



Journal of
*The Association of Hearing Instrument
Practitioners of Ontario*

Signal

Summer/2012 • Edition 94

Cardiovascular Health
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The Association of Hearing Instrument
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Gateway Plaza, 55 Mary Street West, Suite 211,
Lindsay, ON K9V 5Z6
Tel: 705-328-0907 | Toll Free: 1-888-745-2447
Fax: 705-878-4110 | www.helpmehear.ca

Editor-in-Chief
Lisa Simmonds Taylor

Contributing Writers
Helaine Alessio, Kathleen Hutchison, Vivienne Saba-Gesa,
Joanne Sproule, Lisa Simmonds Taylor, Brian Ward

Editorial Advisory
Vivienne Saba-Gesa
Joanne Sproule

Managing Editor
Scott Bryant

Art Director/Design
Andrea Brierley
abrierley@allegrahamilton.com

Circulation Coordinator
Brenda Robinson
brobinson@andrewjohnpublishing.com

Accounting
Susan McClung

Group Publisher
John D. Birkby
jbirkby@andrewjohnpublishing.com

Distribution

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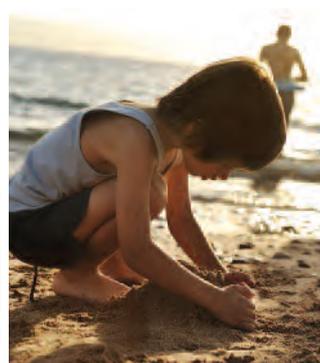
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The Association of Hearing Instrument
Practitioners of Ontario
Gateway Plaza, 55 Mary Street West,
Suite 211, Lindsay, ON K9V 5Z6
T: 705.328.0907 • TF: 1.888.745.2447
F: 705.878.4110 • office@ahip.ca
www.helpmehear.ca

Directors



Edmond Ayzazyan, H.I.S.
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Dear Members,

Where do I begin? What an amazing 2012 Symposium! This was in large thanks to the tireless efforts of Chris Helik and Maggie Arzani and to the manufacturers for their continuous support of AHIP members.

I would like take this opportunity to congratulate the newly elected AHIP Board of Directors. To date, you would have received a membership mailing detailing the various committees as well as updates on our progress since the Annual General Meeting. Your newly elected board has much work to do on your behalf. A strategic plan has been established to focus on AHIP's third party relations, public relations, educational standards as well as building our relations with CASLPO, CHIPS, and CHHA.

I strongly encourage you as AHIP members to please let your thoughts be heard. If you have any concerns or have any suggestions on specific issues please call or e-mail the AHIP office at office@ahip.ca. We would be pleased to help clarify any issue or have your suggestions fully discussed at the next meeting of the AHIP Board of Directors. We are a team, let us all work together in a united front to continue to provide professional, quality hearing health care to the hard of hearing of Ontario.

Respectfully Submitted,

Vivienne Saba-Gesa, H.I.S.
AHIP President



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Dear Members,

This edition of the *Signal* highlights a look back at the quality education obtained and the fun and memories made at Symposium 2012. It was also a time to celebrate AHIP's 25th Anniversary and recognize all those who have dedicated so much to ensure the highest levels of hearing health services and ethical standards continue to be available to the hard of hearing of Ontario.

I am also extremely pleased to have recently attended on behalf of AHIP, the National Canadian Hard of Hearing Association (CHHA) convention in Ottawa at which they celebrated their 30th Anniversary. CHHA is a non-profit, self-help consumer organization run by and for persons who are hard of hearing. Through self help initiatives, public awareness and political involvement their goal is to remove barriers and make every community in Canada a better place for persons who are hard of hearing.

Happy Birthday AHIP! You look fabulous but who doesn't at 25? Our 25th Annual Symposium was an event to remember, once again flawlessly pulled off by our symposium chairs Chris and Maggie. They are starting to make it look easy and trust me it is not. A lot of work goes on all year long to plan for the event. In fact, the dust hasn't even settled before they start working on next year's gathering.

The food and speakers were fantastic and the entertainment was top notch. Thank you Sharon Canzi for taking pictures with your gigantic camera. You have captured a few moments we will not soon forget. Speaking of moments not soon forgotten, I saw Carol Burnett coming out of the Fallsview Casino Hotel elevator. I gave her a big friendly "Hi!" because she looked familiar so I figured she was with us. It was only after she returned my greeting and the elevator door had closed that I figured out who she was. I am not one to be star struck but she is a legend so yeah, I thought it was pretty cool.

The Ontario Chapter of CHHA currently has fifteen (15) branches which include: Barrie, Durham, Hamilton, Kingston, London, Muskoka-Parry Sound, Ottawa, Orillia and District, Ottawa Valley, Sault Ste. Marie, Sudbury, Toronto, Thunder Bay, Windsor, and York.

The AHIP Board is initiating discussions with CHHA to find ways to support Ontario CHHA initiatives. In addition, the board encourages individual members where branches currently exist to examine ways to help in your communities.

Respectfully Submitted,

Joanne Sproule
Executive Director



As for content for this edition of the *Signal*, we have a member interview with Brian Ward who thrilled us with his guitar at the AHIP Birthday Bash. Did You Hear? topics include the link between hearing loss and risk of falling as well as a relationship between sleep apnea and an increased risk of sudden hearing loss, super hero hearing aids and the first national guideline for sudden hearing loss. We have advice on how to implement Ontario's newest accessibility standards and an article examining the associations between cardiovascular health and hearing. Have a safe and sunny summer everyone!

Lisa Simmonds Taylor, BA, H.I.S.
AHIP Secretary, Editor-in-Chief



Spotlight On...

Brian Ward

By Lisa Simmonds Taylor, BA, HIS



AHIP's 25th Birthday Bash at Symposium 2012 starred the all-member band that somewhere along the way became known as the AHIPsters. The band is made up of a group of members with varying degrees of experience and expertise. None are more experienced or accomplished than Brian Ward. Brian has wowed us with his electric guitar solos over the years; however, this year we were also treated to a solo acoustic guitar performance. The pieces showcased intricate finger picking and harmonics and even featured a Brian Ward original. The performance was impromptu, encouraged by the other members of the band. Brian wouldn't have suggested he end the show solo, he doesn't pay too much attention to his ego. It is my pleasure to perform with Brian and to interview him for this edition of the *Signal*.

What intrigued you about this profession and how did you get started?

I was particularly interested in health care and my previous experience with music and audio production was a natural fit with working in the field of hearing health care. The transition from working with music to working in this field was very intriguing to me. Since both fields involve working with people and audio there are a lot of similarities, so working to help those who live with hearing loss every day was a natural choice. I was inspired to become involved in the hearing health care field early on since it was "in the family" - prior to becoming a pediatric endocrinologist my sister was an audiologist/speech language pathologist, and she definitely influenced my path.

What jobs did you have prior to becoming a hearing professional?

Prior to entering this field, I was a full-time musician in a group called The Gandharvas. The band was signed to MCA/Universal with recordings released in Japan, Canada, and the U.S.A. As a co-founder and member of the band from its beginning to end, the rigorous cycle of writing, recording, doing videos, and touring is definitely some of the most challenging work I've done. I've also enjoyed working as a music educator for a number of years focusing mainly on guitar instruction. It's great to teach students of all types and ages because it helps keep you fresh and inspired, and watching people flourish as they learn and develop new skills is very rewarding. Very early on, (and much before easy access to the Internet), I worked at a new and used CD/record shop where I had the privilege of being influenced by many different styles of music from around the world that I otherwise wouldn't have

experienced - it really helped to diversify and shape me as a person and a musician.

What do you think has been the best event/achievement in your life so far, either professional or personal?

Like all of us, there have been many memorable events/achievements along the way. I like to think of these positive events in daily life as "small victories." As a hearing health care professional, one of those "best" events occurs every day as the result of doing what we all strive to do by enriching lives through better hearing ability and more effective communication. I feel that it's always a "best" event or an achievement when we can truly affect in a positive way how someone relates to the world around them. As a professional musician and band member, receiving a Juno nomination for Best New Group and MuchMusic MMVA nominations was an achievement. There were many memorable events that occurred while performing on tour in the United States and Canada in arenas and outdoor festivals - it's always a memorable event when you're creating music with others and performing for thousands who are all experiencing a positive vibe as the result of the music they're listening to you create live. On a personal level, my wedding day was certainly a fantastic and memorable event that I always think of with great fondness.

What are your hobbies/interests?

Hiking, canoeing, camping, snorkelling, reading about my family's genealogy, doing music-related activities (i.e., writing and recording music in my studio), reading non-fiction, viewing films and documentaries (especially those that are historical - my grandfather lived through WWI after being bayoneted and gassed, and I'm very interested to know about the experience of soldiers like my grandfather and civilians alike, and how the human spirit can have triumph over adversity).

