

Role of general practitioners in managing age-related hearing loss

Julie M Schneider, Bamini Gopinath, Catherine M McMahon, Helena C Britt, Christopher M Harrison, Tim Usherwood, Stephen R Leeder and Paul Mitchell

As our population ages, age-related hearing loss is becoming an increasingly common disability.¹ In a 2007 report on the burden of disease and injury in Australia,² adult-onset hearing loss emerged as one of the leading causes of burden of disease in the 45–64-years age group, for both men and women. Data from the Blue Mountains Hearing Study (BMHS), conducted from 1998 to 2000 among people aged 50 years and over, showed a 31.3% prevalence of bilateral hearing loss.³

Diminished ability to hear and communicate is frustrating, and affects both the individual and other people in his or her environment.⁴ An association between hearing loss and poor quality of life has been established.^{3,5–8} Conversely, the use of a hearing aid is associated with improved self-sufficiency, reduced depression and longer life expectancy.^{6,9} Despite this, there is a high level of unmet need for hearing services among older people, and use of hearing aids is inconsistent.^{3,10,11} The BMHS found that, of the 33% of people with bilateral hearing loss who owned a hearing aid, only 25.5% used it habitually.³

As the point of referral to specialist health care in Australia, general practitioners are integral to the process of detecting age-related hearing loss. However, the extent to which GPs suspect, identify or facilitate the management of hearing loss is questionable. International data suggest that only a minority of suitable patients are being considered for hearing screening.^{12,13} In an American study, 34% of primary care physicians were documented to routinely screen their older patients for hearing function,¹⁴ and in a Danish study, only 7% of GPs were reported to enquire about hearing function in older patients.¹⁵ Very few Australian Medicare items have a mandatory requirement for physical examination of hearing. In Medicare items specific to older people, hearing assessment is included only if identified as an issue of particular relevance to the patient. Yet, some type of confirmation is needed, as patients eligible for federally funded hearing health services provided by the Office of Hearing Service require a voucher application completed by their GP. From 1 July 2010, the Australian Government will introduce a new eligibility requirement specifying

ABSTRACT

Objective: To assess the extent to which general practitioners in Australia are engaged in identifying age-related hearing loss and facilitating its management.

Design, setting and participants: Cross-sectional analysis of data collected between 1998 and 2000 from the Blue Mountains Hearing Study (BMHS), a representative population-based cohort of people aged ≥ 50 years in two postcode areas west of Sydney. Also analysed were data collected between 2003 and 2008 from random samples of Australian GPs who participated in the Bettering the Evaluation and Care of Health (BEACH) study, a national continuous cross-sectional survey of GP activity.

Main outcome measures: Rate of facilitating management and identification of hearing loss in older patients; content of GP–patient encounters with hearing-impaired people; characteristics of participants seeking help from their GP.

Results: Of older people in the BMHS with measured (objective) bilateral hearing loss, about a third reported seeking help from their GP. BEACH survey data showed that only about 3 per 1000 GP consultations with patients aged ≥ 50 years involved management of age-related hearing loss. For every 100 age-related hearing problems managed, GPs undertook 12 procedural treatments, provided 20 referrals to specialists, and made 29 referrals to allied health professionals.

Conclusion: In their routine consultations with patients, GPs have opportunities to identify hearing loss and appropriately refer patients to specialists or allied health professionals. Although GPs are responding to patient presentations for hearing loss, referring around 50% of cases, there appear to be relatively few cases in which hearing loss is identified opportunistically. Levels of identification and management of hearing loss by GPs in Australia are relatively low.

MJA 2010; 192: 20–23

that clients must have a minimum three-frequency average hearing loss of more than 23 dB before a hearing device is fitted.¹⁶ Using these new criteria, the expectation placed on GPs to record action taken on hearing loss could increase.

Using data from two key Australian studies, the BMHS and Bettering the Evaluation and Care of Health (BEACH) surveys, our aim was to ascertain the extent to which GPs are actively engaged in identifying and facilitating the management of hearing loss among older people.

