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Disparities in Hearing Aid Use Among Those With Hearing Loss in Rural and Urban Settings

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ABSTRACT

Objective: To investigate potential disparities in hearing aid use among urban and rural populations with hearing loss.**Study Design:** Cross-sectional analysis.**Methods:** We used pooled data from the 2017 and 2018 rounds of the Medicare Current Beneficiary Survey (MCBS). Our analytic sample was restricted to 8107 participants with hearing loss (those who reported little to a lot of trouble hearing) and with a full set of covariates. Multivariate logistic regression models for the probability of hearing aid use were estimated using a participant's place of residence (rural/urban) and household income relative to the Federal Poverty Level (low and middle income $\leq 200\%$ of Federal Poverty Level (FPL); high income $> 200\%$ FPL) as main exposures.**Results:** In models using place of residence as the main exposure, we found no statistically significant difference in hearing aid use between rural and urban populations. In models combining place of residence with income, we found that respondents in the rural high-income group were at the highest odds for hearing aid use (odds ratio (OR): 1.99, 95% confidence interval (CI): 1.52–2.59) when compared to the rural low and middle-income group and, similarly, for the urban high-income (OR: 1.57, 95% CI: 1.26–1.96) and urban low and middle-income groups (OR: 1.31, 95% CI: 1.02–1.69).**Conclusions:** There are potential interactions of metro status and income regarding hearing aid use that are more pronounced in rural populations. This might allow policymakers to target interventions for hearing loss to rural and low-income populations.**Level of Evidence:** 3

1 | Introduction

Hearing loss is common among older adults in the United States. Fifteen percent of adults over the age of 18 report hearing loss. The prevalence increases with age to the extent that nearly 70% of adults over the age of 70 have hearing loss. While traditionally viewed as a benign aspect of aging, hearing loss does play a role in health and well-being. Previous work linked hearing loss to communication barriers, strained relationships,

underemployment, and reduced financial welfare [1]. In a 2017 report, the World Health Organization estimated the cost of hearing loss to be \$750B annually [2]. Furthermore, a study by Jung and Bhattacharyya demonstrated the extent of the personal financial implications for those with hearing loss. The adjusted odds ratio for unemployment or partial employment in people with hearing loss versus those without was 2.2. Income from work was less common in those with hearing loss, with an adjusted odds ratio of 2.5. For those with income from work,

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individuals with hearing loss made about 25% less than those without loss [3].

In addition to the costs associated with underemployment and reduced financial welfare, recent work revealed associations between hearing loss and adverse aging outcomes including depression, social isolation, cognitive decline, and dementia [4–6]. The total direct healthcare costs for those aged 65 and older with depression have been estimated at \$9.8 billion in 2016—\$930 million out-of-pocket, \$1.4 billion from private insurance, and \$7.4 billion from public insurance [7]. Furthermore, the costs associated with Alzheimer's disease and related dementias (ADRDs) were \$196 billion. Formal and informal care costs using replacement cost and foregone wage methods were \$450 billion and \$305 billion [8].

Fortunately, hearing aids may play a protective role in the negative sequelae of hearing loss by amplifying the spoken word, auditory cues, and background sound stimuli [9]. This may enhance intrapersonal relationships, work performance, and safety. Unfortunately, less than 20% to 30% of adults with hearing loss own and use hearing aids [10]. Affordability, stigma, lack of awareness, and accessibility to providers of hearing care are potential barriers to hearing aid use [11].

Hearing aids can be unaffordable, particularly for older adults with fixed and limited financial resources. The costs of hearing aids average \$4600 per pair or \$2700 per ear [12]. Unfortunately, traditional Medicare, the primary insurer of those aged 65 or older in the United States, does not cover hearing aids or hearing aid fittings. Medicare Part B does cover diagnostic hearing and balance testing. There is a Medicare Part A benefit for cochlear implantation and osteointegrated temporal bone implants [13]. Additionally, traditional Medicare enrollees may have access to a hearing aid benefit with secondary commercial health insurance plans or Medicaid.