Definitely take a moment to check out some of The Gandharvas tunes online. You will not be disappointed. And if you don't know what a Gandharva is (I didn't) you can look that up on Wikipedia. It is an appropriate handle. Brian is not only extraordinarily talented but extremely humble, kind and caring. He is an asset to our profession and the cherry that sits atop our annual taste of the AHIPsters.



Hearing Loss is Risk Factor for Falls

Hearing loss has been linked with a variety of medical, social and cognitive ills, including dementia. However, a new study led by a Johns Hopkins researcher suggests that hearing loss may also be a risk factor for another huge public health problem: falls.

The finding could help researchers develop new ways to prevent falls, especially in the elderly, and their resulting injuries that generate billions in health care costs in the United States each year, by some estimates.

To determine whether hearing loss and falling are connected, Frank Lin, MD, PhD, at Johns Hopkins, and his colleague Luigi Ferrucci, MD, PhD., of the National Institute on Aging, used data from the 2001 to 2004 cycles of the National Health and Nutrition Examination Survey. This research program has periodically gathered health data from thousands of Americans since 1971.

During those years, 2,017 participants ages

40 to 69 had their hearing tested and answered questions about whether they had fallen over the past year. Researchers also collected demographic information, including age, sex and race, and tested participants' vestibular function, a measure of how well they kept their balance. Their findings are published in the Archives of Internal Medicine.

Lin, and Ferrucci found that people with a 25-decibel hearing loss, classified as mild, were nearly three times more likely to have a history of falling. Every additional 10 decibels of hearing loss increased the chances of falling by 1.4 fold. This finding still held true, even when researchers accounted for other factors linked with falling, including age, sex, race, cardiovascular disease and vestibular function. Even excluding participants with moderate to severe hearing loss from the analysis didn't change the results.

Lin, an otologist and epidemiologist, says among the possible explanations for the

link is that people who can't hear well might not have good awareness of their overall environment, making tripping and falling more likely.

Another reason hearing loss might increase the risk of falls, Lin adds, is cognitive load, in which the brain is overwhelmed with demands on its limited resources.

"Gait and balance are things most people take for granted, but they are actually very cognitively demanding," Lin says. "If hearing loss imposes a cognitive load, there may be fewer cognitive resources to help with maintaining balance and gait."

Funding support for this study was provided by the National Institutes of Health.

http://www.betterhearing.org/press/news/Hearing_loss_risk_factor_for_falling_pr03052012.cfm

Hawkeye and the Blue Ear Help a Mother and Her Hearing Impaired Son

Not content with being one of the stars of this summer's uber-successful Avengers movie (and having a new solo series launch this summer), Marvel Comics' Hawkeye is now teaming up with fellow hearing impaired hero the Blue Ear to help boost one real-life kid's confidence and inspiring him to wear his hearing aid. Pretty good for an archer, right?

The kid in question is four-year-old New Hampshire resident Anthony Smith, who was refusing to wear his "blue ear" hearing aid because, he explained, superheroes don't wear hearing aids. Desperate for help, Anthony's mother Christina D'Allesandro wrote to Marvel, hoping to discover a superhero that proved him wrong – and that's where the man with the bow, arrows and penchant for purple clothing comes in (Maya Lopez a.k.a. Echo is another hearing-impaired character in Marvel's stable of heroes, although unlike Hawkeye, she is completely deaf and wouldn't benefit from a hearing aid).

Hawkeye, as longtime fans know, has been hearing-impaired since a battle with Crossfire in the 1980s, something that editor Bill Rosemann relayed after reading Christina's e-mail, as he told Robot 6:

Tom Brevoort [Marvel's Senior Vice President of Publishing] brought up Hawkeye's loss of hearing back in the '80s, which spurred me to send a shot of the West Coast Avengers #1 cover to Christina, suggesting that she tell Anthony that not only do superheroes definitely wear hearing aids, but that he could be an honorary Avenger if he wore his.

But the idea of inspiring Anthony didn't stop there. Rosemann continues: Lauren Sankovitch passed the e-mail to Nelson Ribeiro in Collected Editions, who then delivered his full-color Mighty Marvel Masterpiece spotlighting the brave Blue Ear. Finally, Tom Brennan reached out to Manny Mederos in the Bullpen, who then drew his awesome team-up shot of Hawkeye and

Blue Ear. So just as every one of our comics can only reach readers through the action of many hands, this too was truly a team effort.

The artwork did its job, according to D'Allesandro. "it's just so captivated Anthony and his little buddies," she explained to the Concord Monitor, adding that the boy has shared the images with friends and been inspired to start wearing his hearing aid no matter what. Even when he complains about the discomfort, she says, "I tell him he has to hear people calling for help. He gets the whole connection. He's loving it."

http://www.betterhearing.org/press/news/Hawkeye_and_the_Blue_Ear_Help_a_Mother_and_Her_Hearing_Impaired_Son_pr05242012.cfm

First National Guideline for Sudden Hearing Loss Published

The first national treatment guideline for sudden hearing loss, a frightening condition that sends thousands in the U.S. to the emergency room each year, was published this month in the journal Otolaryngology–Head and Neck Surgery.

The guideline was developed by a 19-member panel led by Robert J. Stachler, MD, an otolaryngologist in the Department of Otolaryngology–Head & Neck Surgery at Henry Ford Hospital in Detroit.

"In most cases, patients will have multiple visits with several physicians and undergo extensive testing before a diagnosis is made. There's also been a lack of one or more uniformly accepted treatments, or a consensus on how to counsel patients who do not fully recover their hearing," says Dr. Stachler.

"By focusing on opportunities for quality improvement, the guideline should improve diagnosis, reduce unnecessary tests and imaging procedures, and improve hearing for patients affected by sudden hearing loss."

The diverse panel of medical experts – which included Henry Ford's Kathleen L. Yaremchuk, MD, chair of the Department

of Otolaryngology–Head & Neck Surgery, and Christopher A. Lewandowski, M.D., a physician in emergency medicine – developed the guideline after reviewing the literature and reaching a consensus for patient diagnosis, management and follow-up care.

Sudden hearing loss is the rapid-onset – generally during a 72-hour period – of hearing impairment in one or both ears. Patients typically report having a feeling of a full or blocked ear. In many cases, evaluation and treatment are often delayed since its symptoms are so common and non-specific, according to Dr. Stachler.

Causes of sudden hearing loss range from infection and trauma to inner ear problems like Meniere's disease.

The new guideline includes: Recommendations to help clinicians distinguish conductive hearing loss from sensorineural hearing loss in patients with sudden hearing loss. Both are common causes of hearing loss, but they have very different treatment strategies.

Information to better educate patients about the benefits and risks of medical intervention.

A range of amplification and hearing assistive technology available to those patients with incomplete recovery of hearing.

Recommendations against clinicians ordering computerized tomography (CT) of the head/brain as part of the initial patient evaluation.

The guideline is intended for all clinicians who see adult patients, ages 18 and older. In addition, the guideline covers sudden sensorineural hearing loss (SSNHL), a subset of sudden hearing loss. About 4,000 new cases of SSNHL are reported in the U.S. each year. While most patients recover completely without medical intervention, about 15 percent of those with SSNHL experience hearing loss that gets worse over time.

The complete guideline is published as a supplement to Otolaryngology–Head and Neck Surgery, and is available online at www.entnet.org.

http://www.betterhearing.org/press/news/New_guidelines_sudden_hearing_loss_pr04042012.cfm

Sleep Apnea, Sudden Deafness Linked

A New Taiwanese Study Suggests That People Suffering From Obstructive Sleep Apnea (Osa) Are At A Slightly Greater Risk of Developing Sudden Hearing Loss.

OSA is a nighttime disorder that causes pauses in breathing during sleep. Previous studies had linked untreated OSA to high blood pressure, heart attack, irregular heartbeat, heart failure, obesity, diabetes, unusual daytime sleepiness and an increased risk of injury and death due to drowsiness.

Researchers at the Taipei Medical University Hospital reviewed health records of one million people including 19,000 individuals with sleep apnea. The results showed that from 3,200 cases of sudden deafness 240 were suffering from

sleep apnea before experiencing the hearing problem, said the report published in the *Archives of Otolaryngology–Head & Neck Surgery*.

After considering factors like obesity and heart disease that could be related to both sleep apnea and hearing loss, Dr. Jau-Jiuan Sheu and colleagues found that men with sudden deafness were 48 percent more likely to have a previous sleep apnea diagnosis.

