⁻²² Furthermore,

individuals with hearing loss are at a higher risk of cardiovascular disease, hypertension, and cardiovascular death (eg, stroke) than hearing individuals.²⁰⁻²³ Arthritis is also associated with hearing loss, and research has noted that specific types of arthritis increase risk of hearing loss.^{22,24} Cancer and malignant conditions may require treatments that have side effects of sensorineural hearing loss; a significant association between hearing loss and cancers has been found.^{21,22,25} An association between hearing loss and chronic comorbidities is apparent; however, the relationship of causality with each chronic disease is not fully understood.³ There are few known studies examining if the use of hearing aids improves the health outcomes of comorbid chronic conditions; yet, experts suggest incorporating management of hearing loss into medical treatment.²⁶

Additionally, hearing loss is associated with cognitive impairment and increased risk for cognitive decline.^{3,18,27} Cognitive decline is associated with hearing loss, but it is unclear how the 2 are related.³ Along with cognitive decline, hearing loss is also associated with an increased risk of dementia. One study noted that individuals with hearing loss were over 3 times more likely to develop dementia than individuals without hearing loss.²⁸ More research is needed to determine the impact of hearing aid use on cognitive decline and cognitive impairment because there are studies with varied results.³ However, a study noted that after an 18-month follow-up individuals with hearing loss using hearing aids had improved cognition, and females exhibited better cognitive outcomes than males.²⁹ Hearing aid use was also associated with a delay in dementia diagnosis.³⁰

As it relates to Ohioans, there is a paucity of research that examines the comorbidities of hearing loss. In 2019 almost half of Ohioans had at least 1 chronic condition.³¹ The most prevalent chronic diseases among adult Ohioans are arthritis, diabetes, asthma, chronic obstructive pulmonary disease, cancer, heart disease, and stroke.³¹ Almost 12% of Ohioans over the age of 45 years experience cognitive decline.³² Given that almost half of Ohioans experience a chronic condition and a proportion experience cognitive decline, both correlates of hearing loss, Ohioans could be at a higher risk for having or developing hearing loss.

Mental and Psychosocial Health

Hearing loss is associated with mental and psychosocial health comorbidities as well. Individuals with hearing loss experience higher rates of depression and anxiety.^{3,33-35} In a longitudinal study, individuals with hearing loss were 50% more likely to experience anxiety and 41% more likely to experience depression at 5 years of follow-up.¹⁸ A recent large nationally representative sample of adults in the US found that hearing loss was associated with psychological distress, increased medication use, and utilization of mental health services.³⁶ Individuals with hearing loss are more likely to self-isolate, stay home, and experience social and emotional loneliness.^{35,37,38} Furthermore, some research has found that hearing loss increases the risk for hallucinations and psychosis.³⁹



In 2019, a larger proportion of adult Ohioans were diagnosed with depressive disorder compared to the US overall.³¹ This appears to be an enduring trend; from 2011-2019 a higher proportion of adult Ohioans reported poor mental health over a 2-week period than adults in the US.³¹

Studies indicate mixed results about hearing aid use and mental or psychosocial health outcomes. In some research hearing aid use and hearing aid training was associated with improved depression symptoms and delays in diagnosis of anxiety and depression.^{3,30,40} However, individuals with severe hearing loss who use hearing aids were less likely to stay home than those who do not use hearing aids.⁴¹ Additionally, a 6- and 12-month follow-up study involving adults who obtained hearing aids or cochlear implants found that participants had improved loneliness scores.⁴²

Functioning and Health Care Utilization

Other health issues associated with hearing loss pertain to mobility and injurious falls.^{3,22,30} Authors of a review found that individuals with hearing loss were 1.4 to 2.5 times more likely to experience falls than individuals without hearing loss.³ Recent research has shown that adults with hearing loss have poorer physical activity profiles characterized by less engagement in light intensity and moderate-to-vigorous physical activity, accompanied by more sedentary and fragmented physical activity.⁴³ Adults with hearing loss are more likely to report worse scores on physical health measures than those without hearing loss.⁴⁴⁻⁴⁶ Hearing loss is also associated with impaired activities of daily living, instrumental activities of daily living, lower extremity mobility, and reduced engagement in exercise.⁴⁷⁻⁴⁹