METHODS

The Blue Mountains Hearing Study

The BMHS is a population-based survey of hearing loss among participants of the Blue Mountains Eye Study (BMES), which was conducted in 1992–1994 (BMES-1), 1997–1999 (BMES-2) and 2002–2004 (BMES-3). Survey methods for identifying the original BMES population have been described elsewhere.¹⁷ In brief, a door-to-door census of

two postcode areas west of Sydney identified 4433 eligible residents aged ≥ 49 years, of whom 3654 (82.4%) participated in detailed eye examinations over the period 1992–1994 (BMES-1). This geographically well defined area has a stable population, representative of New South Wales and Australia in measures of both socioeconomic status and income.

At the 5-year follow-up of the BMES (BMES-2), a detailed hearing examination was conducted (the BMHS), commencing in 1998 and finishing in 2000. Of the original 3654 participants, 575 had died and 383 had moved from the area by the time of hearing examinations, leaving 2696 eligible subjects. Of these, 2015 (74.7%) had their hearing tested. An additional 941 eligible people who had been identified in a repeat door-to-door census in 1999 (having recently moved to the area or entered the ≥ 50 -years age group) participated in the hearing examinations. Thus the total number of participants in the BMHS was 2956 (an overall response rate of 75.5% for the cross-section).

Pure-tone audiometry was performed in the BMHS by audiologists in sound-treated booths, using Madsen OB822 audiometers and TDH-39 earphones (Madsen Electronics, Copenhagen, Denmark). Bilateral hearing impairment was determined by the pure-tone average of audiometric hearing thresholds at 500, 1000, 2000 and 4000 Hz (PTA_{0.5-4.0kHz}) in the better ear. Any hearing loss (HL) was defined as PTA_{0.5-4.0kHz} > 25 dB HL, and moderate-to-severe hearing loss as PTA_{0.5-4.0kHz} > 40 dB HL.

Participants were first asked, "Do you feel you have a hearing loss?" Those answering "yes" were then asked, "Have you sought help or spoken to any professional about your hearing loss?" and "Have you received treatment or support services for your hearing loss?" For both questions they were asked to choose from the following responses: family doctor; ear, nose and throat specialist; audiologist; hearing service; and/or self-help group.

Bettering the Evaluation and Care of Health data

The BEACH program continuously collects information about clinical activities in general practice in Australia, including GP and patient characteristics, reasons for seeking medical care, problems managed and actions resulting. BEACH surveys use a cross-sectional, paper-based data collection system developed and validated over 30 years.

Each year, BEACH surveys collect data from about 1000 GPs who each record 100 consecutive consultations, thus providing an annual database of about 100 000 records. Participating GPs are randomly selected from a Medicare claims list of active GPs (ie, those who have provided more than 375 GP services in the previous quarter).¹⁸ Patient reasons for seeking a consultation (up to three per consultation), problems managed (up to four) and treatments provided for each problem are classified using the *International classification of primary care*, 2nd edition (ICPC-2)¹⁹ and coded more specifically in ICPC-2 Plus.²⁰

For our study, we used BEACH data to analyse hearing loss identification and management at encounters with patients aged ≥ 50 years in general practice during the period April 2003 to March 2008. Hearing problems were selected using the following codes:

- ICPC-2 codes: H02 (hearing complaint), H28 (limited function/disability of the ear) and H84 (presbycusis); and
- ICPC-2 Plus codes: H86003 (deafness), H86004 (conductive deafness) and H86007

1 Hearing loss identified among participants in the Blue Mountains Hearing Study, 1998–2000 (n = 2816)*

		Objective hearing loss [†]	
		Present	Not present
Subjective hearing loss [‡]	Present	742 (78.5%)	704 (37.6%)
	Not present	203 (21.5%)	1167 (62.4%)

* Analysis includes only the 2816 participants for whom complete hearing data were available. † Defined as measured bilateral hearing loss of > 25 dB. ‡ Participants answering "yes" to the question, "Do you feel you have a hearing loss?" ♦

(partial bilateral deafness). (Other ICPC-2 Plus terms classified under H86, such as congenital and total deafness, were excluded.)