Some Medicare Part C (Medicare Advantage) plans cover hearing aids and fittings. The benefit and the coverage amount vary by plan [12]. About half (51%) of Medicare beneficiaries were enrolled in a Medicare Part C plan in 2023. However, the availability of Medicare Advantage plans varies across states, from 2% to 60% of beneficiaries, with lower penetration in rural areas. In 29 states (and Puerto Rico), Medicare Advantage enrollees account for at least half of all Medicare beneficiaries. In contrast, Medicare Advantage enrollment is relatively low (less than 40%) in 16 states and the District of Columbia, including four mostly rural states (SD, ND, WY, and AK) with less than 20% of beneficiaries enrolled [14].

Actual or perceived stigma on the part of the individual with hearing loss is a barrier to hearing aid use. Hearing aids may be visible to casual observers. Wearers may believe hearing aids signify a handicap and need for assistance [15]. This negative perception of hearing aid use is deemed the 'hearing aid effect'. This stigma might be particularly pronounced in rural cultures [16].

Previous work revealed disparities in hearing aid ownership by race and socioeconomic status. Black Americans are significantly less likely to own hearing aids [17]. Moreover, a

longitudinal analysis of US Medicare beneficiaries suggests those in the lowest income brackets experienced an overall decrease in hearing aid ownership from 2011 to 2018. Conversely, beneficiaries in the top income brackets experienced sharp increases in hearing aid ownership during the same period [18]. However, there is a paucity of work examining disparities in hearing aid ownership by urban versus rural location or at the intersection of geographic location and socioeconomic status.

Sixty-one million Americans live in rural areas. They tend to be older and of lower financial means. Rural Americans face barriers to access to care, including geographic considerations, limited transportation options, fewer healthcare providers, and lower rates of commercial insurance coverage with a hearing aid benefit. Not surprisingly, Americans living in rural areas have poorer health outcomes than their urban counterparts. Rates for each of the 10 leading causes of death in 2019 were higher in rural than in urban areas. This included unintentional injuries and Alzheimer's disease, which can possibly be associated with hearing loss. Additionally, those in rural areas have a lower life expectancy than their urban counterparts, and the disparity is widening. In 1999, the age-adjusted death rate in rural areas was 7% higher than in urban areas; by 2019, the rate in rural areas was 20% higher than in urban areas [19].

Hearing loss is more prevalent among adults in rural areas [20]. Progression of hearing loss is associated with comorbidities and behaviors more common in rural populations, including hypertension, diabetes, and tobacco smoking [21]. In addition, rural populations are more likely to experience occupational and recreational noise exposure. Rural Americans are more likely to be employed in fields that utilize heavy equipment and tools. Furthermore, they are more frequent users of all-terrain vehicles, firearms, and personal listening devices [22].

Previous work suggests there is a greater delay in the diagnosis and treatment of hearing loss with regard to cochlear implant services in rural communities [23]. Moreover, surveys reveal delays in hearing aid acquisition and reduced hearing aid ownership among rural Americans. Several factors may pose barriers to hearing aid ownership in rural populations, including hearing care provider shortages, transportation difficulties, financial constraints, and stigma [17]. Geospatial analyses suggest audiologists, the primary providers of hearing care services, are in more metropolitan and higher-income counties in the United States [24]. Lastly, rural adults have poorer access to social support networks, which play a key role in recognizing and coping with hearing loss and consistent hearing aid use [25].

Previous work characterizing hearing care by urban–rural divides has been limited to population-based or clinic-based samples. Moreover, work exploring the intersection of geographic location and socioeconomic status is needed to better understand the impact of geographic location on more vulnerable populations. We sought to characterize the association of hearing aid ownership among adults with hearing loss by geographic location and socioeconomic status in a nationally representative survey of Medicare Beneficiaries. Our A priori hypothesis was that living in rural areas is associated with lower reported hearing aid use among those with hearing loss.