In Ohio, only 71.7% of adults reported exercising, which was lower than the proportion in the entire US adult population.³¹ Additionally, from 2011-2019 the prevalence of adults participating in physical activity among Ohioans is lower than national prevalence; however, no information from this data source indicates whether hearing loss is associated with lack of physical activity.³¹ However, hearing loss is associated with an increased risk for physical disability.⁴⁸ Thus, persons with hearing loss have been found to have lower age-specific health-related quality of life in physical health.⁵⁰ Although, the use of hearing aids among individuals with hearing loss has shown that they can prevent injurious falls and mobility restrictions and improve health-related quality of life.^{6,30,41,51}

To exacerbate the situation further, individuals who experience hearing loss report lower rates of preventative care access and higher rates of health care utilization. A recent investigation reported that persons with hearing loss were less likely to receive preventative care and services such as cancer screenings.⁵² Hearing loss is associated with increased mental health services and emergency room utilization.⁵³ Persons who experienced hearing loss had 47% more inpatient hospital visits and 44% greater risk for a 30-day hospital readmission than individuals without hearing loss.⁵³ Thus, some research has shown that persons with se-

vere hearing loss have medical costs that were significantly higher than those without hearing loss.⁴⁹ However, use of a hearing aid has been found to reduce emergency department visits and length of hospitalizations as well as total Medicare costs.⁵⁴ From January 2018 to June 2021, Ohio had the fourth highest number of hospitalization discharges compared to all other states.⁵⁵ Additionally, in 2019, Ohio tied for the eighth highest number of hospital admissions in the US at 122 per 1000.^{55,56} Yet, data are unavailable about how many of these hospital admissions are related to hearing loss.

Burden of Cost

Estimates suggest that 28.8 million noninstitutionalized US adults would benefit from hearing aids.⁹ Despite this, only about 16% of individuals aged 20 to 69 years and 30% of individuals 70 years and over have used hearing aids.⁹ One of the barriers to obtaining hearing aids is cost.⁵⁷ The cost for 1 hearing aid ranges between \$1000 and \$6000 and the cost depends on the technology and features of the hearing aid.⁵⁸ But, the burden of cost extends beyond the cost of hearing aids. During a 10-year span, individuals with untreated hearing loss had 46% higher health care costs than their hearing counterparts.³⁶ Another report posits that each year untreated hearing loss costs \$133 billion, which translates to \$9100 yearly per individual.⁵⁹ Some research suggests that regulatory change and policy changes could lower the cost of hearing aids making them more accessible to individuals. However, opening the market or allowing over-the-counter hearing aids to be sold could lead to more self-service and could compromise patient safety and quality of care.⁶⁰ Little is known about the burden of cost relating to hearing loss for Ohioans. In 2019, the median household income of Ohioans was approximately \$57 000, and health care expenditures were increasing to almost \$9000 per capita. Many Ohioans with hearing loss may face more financial burdens in obtaining hearing aids.^{61,62} Yet, insurance that provides benefits for hearing services and hearing related technologies also plays a key role in individuals obtaining hearing aids.