Statistical analysis

SAS software, version 9.1 (SAS Institute, Cary, NC, USA), was used to perform χ^2 tests. Survey methods in SAS take into account the cluster design of the BEACH data. Non-overlapping 95% confidence intervals indicated a statistically significant difference between the point estimates.

Ethics approval

The BMHS was approved by the University of Sydney Human Research Ethics Commit-

tee, and written informed consent was obtained from all participants. The BEACH program is approved by the Australian Institute of Health and Welfare Ethics Committee and the University of Sydney Human Research Ethics Committee.

RESULTS

BMHS findings

In the BMHS cross-section of 2956 subjects, 2816 had complete data on both measured and self-reported hearing loss. A third (945 [33.6%]) were identified as having measured (objective) bilateral hearing loss (> 25 dB HL) (Box 1). Among this group, many were aware of their impairment (78.5%) and over half (61.1%) reported seeking some form of help for it. The proportion of people who had sought help was strongly associated ($P < 0.001$) with the severity of the hearing impairment (mild, 51.3%; moderate, 76.9%; severe, 95.6%).

Of those aware of their hearing loss, 35.3% reported seeking help from their GP (Box 2). However, only 6.4% of those seeking some form of help reported receiving referral for treatment or support services for their hearing loss from their GP. About one in seven (14.8%) of those who reported seeking help indicated that no treatment or referral was provided.

More female (62.0%) than male participants (54.0%) reported seeking help from their GP, but the difference was not significant ($P = 0.08$). Participants who indicated

2 Reports of seeking and receiving help for hearing loss among participants with objective hearing loss in the Blue Mountains Hearing Study, 1998–2000*

Help-seeking among participants aware of a hearing loss (n = 742)	Number (%) of participants [†]
Any help	453 (61.1%)
Help from general practitioner	262 (35.3%)
Help from audiologist	179 (24.1%)
Help from other hearing service	157 (21.2%)
Reports of receiving treatment or support among participants seeking any help (n = 453)	
From GP	29 (6.4%) [‡]
From ear, nose and throat specialist	71 (15.7%)
From audiologist	133 (29.4%)
From other hearing service	148 (32.7%)
No treatment or referral provided	67 (14.8%)

* Sixteen responses were missing for type of help sought. Eighty-six responses were missing or unsure for treatment or support received. † Up to three responses could be selected for each question, thus the numbers and percentages are not exclusive. ‡ Those reporting receiving treatment/support from other hearing professionals may have been referred by their GP without them perceiving this as treatment/support from their GP. This may have contributed to low numbers for GP treatment/support. ♦

3 Management rates for hearing problems among patients with age-related hearing loss* in BEACH surveys, by sex and age group, April 2003 to March 2008

	All cases of hearing loss [†]		New cases of hearing loss		
	Number of encounters	Variable-specific rate/1000 encounters (95% CI)	Number of encounters	Variable-specific rate/1000 encounters (95% CI)	New cases as % of all cases
Encounters (n = 231 460)	688	3.0 (2.7–3.2)	261	1.13 (0.98–1.27)	37.9%
Sex					
Male (n = 96 732)	337	3.5 (3.1–3.9)	134	1.39 (1.13–1.64)	39.8%
Female (n = 132 961)	348	2.6 (2.3–2.9)	127	0.96 (0.78–1.12)	36.5%
Age group					
50–64 years (n = 100 307)	217	2.2 (1.9–2.5)	87	0.87 (0.68–1.05)	40.0%
65–74 years (n = 59 046)	189	3.2 (2.7–3.7)	76	1.29 (0.97–1.60)	40.2%
≥ 75 years (n = 72 107)	279	3.9 (3.4–4.3)	98	1.36 (1.08–1.64)	35.1%

BEACH = Bettering the Evaluation and Care of Health. * Age-related hearing loss included *International classification of primary care*, 2nd edition (ICPC-2) codes H02 (hearing complaint), H28 (limited function/disability of the ear), H84 (presbycusis) and ICPC-2 Plus codes H86003 (deafness), H86004 (conductive deafness) and H86007 (partial bilateral deafness), but excluded other ICPC-2 Plus terms classified under H86 (such as congenital and total deafness). † Three responses were missing for both sex and age categories. ◆

they had received help from at least one hearing health professional were more likely to be currently using hearing aids (88.2%) than those who reported receiving help first from a GP (58.6%) ($P < 0.001$).