2 | Methods

For this cross-sectional analysis, we pooled the 2017 and 2018 rounds of the Medicare Current Beneficiary Survey (MCBS) data. The MCBS is a nationally representative survey of Medicare beneficiaries that includes demographic, socioeconomic, health status, and healthcare utilization data. While hearing aids are not a covered Medicare Part B benefit, the survey does have specific questions related to hearing loss and hearing aid use. The MCBS uses a rotating panel design with four panels active at a given time. Each year, a new panel is introduced to replace the oldest panel. Medicare is the public health insurance in the United States provided to all citizens 65 years of age and older, and those younger with qualifying conditions. As a secondary analysis of publicly available de-identified data, this study did not require IRB approval.

The two cycles combined included a total of 30,444 individual observations. As some participants were observed in both the 2017 and 2018 study cycles, we decided to include only the first year an individual was observed, yielding a total of 21,361 observations. We excluded from our analytic sample study participants younger than 65 years ($n=3621$), those with normal hearing or incomplete hearing information ($n=8869$), and those with missing location information ($n=5$). Finally, we further excluded participants with an incomplete set of covariates (missing race or ethnicity, $n=517$; education, $n=44$; and activities of daily living (ADL) score, $n=398$) yielding an analytic sample of $n=8107$ participants.

2.1 | Hearing Status and Hearing Aid Use

In order to identify those at risk for hearing aid use we restricted our analyses to participants with hearing loss. Hearing loss was identified based on participant self-report data about (1) hearing aid ownership as identified by the question “Do you own hearing aid(s)” — “yes” or “no,” and/or (2) reporting having a little to a lot of trouble hearing in response to the question “Which statement best describes your hearing [with a hearing aid]?” — “no trouble,” “a little trouble,” or “a lot of trouble.”

2.2 | Metropolitan Classification and Income Status

Our exposure of interest was the rural or urban location in which the participant lived at the time of the survey. Regions were classified according to the U.S. rural-urban commuting area (RUCA) codes used by the U.S. Census Bureau. Rural was defined as a non-metropolitan region with a population of fewer than 50,000 people, while urban was defined as a metropolitan region with a population greater than 50,000 people.

We used the 2017–2018 Federal Poverty Level (FPL) for a two-person (≥ 65 years) household to classify Medicare beneficiaries as high ($\geq 200\%$ FPL) or low and middle-income ($< 200\%$ FPL) based on self-reported household income. Income levels include any source of income, including social security. We used 200% of the federal poverty line as our delineation, as this threshold

is used for Medicaid eligibility in states that expanded their programs under the Affordable Care Act.

To characterize the combined association between metropolitan region and income status, we further categorized study participants into four groups: rural and low-and middle-income, rural and high income, urban and low-and middle-income, and urban and high income.

2.3 | Other Covariates

The selection of additional covariates in our analysis was informed by a previous healthcare utilization framework (Anderson-Aday framework) and the literature on hearing aid use [26]. Sociodemographic variables included age (measured continuously in years), self-reported race (Non-Hispanic White, Non-Hispanic Black, and other), sex (male or female), educational attainment (less than high school, high school or vocational/technical/business degree, and some college or more), and dual Medicare and Medicaid enrollment. Factors specifically related to health status included functional limitations defined by the number of Activities of Daily Living (ADLs) the participant could not complete without help (no functional limitations, at least a functional limitation), and a count of chronic conditions (categorized as 0, 1–2, and 3 or more of the following conditions: cancer, chronic obstructive pulmonary disease/asthma, chronic heart disease, serious mental illness, acute myocardial infarction, hypertension, diabetes, stroke, depression, arthritis, dementia or Alzheimer's disease).

2.4 | Statistical Analysis

First, we explored the characteristics of the analytic sample by metropolitan region-income category. The probability of hearing aid ownership by metropolitan region-income categories was analyzed using a multivariable logistic regression. Our estimates followed a model building approach. We first estimated a model including our main exposure. Second, we additionally adjusted for a subject's age, sex, and race/ethnicity. Finally, we further adjusted for education, chronic comorbidity count, number of functional limitations, and dual Medicaid eligibility. Odds ratios (OR) and 95% confidence intervals (CI) were calculated. The average adjusted predicted (AAP) probabilities for hearing aid ownership by metropolitan region-income group and corresponding 95% CI were also calculated. Significance testing for all analyses was 2-sided with a type I error of 0.05. All analyses included the ever-enrolled survey weights averaged across study cycles to account for the MCBS survey design. Stata/SE 18.0 statistical software was used for all analyses (StataCorp, College Station, TX).