Insurance Coverage

In the US health insurance consists of private insurance, Medicaid, and Medicare. Table 1 provides an explanation of each insurance as it relates to obtaining hearing aids. In 2020, only 6.2% of individuals in Ohio were uninsured.⁶³ Of those that had health care insurance 49.2% received it through an employer, 19.7% received it through Medicaid, 18.4% received it through Medicare, 1.3% received it through military, and 5.1% received health care insurance privately.⁶³

Most health care coverage does not cover hearing aids because of multiple factors. Hearing aids are considered by some insurance companies to be an elective rather than a necessary medical device despite the supportive research indicating a decline in quality of life and health among individuals with hearing loss.⁶⁴ Only 23 states have state mandates for hearing aid coverage, and each state has different requirements for coverage such as age, amount



Table 1. Types of Health Insurance and Coverage of Hearing Aids

| Insurance | Description | Eligibility | State Level Coverage |
|-----------------|--|--|---|
| Private | Primarily obtained through employer sponsored group plans, occasionally privately purchased ⁶⁴ | Varies and depends on the insurance; but most do not cover hearing aid costs ⁶⁴ | Varies by insurance provider |
| Medicaid | Health coverage for low-income adults, children, pregnant women, and elderly adults with disabilities ⁶⁵ | Individuals with low incomes, pregnant women, infants, and children, older adults, and individuals with disabilities Must be an Ohio resident and US citizen or meet citizenship requirements, have a social security number, meet the financial requirements ⁶⁶ | Covers hearing tests and hearing evaluations, counseling, ear molds, hearing aids, warranties, batteries, a cleaning kit, and repairs to the hearing aids ⁶⁶ |
| Medicare | Medicare is health coverage for individuals over the age of 65 years, some younger individuals with disabilities, and individuals with end-stage renal disease ⁶⁷ | Medicare does not cover hearing aids; however, some Medicare Part C plans do ^{67,68} | Some Ohio Medicare Part C plans offer hearing aid coverage; coverage varies ⁶⁷ |

covered, benefit period, and health care provider qualifications; but Ohio is not one of the states. Most private insurance does not cover hearing aids, and Medicare does not cover hearing aids.^{64,65,69} However, there are some Medicare Advantage Plans or Part C plans that offer hearing benefits.⁷⁰ One Ohio Medicare Advantage Plan covers 1 hearing exam, 3 hearing aid fittings; yet the copay for hearing aids can range from \$700 to \$1000 per hearing aid per year.⁶⁸

Pertaining to Medicaid, an analysis in 2016 of state-by-state coverage revealed that Ohio provides coverage for hearing aids, the initial set of hearing aid batteries, and 3 hours of counseling.⁷¹ In Ohio, Medicaid covers hearing tests and hearing evaluations, counseling, ear molds, hearing aids, warranties, batteries, a cleaning kit, and repairs to the hearing aids and only provides coverage for mild hearing loss.^{66,71,72} However, there are limitations. Reimbursement is limited to 1 hearing aid in 4 years unless there is a special circumstance. In addition, only specific types of hearing aids are covered, and only 1 major and 1 minor repair is covered in a 1-year period.^{66,72} Furthermore, authorization of benefits is required by Medicaid prior to receiving coverage for hearing aids.⁶⁶ Yet, individuals and families may not meet the eligibility criteria for Medicaid because their annual income is over the threshold, but they do not have enough income to offset the burden of cost. Therefore, Ohioans with hearing loss face disparities because of the limitations of health insurance coverage for hearing aids, the cost of hearing aids, and the increased medical expenditures experienced.

Call to Action

The Lancet Commission and World Health Organization aim to continue efforts in preventing and treating hearing loss among populations.^{2,73} Current estimates suggest that 1 in 4 people will have some form of hearing loss by 2050.² A lack of treatment, such as hearing aids, for hearing loss has a detrimental impact on peo-

ple’s ability to function, work, and achieve optimal health. If appropriate early interventions are implemented, then there is potential to mitigate the impacts of hearing loss. Hearing technology (eg, hearing aids) has been identified as a potentially cost-effective approach for addressing hearing impairment.² However, financial costs and lack of insurance coverage persist as substantial barriers in access to care for persons with hearing loss globally, nationally, and among Ohioans. Thus, there is an urgent and critical need for the development of policies and programs that reduce barriers to obtaining needed hearing related services and technology.