BEACH findings

Of the 485 300 encounters recorded over the period April 2003 to March 2008, 231 460 (47.7%) were with patients aged ≥ 50 years, and 688 (0.3%) of the encounters in this group involved management of a selected hearing problem. Of the 4853 participating GPs, 99.9% recorded at least one encounter with a person aged ≥ 50 years,

but only 603 (12.4%) managed any of the selected hearing problems.

The management rate of hearing problems among men (3.5/1000 encounters) was significantly higher than among women (2.6/1000 encounters), and increased significantly with patient age, from 2.2/1000 encounters among patients aged 50–64 years to 3.9/1000 encounters among patients aged ≥ 75 years (Box 3). New cases of age-related hearing loss ($n = 261$) accounted for 37.9% of the total recorded contacts and were managed at a rate of 1.13/1000 encounters in the ≥ 50 years age group. New cases showed the same pattern as total cases, with higher rates among

men as well as higher identification rates with increasing patient age (Box 3). Very few hearing problems ($n = 6$ [0.9%]) were considered by the GP to be work-related. There was no significant difference in the management rate of hearing problems among patients in major cities compared with those in other areas.

At 82% of new hearing problem encounters and 71% of follow-up visits for the hearing problem, at least one of the patient's expressed reasons for the encounter was ear-related. More than two-thirds of these included descriptions of hearing symptoms/complaints or deafness, and a further 10% were requests for ear checks or for referrals for ear problems.

For every 100 hearing problems managed, GPs undertook 12 procedural treatments (eg, drainage); provided 20 specialist medical referrals (mostly to ear, nose and throat specialists); and made 29 referrals to allied health professionals (predominantly for acoustic testing or audiology) (Box 4). GP management actions for new cases of hearing loss did not differ significantly from those for all cases.

DISCUSSION

BMHS data suggest that older people who self-reported hearing loss were more likely to seek help when the loss was moderate to severe, and more likely to seek help first from their GP than from an audiologist or hearing service. Only a small proportion reported receiving treatment or support from their GP, but many reported receiving treatment from a specialist or audiologist/hearing service, suggesting that they may have been appropriately referred by their GP without necessarily perceiving this as "treatment".

4 Summary of BEACH data: management actions for all patients with age-related hearing loss ($n = 688$), April 2003 to March 2008

Management action	Number of actions	Management rate/100 age-related hearing loss problems managed (95% CI)
Medications	22	3.2 (1.7–4.7)
Prescribed/supplied	17	2.3 (1.0–3.7)
OTC medication advised	5	0.7 (0.1–1.4)
Other treatments		
Clinical*	77	11.2 (8.7–13.7)
Procedural [†]	82	11.7 (9.3–14.5)
Referrals	352	51.2 (47.3–55.0)
Specialist [‡]	134	19.5 (16.4–22.6)
Allied health professional [§]	202	29.4 (25.9–32.9)
Other	16	2.3 (1.2–3.5)
Tests and investigations		
Pathology tests ordered	13	1.9 (0.0–3.8)
Imaging ordered	12	1.7 (0.8–2.7)

OTC = over-the-counter (non-prescription). * Predominantly administration, advice/education and counselling. † Predominantly removal of earwax. ‡ Predominantly ear, nose and throat specialists. § Predominantly acoustic testing practitioners and audiologists. ◆

In their routine work with patients, GPs have the opportunity to detect hearing loss and to refer patients to appropriate hearing health providers. However, according to BEACH data, there were relatively few encounters with patients aged ≥ 50 years in which GPs detected or managed hearing loss. In most cases it was patients themselves who identified an ear problem as a reason for the encounter, suggesting that few cases of hearing loss were discovered opportunistically. BEACH data indicated that, of patients seen for age-related hearing loss by their GP, about half were referred to a specialist (20%) or allied health professional (30%) at their first or subsequent presentation. It is not known whether the remaining non-referred patients were in need of, but did not receive, further management. They may already have been under the care of a specialist and/or audiologist, requiring only periodic interventions from the GP, such as drainage or flushing.