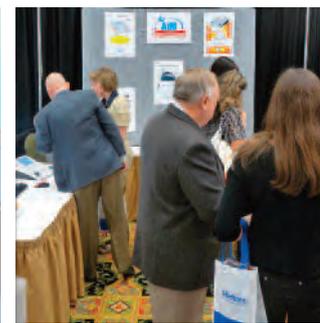
Although the absolute difference was small and just 0.5 percent, researchers

suggested in cases of sudden hearing loss, doctors may investigate the presence of apnea, which is easy to diagnose and treat among different associated risks. Researchers suggested that inflammation and changes in blood vessels linked to sleep apnea could contribute to the risk of deafness.

http://www.betterhearing.org/press/news/Sleep_apnea_and_hearing_loss_pr232012.cfm



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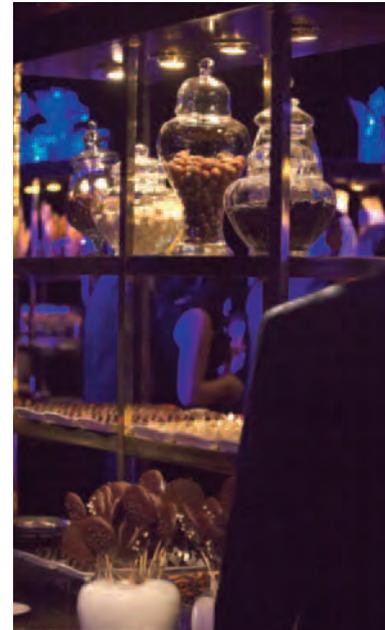
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Symposium 2012 Entertainment & Candid Moments



Accessibility Standard for Customer Service: Getting Started Guide for Employers

Organizations with Fewer Than 20 Employees Becoming Accessible

Accessible customer service is not about ramps or automatic door openers. It's about understanding that people with disabilities may have different needs.

This guide will help you: understand the standard and what you need to do; create your plan on accessible customer service; and train your staff.

The Accessibility Standard for Customer Service applies to all people or organizations in Ontario that provide goods or services, and have one or more employees.

It affects these sectors: Private, Non-profit, Public.

To provide accessible customer service, organizations need to do the following steps outlined below.

Create and Put In Place A Plan

- Considers a person's disability when communicating with them
- Allows assistive devices such as wheelchairs, walkers and oxygen tanks
- Allows service animals
- Welcomes support persons
- Lets customers know when accessible services aren't available
- Invites customers to provide feedback

Train Staff On Accessible Customer Service

A. Create an accessible customer service plan: Develop and put in place a plan that outlines how you will provide goods or services to people with disabilities. Put the customer first – and let the principles of independence, dignity, integration and equality of opportunity guide you.

Tips:

- Make a list of what you do every day to provide customer service.
- Identify potential barriers for people with

disabilities. Use this information to refresh existing – or create new – ways of doing things.

Examples

A clothing store might decide to exempt people with disabilities from its no-refund return policy because its fitting rooms are not wheelchair accessible.

A grocery store has a practice of placing rolls of plastic bags for produce on top of the produce shelves. By placing the rolls lower, people who use mobility devices can access the bags without assistance.

Consider A Person's Disability when Communicating with Them

Accessible customer service is often about finding ways around barriers faced by your customers. Ensuring staff know what's expected of them when they communicate with customers with disabilities will help you deliver accessible customer service.

Tips

- Consider how people with various disabilities communicate.
- Ask your customers how you can best communicate with them.
- Ask yourself how can I make communication accessible? Every situation is different and depends on an individual's needs. Get more details on various **ways to communicate**.

Example

A dance studio offers their class schedule in paper format at the front desk. When a customer with low vision asks for the schedule in Braille, the manager explains that it is not available in Braille, but is available in an accessible format on the studio's website. This works for the customer because she has a screen reader at home that reads what is displayed on the website.

Another customer, who has a learning disability, is having difficulty understanding a particular part of the schedule and simply asks the manager to read that part to him aloud.

Allow Assistive Devices

An assistive device is any piece of equipment a person with a disability uses to help them with daily living. Some examples include: a wheelchair, screen reader, listening device or cane.

Tips

- Consider how you will address the use of a customer's assistive device.
- Will you offer helpful measures, such as carry-out service or delivery?
- Are there any dangers on your premises – and how will you address them? For example, an open flame could be dangerous for someone with an oxygen tank.

Example

Janet can walk short distances and uses a scooter. It is often difficult to find space in a busy restaurant to park her scooter. She finds it helpful when staff suggest parking options and make space.

Allow Service Animals

Guide dogs are not the only type of service animal. Other kinds of animals, such as cats or rabbits, can be trained to help people with disabilities too.

Welcome service animals into your workplace or business. If a service animal is excluded by law, provide another way for the person to access your goods and services.

Tips

- Identify the areas of your organization open to service animals.
- Do you need to do anything different to serve people with service animals?
- How else will you provide service, if service animals are excluded by law?

Example

A restaurant allows service animals into its dining room and bar but since other legislation prevents

animals from entering the kitchen, staff meet with suppliers or sales reps with service animals in the office upstairs.

Welcome support persons

A support person does not have to be a paid support worker. He or she can be a family member or a friend.

Support persons help someone with a disability perform daily tasks. Often people who have a support person are not able to do things by themselves, such as eat meals, use the washroom or change their clothes. Without support, that person may be unable to access your organization.

Welcome support persons to your workplace or business. Let people know if you charge an additional fee for a support person. This fee needs to be clearly stated in advance.

Tips

- Think about how your services are used by people with a support person.
- Decide how you will deal with special situations or services.
- Consider what parts of your premises are open to the public.
- Develop and clearly state the admission fee, if your organization sets a fee for support persons.

Example

A movie theatre posts a notice on its website and at its ticket window that support persons will be charged 50% of the admission fee when accompanying a person with a disability.

Let Customers Know When Accessible Services Are Not Available

Sometimes accessibility features or services require repair or are just temporarily out of service (e.g., an elevator or accessible washroom). When this happens, let your customers know by posting a notice.

Tips

- Make a list of the facilities and services people with disabilities rely on.
- Prepare a template notice in advance. Include:

the reason for the disruption, how long the service will be unavailable and a description of alternative facilities or services, if available.

- Post the notice in a place where people are most likely to find it (e.g., the entrance door to your business, on your website, another high-traffic area).

Example

A dry cleaning business must remove the ramp in front of their store for a few weeks. They post a sign outside and leave a message on their phone explaining the situation. Both the sign and the message explain that repairs are being done, give the date when the ramp will be available again, and offer to meet customers outside if they call ahead in order to pick up or drop off garments.

Invite customers to provide feedback

A good way to learn about barriers that exist in your workplace is to collect comments from your customers with disabilities. Invite customers to give feedback on how you provide accessible customer service. Let customers know how to do this.

Tips

- Determine how you want to receive feedback (e.g., in person, by telephone, in writing or by email).
- How will you respond to feedback, including complaints?
- How will you let customers know about the process?

Example

An inn posts a sign in its lobby, and includes a notice on the receipt that visitors receive when they check out, informing them that they can submit feedback at the front desk, by phone or through the inn's website. The sign states that details about its feedback/complaints process are available online.

Train Your Staff On Accessible Customer Service

Members of your organization who either work with customers or create customer service plans should be trained. It could be housekeeping staff at a hotel or even an organization's chief policy maker. The most effective training will be customized to the needs of

your organization and should include:

- An overview of the Accessibility for Ontarians with Disabilities Act, 2005 and the requirements of the customer service standard
- Your organization's plans to provide accessible customer service
- How to interact with people with various types of disabilities
- How to interact with people with disabilities who use an assistive device or require the assistance of a service animal or support person
- How to use any equipment or devices available at your workplace to assist people with providing goods or services to people with disabilities
- What to do if a person with a disability is having difficulty accessing your organization's goods or services.

Tips

- Determine who needs to be trained. Start with employees, volunteers, agents, contractors and others who interact with the public on your behalf.
- Remember to train new staff soon after they are hired, offer refreshers if you make changes to your plan.
- Use our Training Tips to get your staff on board.

Example

A toy store employs three full-time sales associates as well as two seasonal part-time employees who take orders over the phone. The sales associates receive training on accessible customer service, and so do the part-time employees because they interact with customers over the phone.

Questions?

For more detailed information you can also read our Employer Handbook

Visit ontario.ca/AccessON

Or contact:

Toll-free: 1-866-515-2025

TTY: 416-325-3408 / Toll-free: 1-800-268-7095

Fax: 416-325-3407

From:

http://www.mcscs.gov.on.ca/en/mcscs/programs/accessibility/customerService/under_20_get_start.aspx

Why Accessibility is good for Ontario

ac'ces'si'bil'i'ty [ak-ses-uh-bihleete] noun

Accessibility simply means giving people of all abilities opportunities to participate fully in everyday life.

now

1 in 7 people in Ontario have a disability, that's **1.85 million Ontarians**.

1 in 7



soon

By 2036, that number will rise to **1 in 5** as the population ages.

1 in 5



Customers with disabilities are a growing market no business can afford to overlook.



In the next 20 years, an aging population and people with disabilities will represent **40% of total income in Ontario**

— that's **\$536 Billion**.