We frame our call to action for Ohioans in the Social-Ecological Model.⁷⁴ The Social-Ecological Model provides a foundation for incorporating a wide range of perspectives into action strategies that promote hearing health. With hearing loss there are several practitioners, professionals, and stakeholders that can be leveraged to promote hearing health equity. The Social-Ecological Model holds that actionable approaches are influenced by a myriad of structures, systems, and groups requiring effective interventions to focus on multiple levels of application.

We are applying the Social-Ecological Model as a framework to identify approaches to reduce the burden of hearing loss. The Social-Ecological Model is tailored to show the different levels of society that are interacting and influencing hearing health. This model is organized into 3 categories: Intrapersonal and Interpersonal, Institutional and Community, and Public Policy and Society (Figure 1). Example actions that stakeholders may participate in to promote hearing health among Ohioans are summarized in Table 2.

Intrapersonal and Interpersonal

Extensive research has demonstrated that personal characteristics are associated with hearing loss. Many people who develop hearing loss have a genetic disposition and individual behaviors that



contribute to the onset and progression of hearing loss over the life course. An individual's engagement in behaviors that either exacerbate or protect against hearing loss is related to many factors such as self-efficacy, knowledge, and locus of control.⁷⁵ Some individual level interventions have incorporated a focus on genetic screenings, modifying individual behaviors, or other strategies showing varying effectiveness in promoting hearing health. For instance, the Ohio Hearing Conservation Program is a state-level initiative that aims to increase awareness about preventable hearing loss among school-aged children and to provide information on hearing conservation programs for school personnel who are developing local programs.⁷⁶ Interventions for individuals can be beneficial to implement to prevent, screen, diagnose and treat hearing loss.

Interpersonal dynamics play a critical role in understanding the etiology of hearing loss. Interactions with friends, family, groups, and other social networks can shape behavioral engagement either improving or hindering hearing health. Social support and relationship interactions with others (eg, spouses, health care providers) have been identified as important determinants of health care seeking, engagement in care, and treatment for hearing loss.^{57,77} Several interventions have aimed to incorporate interpersonal relationships, finding that this expansion of focus beyond the intrapersonal level can be effective in promoting engagement and improving outcomes.⁷⁸ Providers in Ohio may seek to incorporate both intrapersonal and interpersonal factors when working to provide adequate care and services to prevent, treat, and manage hearing loss.

Institutional and Community

Persons with hearing loss spend significant amounts of time within institutional and community environments (eg, work, health care services, school, neighborhoods). These contextual exposures are strongly associated with behaviors and health outcomes among persons with hearing loss. Institutional or community settings can provide the foundation for promoting or hindering hearing health.

One of the factors that impacts individuals from obtaining needed hearing related services and technology is lack of access to resources within institutions and communities. Some opportunities are available to some Ohioans. Individuals who experience hearing loss may qualify for financial assistance through organizations that aim to provide financial resources for individuals to purchase hearing aids. The Ohio Department of Health: Children with Medical Handicaps provides financial assistance and assistance with identifying providers. However, this service is limited to Ohio resident children who are under the age of 21 years, under the care of an approved medical doctor, are financially eligible, and have special health care needs.⁷⁹ The Sertoma Hearing Aid Recipient Program by the Lima Noon Sertoma Club is another hearing aid assistance program. It seemingly does not have an age limit for applicants but does require financial information and an agreement to a 1 year follow-up appointment after receiving the hearing aids.⁸⁰ There are other similar programs in urban areas; but rural areas are in need of programs to assist in obtaining needed hearing-related services.