3 | Results

The characteristics of the analytic sample by metropolitan region-income status are presented in Table 1. There were more respondents in the urban groups (6019, 74.2%). The urban respondents and low-income respondents trended older. There

TABLE 1 | Weighted characteristics of older medicare beneficiaries by metropolitan region and income in the 2017–2018 MCBS (N=8107)^{a,b}.

	Total % (95% CI)	Metropolitan region and income			
		Rural-low and middle income % (95% CI)	Rural-high income % (95% CI)	Urban-low and middle income % (95% CI)	Urban-high income % (95% CI)
Proportion		9.6 (8.0, 11.6)	12.5 (10.2, 15.2)	25.2 (23.4, 27.0)	52.7 (49.7, 55.7)
Age, y Mean	75.3 (75.0, 75.2)	76.0 (75.4, 76.7)	73.9 (73.2, 74.7)	76.8 (76.3, 77.3)	74.8 (74.4, 75.0)
Female	48.2 (46.6, 49.8)	56.1 (52.1, 60)	42.2 (38.6, 45.8)	58.8 (56.2, 61.5)	43 (41.2, 44.9)
Race					
White	86.4 (84.3, 88.2)	87.9 (83.9, 91.9)	95.2 (93.1, 97.3)	72.3 (68, 76.6)	90.8 (89.1, 92.4)
Black	6.8 (5.4, 8.4)	10 (5.3, 14.8)	2.4 (0.5, 4.3)	12.6 (9.2, 16)	4.4 (3.2, 5.7)
Other	6.8 (5.6, 8.4)	2.1 (0.5, 3.6)	2.4 (0.6, 4.1)	15.1 (12, 18.2)	4.8 (3.5, 6.1)
Education					
< High school	13.5 (12.2, 14.9)	28.8 (23.2, 34.4)	8.1 (5.8, 10.4)	27.6 (24.8, 30.3)	5.3 (4.4, 6.1)
HS Diploma	51.2 (49.2, 53.2)	59.8 (55.4, 64.1)	56.4 (52.3, 60.5)	56.4 (53.3, 59.5)	45.9 (43.2, 48.6)
≥ Some college	35.3 (33.1, 37.6)	11.4 (8, 14.9)	35.5 (31.7, 39.4)	16 (13.9, 18.1)	48.8 (46, 51.7)
Number chronic conditions ^c					
0	9.2 (8.3, 10.3)	7.9 (6.1, 9.6)	9.6 (6.7, 12.4)	6.9 (5.3, 8.6)	10.5 (9.2, 11.8)
1–2	45.1 (43.5, 46.7)	36.9 (32.9, 40.8)	45.4 (42, 48.8)	39.6 (37.1, 42.1)	49.2 (46.9, 51.5)
≥ 3	45.6 (44.0, 47.3)	55.3 (51.3, 59.3)	45 (41, 49.1)	53.5 (50.9, 56)	40.3 (38.1, 42.5)
Functional limitations ^d					
No functional limitations	71.3 (70.1, 72.5)	59.7 (55.7, 63.6)	78.1 (75.3, 81)	58.5 (55.7, 61.3)	77.9 (76.4, 79.4)
≥ 1 ADL limitation	28.7 (27.5, 29.9)	40.3 (36.4, 44.3)	21.9 (19, 24.7)	41.5 (38.7, 44.3)	22.1 (20.6, 23.6)
Dual medicare-medicaid	6.5 (5.6, 7.5)	14.3 (10.3, 18.3)	0.8 (0.2, 1.4)	18.6 (16.1, 21.1)	0.6 (0.3, 0.9)
Has hearing aid	28.3 (26.9, 29.8)	20.1 (16.8, 23.4)	33.4 (30.3, 36.5)	25.2 (22.9, 27.5)	30.1 (28.1, 32)