A more accessible Ontario is good for our economy and our communities.

360,000

Ontario businesses and organizations affected by Ontario's accessibility law. It helps them meet the needs of people with disabilities and **attract their growing spending power**.



Improved accessibility in Ontario can help generate up to:

\$9.6 Billion in new retail spending & **\$1.6 Billion** in new tourism spending

To learn more about how we are making Ontario more accessible, visit: ontario.ca/AccessON



facebook.com/AccessON



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youtube.com/accessontario

Data credits:

- Ontario Ministry of Community and Social Services
- Ontario Population Projections 2008-2036, Fall 2009 Ministry of Finance Report
- Participation and Activity Limitation Survey 2006, Statistics Canada
- Martin Prosperity Institute, Releasing Constraints: Projecting the Economic Impacts of Improved Accessibility in Ontario, June 2010

Examination of the Associations between Cardiovascular Health and Hearing: Comparative and Historical Perspectives

By Kathleen M. Hutchinson and Helaine M. Alessio



About the Authors

Kathleen M. Hutchinson (far left) is with the Department of Speech Pathology and Audiology, Miami University Oxford, OH USA. She can be contacted by e-mail at: Hutchik@muohio.edu.

Helaine M. Alessio is with the Department of Kinesiology and Health, Miami University Oxford, OH USA

ABSTRACT

Purpose: Recent evidence has revised popular views about age-associated hearing loss, and has uncovered variables other than age that play a significant role in the decline in sensory function over time. The purpose of this review is to describe a quarter century of progress in understanding factors, other than age, that are associated with presbycusis, focusing on the influence of cardiovascular health.

Methods: Scientific evidence investigating noise exposure, cardiovascular health, personality, and other health variables was critically examined in this literature review.

Results: Over 25 years of research investigating hearing loss over time indicates that although aging plays a part, multiple factors, and in particular, cardiovascular health, impacts the rate and age at which hearing sensitivity is compromised and presbycusis occurs.

Conclusions: Factors other than age contribute to hearing sensitivity, opposing the long-standing expectation that hearing loss declines with age. Cardiovascular health is a powerful mediator of hearing sensitivity and individuals with high cardiovascular fitness can maintain better hearing acuity well into adulthood.

According to the Canadian Community Health Survey and the National Population Health Survey, hearing impairment is a common chronic condition in later life. In both Canadian studies, the prevalence of hearing loss increased with age and sociodemographic factors such as marital status,

education, and income did not matter, except that hearing loss was more common among men.¹ Hearing loss interferes with effective communication, may disrupt work performance, compromise safety, impact interpersonal relations, and lead to depression. Because the number of older adults is

expected to double in size over the next 20 years, and will represent roughly 20% of the United States population,² the preservation of hearing is a national health concern. Already, the number of people in the world, ages 65 and older, increases at an average rate of 870,000 each month.

Presbycusis is a peripheral and/or central auditory decrement over time.³ For years, hearing loss was expected to decline with age, starting at around age 30. It is well known that noise exposure accelerates the loss of hearing acuity and after varying periods of time, causes a permanent noise-induced hearing loss. Additionally, a common finding is the great individual variation in hearing change among older adults of the same age. However, studies of different cultures and cohorts have shown that depending on where and when one lives often determines the amount of noise exposure and hearing loss. Recent experiments have reported that hearing loss is caused by the general effects of a variety of factors,⁴ some within and some outside of a person's control. For example, the presence or absence of regulatory legislation requiring the reduction of noise exposure in the workplace, individual access to hearing protective equipment, use of ear bud headphones, or even knowledge about the consequences of noise exposure, may influence both the amount of noise and behaviour that ultimately affect hearing conservation.⁴

Methods

Primary sources from peer-reviewed literature investigating multiple factors associated with presbycusis and noise-induced hearing loss were consulted in this review. Assessment of hearing sensitivity focuses on pure tone threshold (PTT) and temporary threshold shift (TTS). PTT is considered an objective criterion to establish hearing ability based on a person's response to pure tone stimuli at different frequencies. TTS is a short-term hearing decrement caused by brief noise exposure. Hearing thresholds typically recover from TTS after brief noise exposure. While intensity, duration, and frequency of noise exposure are key determinants of this phenomenon, other factors independent of these noise characteristics may also influence this effect. For example, underlying correlates such as

psychological profiles,⁴ body temperature,⁵ physical exercise,⁶ and variations in middle ear impedance and acoustic reflex properties⁷ have been shown to influence susceptibility to TTS. A reduction of blood flow through the inner ear as a result of generalized peripheral vasoconstriction which occurs in response to loud noise may also be an underlying determinant of TTS.⁸ The cardiovascular system is believed to play a significant role in regulating hearing sensitivity. Current concepts in auditory physiology include active mechanisms that serve to counteract the effects of trauma and stress. The effect of simultaneous noise exposure and cardiovascular responses to exercise has come under scrutiny in both leisure and work environments. This review begins with a discussion of underlying correlates of permanent hearing loss in addition to the role of cardiovascular health in regulating hearing sensitivity, first reported by Alessio and Hutchinson in 1991.⁹

Environmental Noise

The effect of environmental noise, referred to as sociocusis, is known to influence the progression of presbycusis depending on the amount of time and level of noise exposure at work, leisure or home settings. In some settings, sociocusis is negligible. For example, hearing loss is rare in Mabaans, a population indigenous to central Africa, where individuals have little to no exposure to industrial noise in this area of Southeast Sudan. The fact that the perceptual hearing loss of Mabaan adults over 60 years of age is indistinguishable from young adolescents suggests a correlation between auditory capabilities and the healthy and active lifestyle of the Mabaan people.¹⁰ Many people who live in industrialized countries are exposed to environmental noise unfamiliar to the Mabaans and do not typically live active lives that include regular harvesting and hunting. Despite the typical industrial, musical, entertainment, and motorized sounds, noise exposure is moderated in most developed countries through work regulations, educational efforts, and safety precautions including mufflers and earplugs required in noisy workplaces. Additionally, many people use hearing protection during routine activities (e.g., lawn mowing) that involve loud noise.

In contrast, recent popularity of listening to music via

ear bud headphones has caused young individuals to suffer premature hearing loss, resulting in hearing sensitivity levels equivalent to individuals who are decades older.¹¹ Exposure to noise through music performance is another potential mediating factor that contributes to hearing loss. Axelsson and Lindgren¹² found that pure tone thresholds among 59 of the 139 musicians tested showed more hearing loss than would be expected with age, worsening at age 60. Similarly DiSalvo¹³ and Deatheradge¹⁴ investigated hearing sensitivity among 33 younger instrumentalists and vocalists and found no definitive evidence indicating whether a young adult who plays a musical instrument or spends considerable time exposed to music has a greater risk of hearing loss compared to a group of 33 non-musicians. Physical fitness levels were similar in both groups and results included only young adults. Nevertheless, the use of specialized earplugs by professional musicians may assist in protecting hearing sensitivity, especially over time.

Genetics

Hearing loss results from a number of causes and can be characterized as congenital or acquired. Approximately six of every 1,000 newborns have a significant hearing problem at birth, and more than 4,000 babies are born with hearing loss each year.² Advances in genetics have led to the identification of genes that cause hearing loss; as many as half of individuals with hearing loss may have a genetic origin. For example, the connexin 26 (CX26) genetic disorder causes disruption of potassium flow in the inner ear with subsequent hearing loss.¹⁵ Genetic factors play a major role in onset and progression of hearing loss, susceptibility to hearing loss due to noise exposure, and responsiveness to intervention, although the environment and disease processes may contribute to the degree and severity of hearing loss.¹⁵

Behavioural Factors

A common finding in audiology research is that the same noise exposure may result in different levels of either temporary or permanent threshold shifts among similar-aged individuals. This variability complicates the ability to draw conclusions about a cause-and-effect of noise and hearing loss. A study