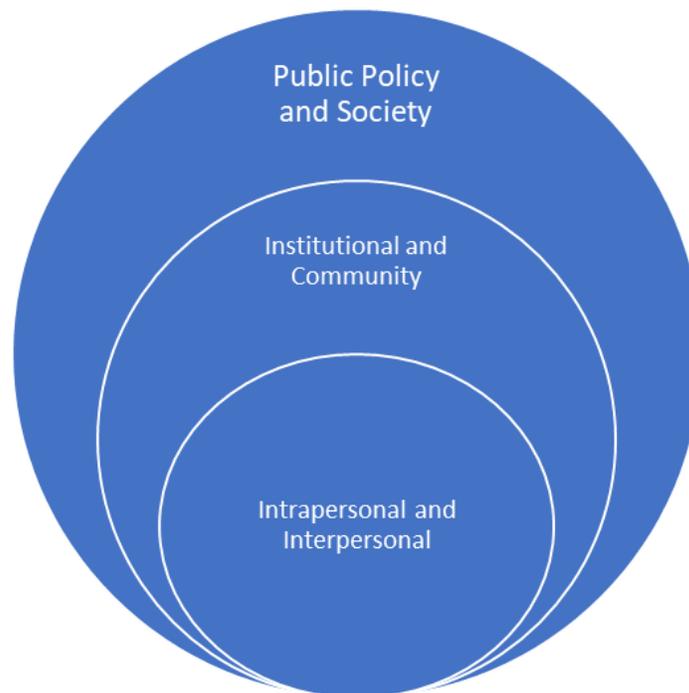


Figure 1. Social-Ecological Model



Table 2. Suggested Actions to Improve Hearing Health Outcomes in Ohio

| Social-Ecological Model Category | Health Care Providers | Public Health Professionals | Politicians | Institutions and Community Organizations | Community Members |
|--|-----------------------|-----------------------------|-------------|--|-------------------|
| Intrapersonal and Interpersonal | | | | | |
| Plan and implement intrapersonal and interpersonal interventions that promote awareness, self-efficacy, knowledge, and locus of control about hearing health and hearing conservation for high-risk populations. | ✓ | ✓ | ✓ | ✓ | ✓ |
| Institutional and Community | | | | | |
| Increase access to resources for hearing related services and technology such as hearing screenings and hearing aids in rural Ohio. | ✓ | ✓ | ✓ | ✓ | |
| Continue supporting the Ohio Department of Transportation traffic noise exposure. | ✓ | ✓ | ✓ | ✓ | ✓ |
| Develop taskforces and coalitions that aim at improving hearing health within communities. | ✓ | ✓ | ✓ | ✓ | ✓ |
| Plan and implement institutional-wide and community-wide programs that increase awareness, self-efficacy, knowledge, and locus of control about hearing health and hearing conservation at places of work, schools, and places of leisure. | ✓ | ✓ | ✓ | ✓ | ✓ |
| Public Policy and Society | | | | | |
| Communicate with state and national level representatives about the need for policy change to improve hearing health outcomes. | ✓ | ✓ | ✓ | ✓ | ✓ |
| Join organizations that aim at creating an equitable policy that improves hearing health for populations experiencing disparities. | ✓ | ✓ | ✓ | ✓ | ✓ |
| Create and implement mechanisms of surveillance. | ✓ | ✓ | | | |
| Begin surveillance of hearing health status and outcomes among Ohioans. | ✓ | ✓ | | ✓ | |
| Develop policies and laws that protect consumers of hearing technology. | ✓ | ✓ | ✓ | ✓ | ✓ |

Another program that has been implemented in Ohio pertains to hearing conservation by limiting traffic noise by constructing walls as barriers.¹⁷ The Ohio Department of Transportation conducts noise assessments and builds walls close to roadways and highways to reduce noise exposure to areas that have high noise exposure because of traffic.¹⁷ These programs are helpful for reducing noise exposure of Ohioans at their homes and workplaces.