^aData derived from the 2016, 2017, and 2018 Medicare Current Beneficiary Survey public use file.^bSurvey weights are applied according to the Medicare Current Beneficiary Survey; percentages are based on the weighted survey sample.^cChronic Comorbidities include: Cancer, chronic obstructive pulmonary disease/asthma, chronic heart disease, serious mental illness, acute myocardial infarction, hypertension, diabetes, stroke, depression, arthritis, dementia, or Alzheimer disease.^dADL—Activity of Daily Living (e.g., bathing or showering, dressing, getting in and out of bed or a chair, walking, using the toilet, and eating).

was a similar distribution of female respondents in urban (49.1%) and rural (49.4%) areas. Urban respondents (5088, 84.5%) and high-income respondents (4594, 93.0%) had a higher report of high school diplomas. Low-income respondents were more likely to report chronic disease, difficulty with activities of daily living, and to be dual Medicaid enrolled. We found more low-income respondents in urban areas (427, 7.9%) dual enrolled in Medicaid than their rural (142, 6.8%) counterparts. Among the four groups, the highest ownership was in the rural and high-income group (37.5%) and urban and high-income (36.1%) beneficiaries relative to the rural and low and middle-income (24.4%) and urban and low and middle-income (29.2%) groups.

The odds ratios for the probability of hearing aid ownership by metropolitan region-income status are presented in Table 2.

All groups had higher odds of hearing aid ownership relative to the rural and low-income group. The largest observed relative difference was between the two rural groups. Specifically, rural-high income beneficiaries with hearing loss had 1.99 times the odds (Odds Ratio [OR]=1.99; 95% Confidence Interval [CI]=1.52–2.59) of owning hearing aids compared to rural low-income beneficiaries with hearing loss. Figure 1 presents the predicted average probability of hearing aid ownership among beneficiaries with hearing loss by metro-income status.

4 | Discussion

In a nationally representative sample of Medicare beneficiaries over 65 years of age with reported hearing difficulty, we

TABLE 2 | Odds Ratio for the probability of hearing aid ownership by metropolitan region type and income group in the 2017–2018 Medicare Beneficiary Survey (MCBS). $N = 8107^a$.

	Model 1		Model 2		Model 3	
	OR (95% CI)	<i>p</i>	OR (95% CI)	<i>p</i>	OR (95% CI)	<i>p</i>
Metropolitan region and income						
Rural-low/middle income	ref		ref		ref	
Rural-high income	2.0 (1.5,2.6)	<0.001	2.2 (1.7,2.9)	<0.001	1.9 (1.5,2.5)	<0.001
Urban-low/middle income	1.3 (1.0,1.7)	0.024	1.4 (1.1,1.8)	0.012	1.4 (1.0,1.7)	0.012
Urban-high income	1.7 (1.4,2.1)	<0.001	1.8 (1.4,2.2)	<0.001	1.5 (1.2,1.9)	<0.001

Note: Model 1 included only the metropolitan region and income group. Model 2 additionally adjusts for age, sex, and race/ethnicity. Model 3 additionally adjusts for education, chronic comorbidity count (among cancer, chronic obstructive pulmonary disease/asthma, chronic heart disease, serious mental illness, acute myocardial infarction, hypertension, diabetes, stroke, depression, arthritis, and dementia or Alzheimer disease), number of functional limitations, and dual Medicaid eligibility.

^aAll analyses included ever-enrolled survey weights to account for the MCBS complex survey design.