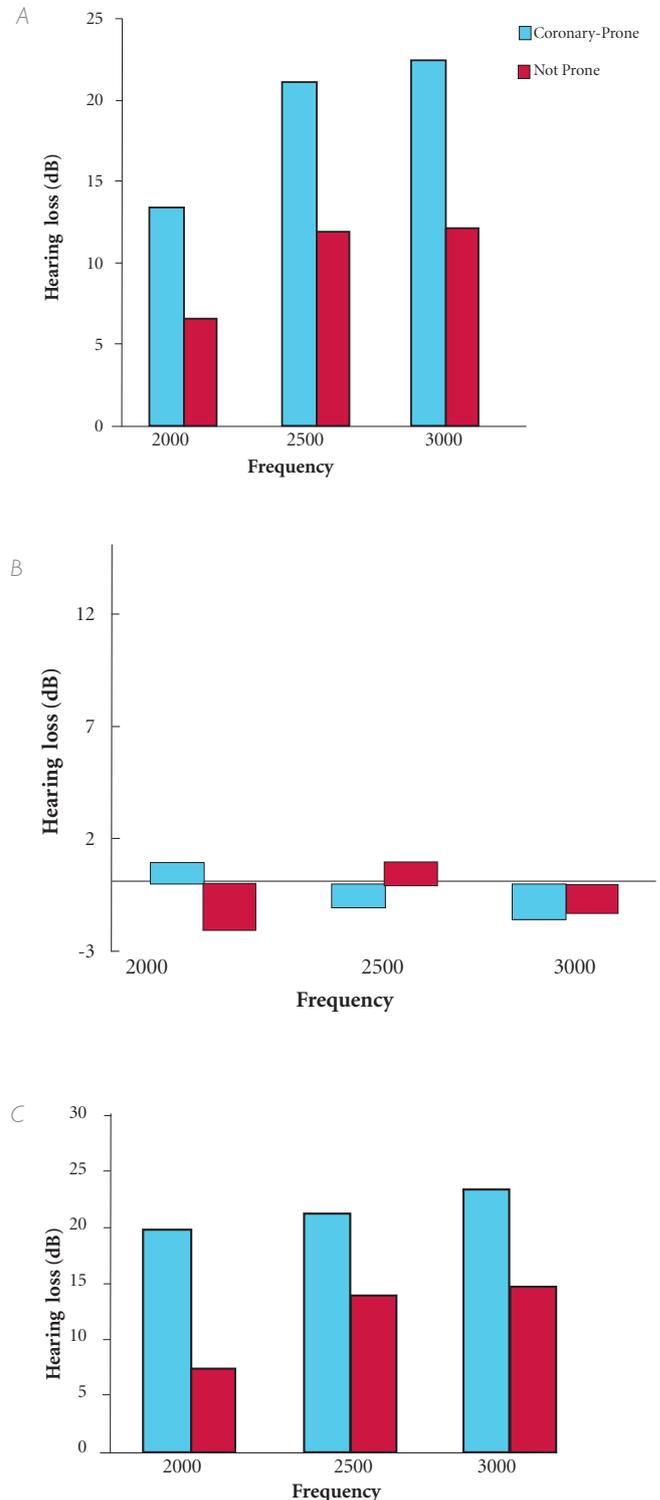


Figure 1 Hearing levels in dB HL at 2000, 2500, and 3000 Hz in coronary-prone and noncoronary-prone groups following 10 minutes of noise (A), exercise only (B), and noise and exercise (C).

by Ickes et al.¹⁶ on stress reaction indicated that individuals who had higher intensive reactions to stress ended up with prolonged peripheral blood vessel constriction, which in turn may have reduced blood circulation in the inner ear. When sorted into type A (coronary-prone) and type B (non-coronary prone) personality types, and exposed to 100 dB SPL noise, type A persons demonstrated increased vasoconstriction compared with persons categorized as type B. Without direct measurements of hearing sensitivity, the authors of this study could only hypothesize that the effects of prolonged vasoconstriction in type A would likely result in higher risk for TTS.

TTS and blood pressure were assessed by Dengerink et al.¹⁷ who concluded that hearing sensitivity was related to an individual's general stress response to noise. The link between personality and hearing sensitivity appeared to be mediated by blood pressure and circulation.

Hutchinson and Alessio¹⁸ investigated the interaction of personality, noise, and hearing sensitivity with a group of individuals categorized as coronary prone, according to the Myers-Briggs test, which consistently identifies sensing/judging (SJ) preferences within the type A behaviour complex. When compared with a control group of noncoronary-prone individuals, the coronary prone group had worse hearing levels at 2000 Hz following 10 minutes of noise (13.7 ± 5.1 vs. 6.5 ± 2.4 dB) and following 10 minutes of noise accompanied by exercise (19.7 ± 4.4 vs. 7.4 ± 2.4 dB; $p < .05$). Evidence of TTS following either noise or noise and exercise in the coronary-prone group occurred independently of differences in circulatory and heart rate measures compared with a control group, indicating other stress mechanisms besides cardiovascular reactivity that contribute to temporary hearing loss (Figure 1).

Exercise: Acute versus Chronic

Study of the effects of exercise on hearing sensitivity,

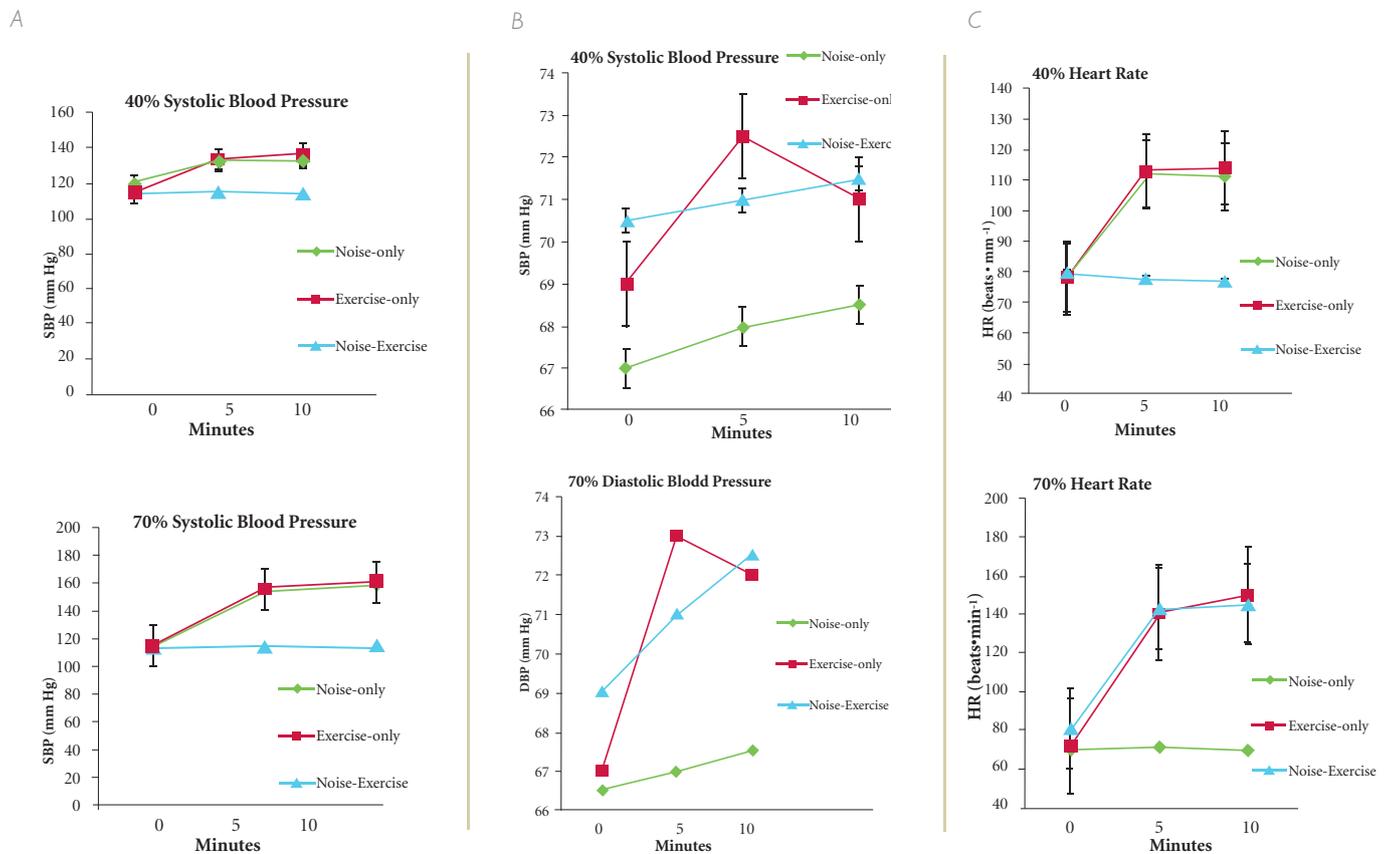
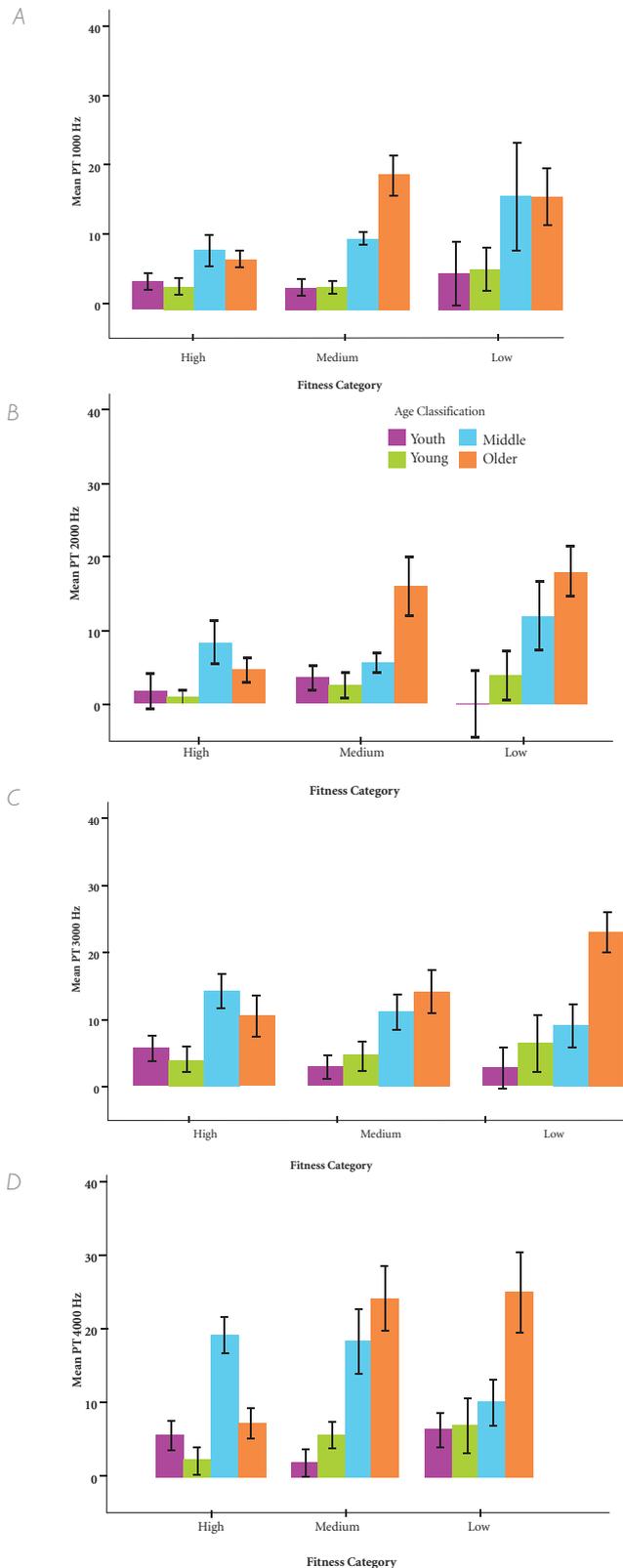