Other opportunities within the community that practitioners (audiologists, public health professionals, clinicians, grassroots leaders, coalition members, and community-based workers) and stakeholders can participate in is through coalition involvement. Coalitions can work toward a common goal in hearing conservation and implementing interventions to prevent hearing loss as well as implement policy changes within institutions and governments to promote hearing conservation and hearing loss treatments. One such group is the Ohio Coalition for the Education of Children with Disabilities that focuses on children; however, there is little work pertaining to adults.⁸¹

Institutional programs and community-wide interventions could be key in hearing conservation. The Ohio State University has a

Hearing Conservation Program that they implement to protect the hearing of their workers.⁸² Also, community-wide programs specifically working with farm families can have a wider reach and promote hearing health education.⁸³ Incorporating similar interventions into the workplace or in a community setting can promote hearing health and hearing treatment.

Public Policy and Society

Public policy, through regulatory and legislative channels involving collaborative processes such as lobbying and advocacy, has an impact on persons with hearing loss. Societal engagement through coalition building and strategic plan development is needed to bring about sustainable changes that improve access to and the quality of care for persons with hearing loss. In Ohio political action is ongoing to support the well-being and needs of persons with hearing loss.

Recent Political Action

In 2019, to reduce the burden of hearing aid costs, Ohio House Bill 243 was introduced to the 133rd general assembly.⁸⁴ The goal was to have health care plans cover \$1400 every 36 months for insured children up to 21 years of age; however, the bill died in com-



mittee.⁸⁵ Yet, efforts persist. In March 2021, the 134th general assembly House Bill 198 was introduced. This bill would require health plan issuers to cover hearing aids and related services for individuals 21 years of age and under with \$2500 per hearing aid every 4 years.⁸⁴ One argument is that mandating House Bill 243 or 198 would increase premiums and would be costly. Yet, other states with similar legislation mandates note that premiums have only risen between 5 and 39 cents per insured individual per month.⁸⁶ These bills, although beneficial and progressive, only focus on gaining hearing aid coverage and related services for part of the population; there are still individuals over the age of 21 years that would benefit from similar coverage.

Other political action that recently took place in Ohio pertained to hearing protection and consumer protection. In 2020 a law was amended to allow Ohioans who ride motorcycles to wear earplugs to protect their hearing.⁸⁷ Also, in response to the US Food and Drug Administration considering a proposal to allow over-the-counter hearing aids, the Ohio Attorney General requested clarification of language to allow the states to protect consumers of the over-the-counter hearing aids by ensuring warranties, refunds, and exchanges of the products.⁸⁸

At the national level, the House of Representatives introduced the Medicare Hearing Aid Coverage Act of 2021 (HR 1118) in February 2021.⁸⁹ The aim of the bill is to allow Medicare coverage for hearing examination, hearing aid, and hearing aid-related services as early as January 2022.⁸⁹ Further information is required to be gathered by the Comptroller General of the US about the programs and insurance coverage as well as the number of individuals with hearing loss that need hearing aids.⁸⁹ Should this bill pass, it would provide hearing aid coverage to individuals over the age of 65; however, there are still young adults and children who will not have insurance coverage.

Surveillance

Little information has been gathered about the hearing status of Ohioans. There is a need to have in-depth surveillance of this chronic health condition since hearing loss is associated with several comorbidities, poorer health outcomes, and higher expenditures. Appropriate surveillance can lead to identifying the population's need for prevention, management, and treatment of hearing loss. Moreover, surveillance could potentially lead to evidence-based practices to prevent and treat hearing loss as well as guide policy development to improve the hearing health of Ohioans. Societal initiatives, including public policy development and change, are needed to create adequate surveillance systems.

CONCLUSION

Hearing loss exacts a notable toll on health and well-being globally, nationally, and in Ohio. While initiatives aim to improve access to and the quality of care for hearing loss, many barriers such as costs and lack of insurance coverage continue to impede health promotion and care. The Social-Ecological Model provides a

framework to understand and address these barriers. To reduce the burden of hearing loss, initiatives such as intervention strategies addressing interpersonal and intrapersonal factors, institutional and community-based programs and networks, and policy development and modification within all levels of this model need to be implemented.

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