A number of factors may contribute to low rates of GP involvement in detecting and managing age-related hearing loss, including time constraints, inadequate remuneration, and lack of awareness of simple tools to identify hearing loss or of the benefits of hearing rehabilitation. With increased Internet access, web-based education has the potential to promote earlier identification of age-related hearing loss in general practice by improving knowledge and communication.²¹⁻²³ However, no web-based training for GPs on age-related hearing loss is currently available. Early intervention, screening and education were three of five critical areas identified by our group for inclusion in a national hearing health policy.²⁴ These could all be addressed by educating GPs about age-related hearing loss and promoting their role in identifying it.

Our study was limited by the nature of the BMHS, a localised metropolitan study that relies on self-report. This can be problematic, as self-report is subject to recall bias and help-seeking behaviour by older people may not be similar in all areas. Another limitation was the presentation only of decibels of hearing loss rather than measures of hearing disability (eg, the Hearing Handicap Inventory). However, a significant correlation exists between measures of impairment (dB HL), hearing handicap and quality of life, with greater hearing impairment being associated with greater handicap.¹¹

In summary, our findings are an important contribution by revealing the relatively low levels of identification and management of hearing loss by Australian GPs. Further

research exploring GPs' knowledge and attitudes towards hearing loss, and individual barriers to the identification and referral of hearing-impaired patients is needed. Greater emphasis on GPs is required if we are to increase the number of older people who receive the benefits of timely and efficacious treatment for age-related hearing loss.

ACKNOWLEDGEMENTS

We thank the GPs who participated in BEACH surveys between 2003 and 2008. During this data collection period, the BEACH program was funded by the Australian Government Department of Health and Ageing, the Australian Institute of Health and Welfare, the National Prescribing Service, AstraZeneca, Abbott Australasia, Janssen-Cilag, Merck Sharp & Dohme (Australia), Pfizer Australia, Roche Products and Wyeth Australia. The BMES was supported by grants from the National Health and Medical Research Council. We would also like to thank Elena Rohtchina for overseeing our statistical analyses.

COMPETING INTERESTS

None identified.

AUTHOR DETAILS

Julie M Schneider, BAppSc(Hons), PhD, Postdoctoral Researcher¹

Bamini Gopinath, BTech(Hons), PhD, Postdoctoral Researcher²

Catherine M McMahon, PhD, Head of Audiology³

Helena C Britt, BA, PhD, Director⁴

Christopher M Harrison, BPsych(Hons), MSocHlth, Senior Analyst⁴

Tim Usherwood, MD, BS, Professor of General Practice⁵

Stephen R Leeder, MD, PhD, Director¹

Paul Mitchell, MD, PhD, FRANZCO, Director²

¹ Menzies Centre for Health Policy, University of Sydney, Sydney, NSW.

² Centre for Vision Research, Department of Ophthalmology, Westmead Millennium Institute, University of Sydney, Sydney, NSW.

³ Centre for Language Sciences, Department of Linguistics, Macquarie University, Sydney, NSW.

⁴ Family Medicine Research Centre, School of Public Health, University of Sydney, Sydney, NSW.

⁵ Department of General Practice, Western Clinical School, University of Sydney, Sydney, NSW.

Correspondence:

paul_mitchell@wmi.usyd.edu.au

REFERENCES

- Wallhagen MI, Strawbridge WJ, Cohen RD, et al. An increasing prevalence of hearing impairment and associated risk factors over three decades of the Alameda County Study. *Am J Public Health* 1997; 87: 440-442.
- Begg S, Vos T, Barker B, et al. The burden of disease and injury in Australia 2003. Canberra: Australian Institute of Health and Welfare, 2007. (AIHW Cat. No. PHE 82).