Figure 2. Systolic blood pressure (SBP) during 40% and 70% of VO max with and without noise (A), Diastolic blood pressure (DBP) during 40% and 70% exercise with and without noise (B), Heart rate (HR) during 40% and 70% exercise with and without noise (C).



Figures 3A–D. Mean pure tone threshold (PTT) at 1000, 2000, 3000, and 4000 Hz (\pm SD) in dB HL by fitness level and age classification. The population was separated into four age groups: 10–19, 20–27, 28–48, and 49–78 years, each of similar group size.

has produced intriguing results over the years. In 1971 Saxon and Dahle¹⁹ tested a traditional activation theory by assessing auditory thresholds at 1000 Hz during rest and following a stressor. The authors chose acute exercise, which consisted of a 2.5 minute step test, as the stressor. They reported that auditory threshold sensitivity was significantly reduced following exercise-induced high heart rate compared with rest; supporting a contention that acute and intense arousal impairs hearing sensitivity. This study was the first to recognize a relation between cardio-vascular adjustments to acute exercise and hearing loss.

Shortly after Saxon and Dahle’s 1971 publication, Ismail et al.²⁰ investigated the impact of chronic exercise on hearing sensitivity. Sixty-four adults between 23 and 62 years of age took part in an eight-month study. After measuring cardiovascular fitness levels, 54 of the 64 adults were equally divided into low, medium, or high physical fitness categories and 10 control subjects were also sorted into an appropriate fitness group. Then, over eight months, the experimental group participated in thrice-weekly hour-long supervised conditioning activities, which included 20 minutes of calisthenics followed by running, and team sports, according to individual preferences. Before and following the conditioning program, PTT, and TTS following noise exposure were compared in all individuals as well as a number of health-related physiological variables. Results from Ismail’s study indicated that chronic exercise was successful in improving biomarkers of cardiovascular fitness, including percent lean body weight, resting, submaximal, and maximal heart rate. Maximum oxygen uptake (VO_2 max) the benchmark assessment for cardio-vascular health and fitness, also improved 21% after 8 months of participating in regular exercise. In contrast, the control group reported no changes in any health-related variables after eight months. Although pure tone thresholds did not improve in the experimental group, individuals in the experimental group were less susceptible to temporary threshold shifts, indicating that the individuals who exercised recovered faster from auditory fatigue following the eight-month conditioning program. This was the first report that associated cardiovascular fitness with enhanced auditory function.

The beneficial role of exercise in mediating hearing sensitivity was questioned in a 1981 study. Sanden and Axelsson²¹ reported temporary hearing loss in young adults who exercised for 10 minutes at 40% of VO₂ max while simultaneously listening to 104 dB SPL noise. The authors hypothesized that elevated blood temperature associated with acute exercise compromised cochlear reserve and function and caused TTS. The authors cautioned against participating in aerobic exercise activity that included vigorous and bouncy movements accompanied by loud music, by placing blame on the exercise activity more than the noise exposure. The same caution appeared in a brief magazine report by Navarro,²² warning readers of the risk of hearing loss from exercising to loud music. The Sanden and Axelsson study and brief report by Navarro both referred to the potential harm from combining vigorous exercise and noise exposure, but surprisingly, both considered exercise rather than noise to be the cause of hearing loss.

Hutchinson and Alessio²³ questioned the assertion that either PTT or TTS could be influenced by noise combined with exercise and physiological responses to exercise, regardless how vigorous, to a greater extent than actual noise exposure. They compared the effect of low (40% of VO₂ max) and high (70% of VO₂ max) intensity exercise with and without 104 dB SPL of noise on TTS. Figure 2 shows that heart rate, blood pressure, and core temperature increased in proportion to exercise intensity and were not changed above resting levels by noise exposure alone²³⁻²⁵ TTS occurred following noise exposure only, with and without exercise of either intensity. These results refuted Sanden and Axelsson and Navarro's concerns that exercise contributes to temporary hearing loss when performed with noise exposure.

Hutchinson and Alessio noticed a surprising trend among participants in the early studies (1991, 1992, 1994, and 1996): the more physically fit subjects tended to perform better on the audiology

tests than less physically fit subjects. This finding led to further investigations of hearing sensitivity among low, medium, and highly fit adults. Results indicated that high cardiovascular fitness correlated with better hearing sensitivity while low cardiovascular fitness correlated with worse hearing sensitivity.²⁵⁻²⁸ These findings (Figure 3) were particularly evident among adults, age 50 and older, indicating that cardiovascular (CV) fitness may have a protective effect on hearing loss with age.^{27,28} Other health factors related to CV fitness and health were similarly examined in relation to hearing sensitivity, including muscle strength and blood pressure. Only CV health remained as a positive predictor of improved hearing sensitivity across age levels.

The cardiovascular system has been found to play a crucial role in regulating hearing sensitivity. TTS, a short term worsening of hearing thresholds, results from noise exposure; chronic noise exposure may result in PTS. One widely held theory is that a reduction in blood flow through the inner ear causes temporary TTS and subsequent short-term hearing loss. Generalized peripheral vasoconstriction, which occurs in response to loud noise, may be an underlying determinant of TTS.⁸ Variations in cochlear blood flow may affect the availability of oxygen and glucose, which is more rapidly metabolized during sound stimulation.⁶ A decline in blood flow through the inner ear is attributed to increased peripheral blood pressure or decreased oxygen tension in the cochlear endolymph and

Table 1. Characteristics of four subject groups (mean ± SEM) comparing effects of muscle strength and cardiovascular fitness on pure tone threshold

Group	Number	Age (years)	Total Strength (kg)	VO ₂ max (ml·kg ⁻¹ ·min ⁻¹)	Body Mass Index	Body Composition (percent fat)
Low CV-Low MS	15	21.2 ± .57	404 ± 37.9	30.06 ± 0.97**	23.85 ± 1.10	21.51 ± 1.69 ^{††}
High CV-Low MS	10	21.0 ± .89	497 ± 45.6	42.97 ± 2.49	22.49 ± .56	13.18 ± 1.65
Low CV-High MS	7	20.85 ± .94	612 ± 73.3*	29.68 ± 1.7**	27.24 ± 1.99 [†]	19.35 ± 3.9
High CV-High MS	11	20.27 ± .50	523 ± 51.3	41.8 ± 1.6	23.16 ± 1.05	15.64 ± 2.1

*Significant difference (p<.05) between Low CV-High MS and Low CV-Low MS and High CV-Low MS.

**Significant difference (p<.05) between both groups with low CV and both groups with high CV.

† Significant difference (p<.05) between low CV-high MS and other three groups.