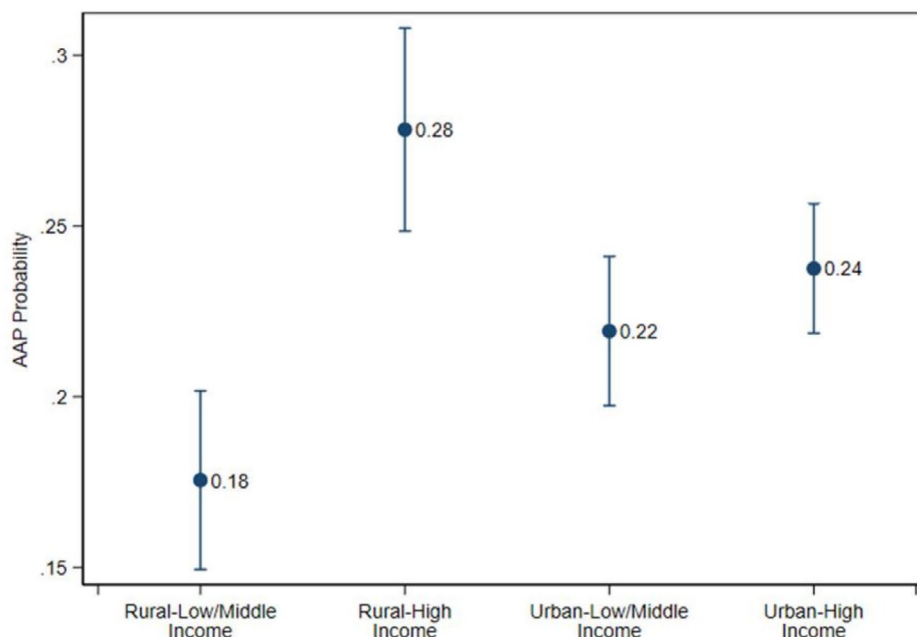


FIGURE 1 | Average adjusted predicted (AAP) probability of hearing aid ownership by metropolitan region–income group.

found that beneficiaries with hearing difficulty living in rural communities with income below 200% of the poverty line were significantly less likely to own hearing aids relative to rural and high-income, urban and low-income, and urban and high-income beneficiaries. Overlapping confidence intervals suggest no significant differences between the other metro-income status groups. While previous work has implicated income and rural disparities in isolation, the potential interactions of metro status and income regarding hearing aid use are novel and suggest complex disparities in hearing care in the United States.

Rural, low-income Americans may face several significant barriers to hearing care. Access to professionals is limited. Audiologists are largely concentrated in urban centers, while hearing aid dispensers tend to spread to more rural areas. However, hearing aid dispensers in rural populations are largely private, for-profit small businesses, sometimes owned by large hearing aid manufacturers, with lower sales volumes and little competition. These business conditions may result in hearing

aids being more expensive in these settings, catering to patients with higher incomes.

Moreover, in rural areas, the low concentration of hearing care providers may mean the nearest hearing aid dispenser is a considerable distance. This would require access to reliable transportation, fuel, time, and possibly the time of a caretaker. Unfortunately, this may result in limited access for lower-income rural Americans.

Disparities in social programs in rural–urban areas may also play a role in the observed differences in hearing aid ownership by metro-income status. There is presumably a more robust health care safety net in urban areas, with non-profit facilities and philanthropic organizations.

The primary strength of the study is that it is a novel examination of the intersection of rurality and income and hearing aid ownership. In addition, the study is generalizable to the general

population. Most people with hearing loss do fall in the age range of a Medicare enrollee. Also, the Medicare population is quite heterogeneous and reflective of the senior population at large.

One limitation of the study is there may be selection bias regarding the Medicare enrollees who participated in the MCBS. It is possible that lower-income or rural enrollees might be harder to reach or less likely to participate in the survey. In addition, hearing loss is defined by self-report, which is not as robust as an objective assessment and diagnosis. Respondents in rural areas might be less likely to report hearing loss due to negative attitudes or stigma associated with the diagnosis. Last, rural and urban populations were determined with the crude cut-off of 50,000. This does not account for respondents in smaller communities within proximity to metropolitan areas.

There are several ways in which the cost of hearing aids can be addressed outside of insurance coverage of the cost. Opportunities include buying aids from vendors that buy in larger quantities, buying basic hearing aid models, and buying hearing aids unbundled from optional services a patient might not need or use. Hearing aids might also be financed with more affordable installments or through health savings accounts (HSA) or flexible savings accounts (FSA) to utilize pre-tax dollars [27]. However, these plans would not be available to those retired or not otherwise participating in the workforce.

