"...EVERY MOMENT WAS INCREDIBLE...KINDNESS AND OPENNESS OF PROFESSIONALS...APPRECIATION OF AUDIOLOGY..."

"...THE JOY ON EVERY STREET CORNER EVEN MIDST THE POVERTY... AMAZED AT THE LEVEL OF EDUCATION OF THE AVERAGE CUBAN..."

Hearing Health IN CUBA

BY DEBORAH L. CARLSON

The Academy's initial delegation was an invitation to interact and connect with our Cuban counterparts to learn about their needs and solutions in the identification and management of hearing loss.

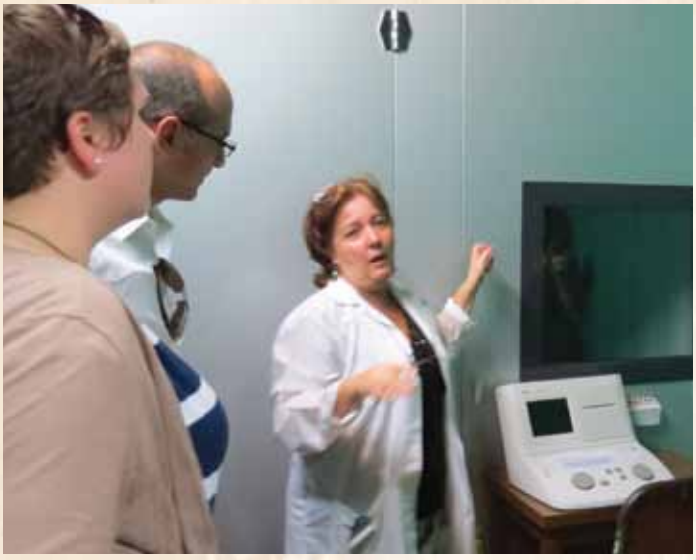
The World Health Organization (WHO) estimates 360 million people worldwide have a disabling hearing loss (>40 dB for adults; >30 dB for children), and half of that is believed to be preventable. The majority of those with hearing loss live in low- and middle-income countries (WHO, 2012). Access to services, availability of hearing devices, and education and training of those managing hearing loss varies throughout the world. Efforts to understand the global challenges of identifying and managing this chronic health condition are critical to enhancing the quality of life, educational, and vocational opportunities for those with hearing loss and to reducing the associated societal costs of hearing loss.

During its 25th anniversary year, the Academy entered into an agreement with Academic Travel Abroad Inc. (ATA) in an effort to gain perspective and understand the common and diverse challenges of our hearing health-care counterparts in other countries. The initial delegation offered an opportunity to interact and connect with our Cuban counterparts to learn about their needs and solutions in the identification and management of hearing loss. This professional exchange differed from a service-related, humanitarian mission and instead focused on experiencing the profession through a different viewpoint. One-on-one and small group interactions with specialists and fellow practitioners allowed for mutual learning, the development of ongoing relationships, increased collaboration, and facilitated recognition of the Academy as a global leader in hearing health care.

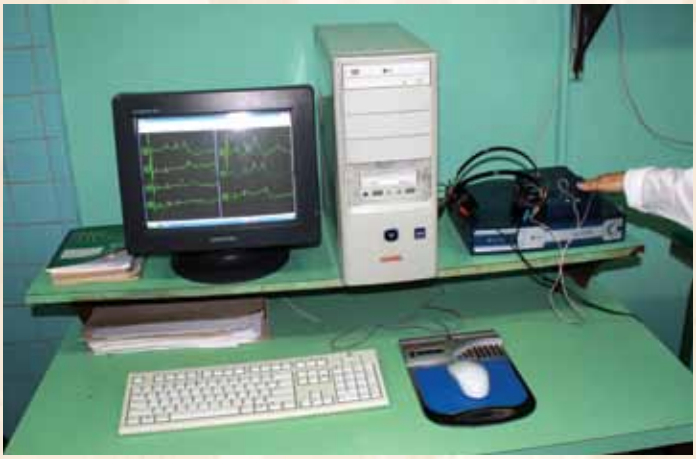
Cuba is a country close in geographical proximity to the United States, yet so far in terms of access. U.S. citizen travel to Cuba is restricted by the Office of Foreign Assets Control (OFAC) of the U.S. Department of the Treasury. The delegation traveled in October 2013 under OFAC regulation 31 CFR §515.564, a general license for professional interactions.