†† Significant difference (p<.05) between low CV-low MS and high CV-low MS and high CV-high MS.

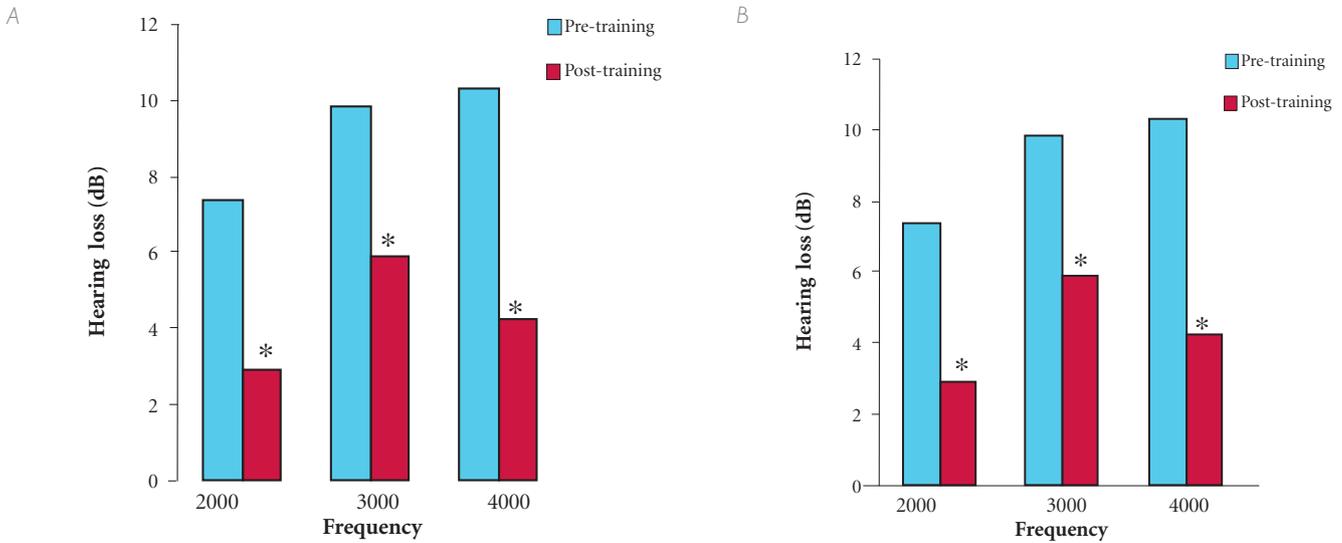


Figure 4. Temporary threshold shift in dB HL pre- and post-exercise training for experimental group (A) that exercised ($*p < .05$) and control group (B).

vasoconstriction, especially of the stria vascularis. Reduction in blood circulation through the inner ear can also cause reduced hearing acuity over time and lead to TTS and permanent hearing loss. Metabolism and blood flow are directly related to the vascular pattern of the cochlea. If one's circulation is compromised, blood flow through the cochlea may also be reduced. The impact of the cardio-vascular system on hearing sensitivity is therefore theorized to be related to changes in blood circulation to the hearing mechanism as a result of exercise; it is

hypothesized that regular exercise reduces PTS by an increase in blood flow and oxygen delivery in a healthy cardiovascular system.

Additional descriptive information about the association between hearing sensitivity and health-related components was studied by examining combined muscle strength and cardio-vascular fitness.²⁶ Muscle strength was determined by performing leg curls, leg extensions, and bench press on a Nautilus machine (Nautilus Inc., Deland,

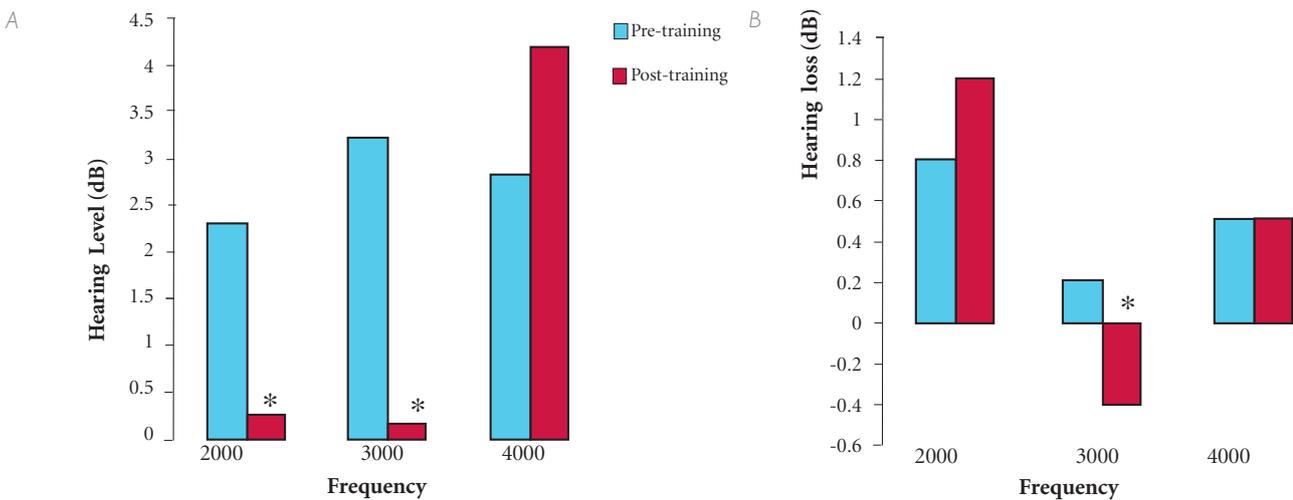


Figure 5. Pure tone thresholds in dB HL pre- and post-exercise training for experimental group (A) that exercised ($*p < .05$) and (B) control group.

Fl) and a hand grip using a standard dynamometer. Subjects also underwent skin fold testing, testing for blood lipids and glucose, and a 48-hour diet and physical activity recall. Distortion product otoacoustic emissions (DPOAE) testing was performed to assess cochlear integrity. Baseline PTTs were also determined.

Participants in the study were split into four groups for comparison, based upon their level of cardiovascular (CV) fitness and muscle strength (MS): low CV-low MS, high CV-low MS, low CV-high MS, and high CV-high MS (Table 1). As expected, the group with both high CV and high MS had the best hearing sensitivity. The group exhibiting the worst hearing sensitivity was the low CV fitness and high MS group. Equally surprising was the finding that when muscular strength was accompanied by high cardiovascular fitness, individuals demonstrated better PTTs; high muscular strength alone was negatively correlated with PTTs.²⁶ Once again, hearing sensitivity was associated with cardiovascular health. It is unclear why muscle strength has a negative correlation with hearing sensitivity. Nevertheless, as long as high muscle strength was combined with high cardiovascular fitness, then hearing sensitivity was better.

Effects of Exercise Training on Hearing Ability

Although cardiovascular responses to exercise in combination with noise do not appear to influence the level of hearing sensitivity,²³⁻²⁵ findings indicate that chronic cardiovascular adaptations to physical training might attenuate the level of hearing loss from noise exposure, thus preserving hearing sensitivity.²⁹ By comparing hearing ability among low and moderately fit people before and after the completion of an eight-week aerobic exercise training program, Cristell et al.²⁵ found that an increase in cardiovascular fitness (15–25% increase in VO₂ peak) resulted in less susceptibility to TTS at all frequencies (Figure 4) and an improvement in baseline hearing levels at some frequencies (Figure 5). This increase in VO₂ peak was similar to the increase reported by Ismail et al.²⁰

Although results suggest that exercise training may be used as a preservative measure against loss in hearing sensitivity the increased in VO₂ peak must achieve at least a level of fitness considered to be moderate. In our laboratory, low fit individuals who improved their VO₂ peak, but still did not attain a level of fitness that met or exceeded moderate fitness level for their age group, did not demonstrate improved hearing sensitivity.