As noted, another recent development to address hearing aid access and cost is over-the-counter (OTC) hearing aids. The Food and Drug Administration approved the sale of OTC hearing aids without a prescription in 2022 [27]. OTC hearing aids are suitable for people with mild or moderate hearing loss. They do not require a fitting. They have a maximum output feature that limits volume to reduce the risk of injury. OTC aids typically cost less than half the cost of prescription hearing aids [28].

One policy implication would be for Medicare Part B to cover hearing aids. There have been recent legislative proposals to do so, including the Medicare Hearing Aid Coverage Act of 2023 and the reintroduction of the HEAR act in early 2024. A related policy implication would be to legislate Part C coverage of hearing aids. While some Part C plans have a hearing aid benefit, not all plans do, and it varies in amount. As previously noted, these plans have varying geographic availability and tend to be more available in urban areas. Therefore, legislating or promoting universal access to Part C plans might increase access to hearing aids.

There are alternative programs to finance hearing aids directly. Vocational rehabilitation programs might finance hearing aids for those who have a demonstrated need for work [29]. There is also an opportunity for states to fund a hearing aid benefit directly. In 2024, the predominantly rural state of Wyoming passed Senate File 57, creating the Wyoming Adult Hearing Aid Program. The program is administered directly by the Wyoming Department of Health and allows for adults who do not have a hearing aid benefit from health insurance or any other third-party payer to receive a hearing aid benefit [30].

There are opportunities to recruit and retain providers of hearing-related services to rural communities. In addition,

there is an opportunity to leverage telehealth services to bring outside providers into the community. Telehealth may be best suited for audiology follow-up visits, to evaluate hearing aid fit and instruct on use. Telehealth visits can also utilize affiliated personnel like nurses or audiology technicians to facilitate the visit [31]. Potential barriers to utilizing telehealth in rural areas would include restricted broadband access, technological literacy, and attitudinal barriers.

While attention can be focused on treating those with existing hearing loss, more attention can be directed to the prevention of hearing loss, particularly in rural populations. As previously noted, hearing loss is more prevalent in rural populations. Additionally, rural Americans with hearing loss experience a longer delay in diagnosis and are less likely to be treated. One such program is the Safety Days program administered by the Progressive Agriculture Foundation (PAF) [31].

5 | Conclusion

Hearing loss is a common condition among adults in the United States. Those in rural populations are at increased risk for hearing loss. There is similar use of hearing amplification in Medicare beneficiaries with hearing loss in urban and rural areas. However, there is a potential interaction of location and income regarding the use of hearing aids that is more pronounced in rural populations. We see that the highest utilizers of hearing aids are in rural populations with high income and the lowest utilizers in rural populations with low income.

Further areas of research on this topic include better honing of data to true rural populations. With the dataset, we were able to use the blunt cut-off of a population of 50,000. This does not account for suburban or exurban areas within closer proximity to a metropolitan area. Perhaps this could be done with other datasets or by refining the data using zip codes. In addition, we could look at data on providers of otolaryngology and audiology services, including number, density by population, and distance to travel. We could also investigate other otolaryngology services (e.g., sinus surgery) and see if similar patterns exist regarding metro status and income. The FDA approved the sale of over-the-counter hearing aids, and these became available in October of 2022. It will be informative to examine the impact of this on future hearing aid use by comparing future datasets to those examined in this study.

Future policy implications of this data might include better targeting programs for hearing aids to the rural poor. This adds to the body of evidence to deploy human and financial resources in a more targeted manner for efficiency and maximum impact. Opportunities include those to reduce the cost of hearing aids, increase insurance coverage of hearing aids, improve access to providers of hearing-related care, and increase hearing preservation efforts.

Given the known negative impacts of hearing loss on individuals and on the economy, it is critical to address this common condition. In addition to enhanced focus on the prevention of hearing loss, developing a better understanding of the factors that influence hearing aid use allows policymakers and healthcare

providers to create effective strategies to expand utilization. This is particularly important among the rural poor who are at increased risk for hearing loss and have the lowest rates of use.

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Data Availability Statement

The data that support the findings of this study are openly available in Medicare Current Beneficiary Survey at <https://www.cms.gov/data-research/research/medicare-current-beneficiary-survey>.

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