- Chia EM, Wang JJ, Rohtchina E, et al. Hearing impairment and health-related quality of life: the Blue Mountains Hearing Study. *Ear Hear* 2007; 28: 187-195.
- Arlinger S. Negative consequences of uncorrected hearing loss — a review. *Int J Audiol* 2003; 42 Suppl 2: 2S17-2S20.
- Mulrow CD, Aguilar C, Endicott JE, et al. Association between hearing impairment and the quality of life of elderly individuals. *J Am Geriatr Soc* 1990; 38: 45-50.
- Kochkin S, Rogin CM. Quantifying the obvious: the impact of hearing instruments on quality of life. *Hear Rev* 2000; 7: 8-34.
- Heine C, Browning CJ. The communication and psychosocial perceptions of older adults with sensory loss: a qualitative study. *Ageing Soc* 2004; 24: 113-130.
- Gopinath B, Wang JJ, Schneider J, et al. Depressive symptoms in older adults with hearing impairments: the Blue Mountains Study. *J Am Geriatr Soc* 2009; 57: 1306-1308.
- Appollonio I, Carabellese C, Frattola L, et al. Effects of sensory aids on the quality of life and mortality of elderly people: a multivariate analysis. *Age Ageing* 1996; 25: 89-96.
- Jee J, Wang JJ, Rose KA, et al. Vision and hearing impairment in aged care clients. *Ophthalmic Epidemiol* 2005; 12: 199-205.
- Dalton DS, Cruickshanks KJ, Klein BE, et al. The impact of hearing loss on quality of life in older adults. *Gerontologist* 2003; 43: 661-668.
- Bogardus ST Jr, Yueh B, Shekelle PG. Screening and management of adult hearing loss in primary care: clinical applications. *JAMA* 2003; 289: 1986-1990.
- Wallhagen MI, Pettengill E. Hearing impairment: significant but underassessed in primary care settings. *J Gerontol Nurs* 2008; 34: 36-42.
- Johnson CE, Danhauer JL, Koch LL, et al. Hearing and balance screening and referrals for Medicare patients: a national survey of primary care physicians. *J Am Acad Audiol* 2008; 19: 171-190.
- Parving A, Christensen B, Sorensen MS. Primary physicians and the elderly hearing-impaired. Actions and attitudes. *Scand Audiol* 1996; 25: 253-258.
- Australian Government 2009-10 Health and Ageing portfolio budget statements. Budget related paper No. 1.10. Canberra: Commonwealth of Australia, 2009.
- Attebo K, Mitchell P, Smith W. Visual acuity and the causes of visual loss in Australia. The Blue Mountains Eye Study. *Ophthalmology* 1996; 103: 357-364.
- Britt H, Miller GC, Charles J, et al. General practice activity in Australia 2007-08. Canberra: Australian Institute of Health and Welfare, 2008. (AIHW Cat. No. GEP 22.)
- World Health Organization. International classification of primary care, 2nd edition (ICPC-2). Oxford: Oxford University Press, 1998.
- Britt H. A new coding tool for computerised clinical systems in primary care — ICPC Plus. *Aust Fam Physician* 1997; 26 Suppl 2: S79-S82.
- Weston CM, Sciamanna CN, Nash DB. Evaluating online continuing medical education seminars: evidence for improving clinical practices. *Am J Med Qual* 2008; 23: 475-483.
- Fordis M, King JE, Ballantyne CM, et al. Comparison of the instructional efficacy of Internet-based CME with live interactive CME workshops: a randomized controlled trial. *JAMA* 2005; 294: 1043-1051.
- Sly JL, Lombardi E, Kusel M, et al. Piloting a web-based continuing professional development program for asthma education. *Int J Med Inform* 2006; 75: 708-713.
- Smith JL, Mitchell P, Wang JJ, et al. A health policy for hearing impairment in older Australians: what should it include? *Aust New Zealand Health Policy* 2005; 2: 31.

(Received 8 Jun 2009, accepted 15 Sep 2009) □