Cross-Section Study of Cardiovascular Health on Hearing Sensitivity

As demonstrated throughout this review, while declining PTTs is considered a normal age-related change, other factors, such as cardiovascular health, can play a role in the rate and intensity of these changes and may even conserve hearing at some frequencies. Hutchinson and Alessio et al.²⁷ confirmed these findings in two studies, the first of which examined the results of baseline PTTs and VO₂ peak determination using a maximal or submaximal graded exercise test on a Monark bicycle ergometer. Heart rate and blood pressure were also taken during testing. At 2000 Hz, 3000 Hz, and 4000 Hz, pure-tone hearing was positively influenced by cardiovascular fitness. The variable, Decade* VO₂ peak, which relates to the effect of one's age and health on overall hearing, was statistically significant ($p < .01$), suggesting a difference in hearing for differing levels of VO₂ peak in relation to age. Data suggests that age 50 is the separation point, after which fitness level and age are related in a statistically significant way, with high fitness being positively related to better hearing sensitivity (Table 2). Across the age groups, people with low cardiovascular health exhibited the worst hearing thresholds.¹²

In a similar study, PTTs and distortion product

Table 2. Pure tone hearing levels in dB HL by decade age groups, fitness level and frequency

Age	2000 Hz			3000 Hz			4000 Hz		
	Low	Medium	High	Low	Medium	High	Low	Medium	High
Teens	3.5	3.4	4.0	3.0	4.1	.25	2.0	2.2	.75
20s	2.0	3.2	1.8	8.3	4.5	3.7	6.6	4.8	2.3
30s	4.0	4.4	0.0	1.0	2.1	6.5	10.6	3.7	12.0
40s	7.7	7.1	4.8	5.5	8.5	5.2	6.0	11.7	6.8
50s	9.7	4.8	2.7	9.2	8.0	8.5	13.5	11.3	13.0
60s–80s	20.0	16.4	12.2	29.2	17.7	17.2	34.5	21.2	14.2

otoacoustic emissions (DPOAE) measures were evaluated in a representative sample of over 100 participants.²⁸ DPOAE testing was performed in this study in addition to pure-tone threshold testing, as it allowed the researchers to obtain information regarding cochlear function and integrity. Similar to the previous study, VO_2 peak was used to determine the level of cardiovascular fitness; heart rate response, blood pressure, and respiratory gases were monitored throughout the test. After data collection, participants were split into four age categories containing 22 to 26 participants for analytic purposes (youth, 10 to 19 years; young, 20 to 27 years; middle, 28 to 48 years; older, 49 to 78 years). Multivariate analysis using the fitness level as a factor (i.e., VO_2 peak), and PTTs as dependent variables indicated significantly better thresholds for the high versus low fit participants at 1000 Hz. Although PTTs worsened in persons in all cardiovascular fitness categories with age, multivariate ANOVA performed using both age and fitness level as factors showed that those with low cardiovascular fitness in the old age group had significantly worse pure-tone hearing at 2000 and 4000 Hz.²⁸ The PTTs of the old high fit group were consistently better than the mean thresholds of the low fitness levels in the same age group. These results confirm previous studies by Hutchinson and Alessio (1998, 2000, 2005, and 2010) demonstrating the positive benefits of cardiovascular health on hearing sensitivity among adults. Furthermore, these results are particularly strong among aging populations; cardio-vascular fitness seemingly acts as a mechanism of preservation for hearing sensitivity.

Hearing Loss and Diabetes

Given the microvascular abnormalities that underlie cardiovascular health and disease, it is reasonable to postulate that similar mechanisms associated with diabetes, particularly type 2 diabetes, may be associated with hearing loss. Type 2 diabetes is the most common form of diabetes. In type 2 diabetes, the cells do not recognize insulin and since insulin's main role is to facilitate the transfer of glucose from blood into cells, diabetics are at risk of being deprived of glucose that can be used by cells for energy. If this happens, glucose builds up in the

blood instead of going into cells, and this leads to a number of diabetic complications including hypertension, heart attacks, and kidney failure. Whether or not the microvascular changes that occur in diabetics may be associated with microvascular changes that influence hearing loss, has been examined in several large scale studies. In a five-year population-based survey in Australia, age-related hearing loss was present in 50% of diabetic participants ($n = 210$) compared with 38.2% of non-diabetic participants ($n = 1,648$) after adjusting for multiple risk factors.³⁰ A large scale cross-sectional study was used to examine the secular change of the prevalence of hearing impairment over three decades in US adults with and without diabetes. After adjustment for age, sex, race, and education, the prevalence of hearing impairment in the National Health and Nutrition Examination Surveys (NHANES) 1 (1971–1973) and 2 (1999–2004), respectively, was 24.4% and 22.3% for adults without diabetes compared with 28.5% and 34.4% for adults with diabetes. The results indicated that persons with diabetes have a higher prevalence of hearing impairment than persons without diabetes.³¹

The link between diabetes and hearing loss was investigated further in order to determine possible causal factors. In the National Health and Nutrition Examination Survey (NHANES) study, 1,508 participants, aged 40–69 years, who completed audiometric testing during 1999–2004 were studied to determine whether controlling for vascular or neuropathic conditions, cardiovascular risk factors, glycemia, or inflammation influenced the association between diabetes and hearing sensitivity. Bainbridge et al (2010) concluded that mechanisms related to neuropathic or microvascular factors, inflammation, or hyperglycemia mediate the association of diabetes and hearing impairment.³²

Conclusion

This review has described the chronological progression of research on major factors, other than age, that influence hearing sensitivity. The incidence of hearing loss may increase with age in many parts of the world; however, presbycusis does not occur in all persons at one particular age point. When exposed to noise, temporary hearing loss typically

occurs regardless of age; yet factors other than age significantly influence one's hearing sensitivity. Compared to lower fit individuals, TTS recovery is much quicker in moderate and high fit individuals. Cardiovascular fitness is directly associated with hearing sensitivity while muscular fitness is not, however, the combination of high muscle strength and high cardiovascular fitness was associated with the most sensitive hearing. When cardiovascular fitness is improved in lower fit adults, hearing sensitivity also improves, yet the improvement has to reach a level of fitness considered as moderate or higher. When exercising to music, any temporary hearing loss that may occur is due to the level of noise and is not exacerbated by the exercise. After age 50, individuals with high cardiovascular fitness experienced significantly better hearing sensitivity than low fit individuals, who demonstrated a typical age-associated decline in hearing. Evidence suggests that a personality type affiliated with coronary prone behaviour is associated with compromised hearing. Twenty-five years of research supports the importance of health and lifestyle in maintaining hearing sensitivity over the life span.

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Conflicts

None declared.

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Enhanced Health Services has a current opening for a full time Hearing Instrument Specialist in Dryden, ON. Enhanced Health Services operates a group of full service hearing clinics in Manitoba and Northwestern Ontario and is dedicated to providing the highest level of hearing health care to our patients. We are also committed to offering our employees a dynamic, supportive and inviting work environment. Enhanced Health Services is seeking a motivated, dedicated and compassionate hearing professional to join our hearing health care team.

The successful applicant will possess:

- A Hearing Instrument Specialist Diploma
- Eligibility for registration with AHIP
- Knowledge of current hearing aid technologies and best practice protocols
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The mission of Helix Hearing Care Centre is to promote a multidisciplinary clinical approach in the treatment and rehabilitation of hearing loss. To accomplish this goal, we utilize the most advanced technologies and the skills of highly trained, industry leading, hearing care professionals. With over 35 clinics in Ontario, and growing, we are committed to providing the utmost clinical healthcare services to the patients we serve.

As we continue to expand, we are looking to add additional Hearing Instrument Specialist positions to our growing professional team in selected communities and towns.

We offer a dynamic flexible work environment that includes excellent support; on-going training through Professional Mentorship and CEU's as well as the most advanced technology to ensure our professionals can provide the finest quality healthcare available.

In addition you will also enjoy the benefits of:

- The latest PC-based testing equipment
- Full marketing support and a unique customized patient database management system, including medical reporting and invoicing
- Competitive salary package
- Health and medical benefit program
- Relocation benefit
- Bursary programs for recent grads

Qualifications we are interested in include:

- College Diploma from a recognized Hearing Instrument Specialist program or equivalent.
- Member of AHIP.
- Dispensing experience an asset.

We currently have openings in the Barrie area.

Barrie - Located approximately 90 kilometers north of Toronto, on the shores of Lake Simcoe, Barrie has many amenities and services ideal for someone who'd like to be close to the Greater Toronto Area. With Go Train access

into the city and Pearson International Airport only 1 hour away, Barrie is conveniently removed from the city yet never isolated. Barrie is one of Canada's fastest growing cities, it currently has approximately 130 000 residents, and is defined by its English (37.2%), Scottish (25.8%), and Irish populations (23.6%). It has two English and two French school boards, and its principle employers are the Royal Victoria Hospital and Georgian College (and the associated University Partnership Centre and Centre for Health and Wellness). Visit Barrie's historic downtown or hit the slopes at nearby Blue Mountain to see if Barrie is the place for you.

We currently have an opening in the Lindsay area.

Lindsay - Originally a small mill town along the shores of the Scugog River, Lindsay is now the hub of business and commerce in the City of Kawartha Lakes. With its own airport, hospital (Ross Memorial Hospital), and transit system, Lindsay is by far the biggest community in the recently amalgamated towns of Bobcaygeon, Fenelon Falls, Omemee, Woodville, and Lindsay. With 8 provincial parks and conservation areas and over 200 hundred lakes in close proximity, Lindsay is the perfect community for those who love the outdoors. At the same time, Lindsay is only 43 kms from Peterborough's amenities and has a large number of educational institutions including 11 elementary schools, 3 high schools, and a college. Why not visit Lindsay for a weekend and see if this town is right for you?

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