The Academy delegation to Cuba was composed of 11 audiologists from eight states (FL, GA, IN, MN, MO, NM, TX, and OR). Practice settings of the delegates included private practices, medical centers, universities, and ENT clinics. The six-day delegation was centered within the La Habana province and included visits with hearing professionals, researchers, administrators, teachers of the deaf, and other professionals associated with the Cuban Neurosciences Center, William Soler Pediatric Teaching Hospital, Rene Vilches Special School, National Association of the Deaf of Cuba, and Havana Radio's "Cultura Entre los Manos" socio-cultural

"...people, food, music, weather, humor, new friends, and the 'rawness' of the experience."



Evoked-potential testing room and soundbooth/audiometer.



Evoked-potential equipment, audiometer and sound booth in the audiology clinic at the William Soler Pediatric Teaching Hospital.

project for deaf citizens[1]. A visit to the Cuban Institute for Friendship with the Peoples, the official Cuban host of information exchanges, provided an overview of the current status of Cuba and the nation's desired relationships with other countries.

Cuba

An island nation in the Caribbean Sea, Cuba has a population of approximately 11.3 million that spreads across 42,803 square miles (U.S. Census Bureau International Statistics). The population density is approximately 264 per square mile, with about 75 percent of the population living in urban areas. Cuba is organized into 15 provinces and one municipality. The capital city, Havana (La Habana Province), is the largest city in Cuba (population of 2.1m).

Health-Care System

Cuba has a public health-care system with no privately run hospitals or clinics. Education and literacy has been a priority since the revolution in the late 1950s and, with a free and accessible education system, higher education has flourished. As a result, there is an abundance of highly trained health-care providers. Despite the challenges in medical equipment and supplies, Cuba is recognized as having one of the best health-care systems in the world (World Population Statistics, 2013).

Health care in Cuba is a free, tiered system organized around the concept of prevention and community health. Family physicians and nurses deliver primary care with specialty or secondary level visits available on referral to district polyclinics or hospitals. Highly specialized care for complex health problems or procedures is generally limited to clinical research institutes and is available around the Havana area. Home visits are commonplace. Visits to district polyclinics are available as needed, with the patients returning to their community primary physicians for continued management of any diagnosed conditions. Patients are categorized according to risk and conditions or co-morbidities, and the frequency and level of care is tied to these factors.

There are no provider choices; however, everyone has a primary physician or nurse, and these individuals live in the local communities of their patients. All health-care providers are employed by the government, provided with living subsidies, then paid wages similar to other non-health-care workers (Campion, 2013). Home visits are for purposes of health care, as well as education about factors affecting health (e.g., environmental factors and living conditions). Despite limited computer and Internet access, paper medical records and ongoing paper reporting of patient numbers and conditions have resulted in comprehensive tracking of health conditions.

Though well focused on prevention and associated education of patients, resources for health care are limited in terms of equipment, pharmaceuticals, supplies, and outside information. The economic embargo has made it difficult and costly to import parts for mass production of equipment, which limits accessibility within Cuba. To compensate, Cuba has developed its own pharmaceutical and biotechnology industry and exports many of these products to other Latin American countries. The free education system and an abundance of health-care

Clinical staff of the audiology clinic at the William Soler Pediatric Teaching Hospital.

TABLE 1. Work Force Estimates in Cuba for Audiology and Related Fields

Specialty	Number of Professionals
ORL/Ear Nose Throat Physicians	423
Physician in Audiology	50
Audiology Technicians	100
Speech-Language Pathologists	150
Teachers for the Deaf	595

providers have resulted in the additional exportation of medical expertise with a number of Cuban physicians in foreign service, including the recent "Oil for Doctors" program with Venezuela.

Hearing Health

Medical professionals in Cuba are specialists with six years of medical education and two years of family medicine residency (MEDICC). They may then apply for a residency in a second specialty, such as ENT. Following ENT training, an additional year of training can be required to specialize in audiology-related testing and amplification. A multiyear specialization in neurophysiology is available. The neurophysiology certification qualifies medical doctors to conduct electrophysiological exams in multiple body systems, with some focusing their work on the auditory system. National estimates of the workforce specializing in auditory related fields were not available during the delegation; although a 2001 survey of Latin American countries showed a breakdown of specialists listed in TABLE 1 (Madric, 2001). The term "audiologist" is not commonly used in Cuba.

Scientific Pole

At the core of the Cuban health-care system is research related to the prevention and treatment of health conditions or disease considered to have a high degree of societal impact. This research is conducted within the scientific pole, a core of 10 major centers that includes more than 50 related research and production institutions (Evenson, 2007). A variety of products produced by these institutes include bioreagents, pharmaceuticals, vaccines, screening or diagnostic protocols, medical equipment, and software. One institute focuses primarily on the production of animals for use in laboratory research.

The scientific pole is centered in the La Habana province and its institutes integrate and cooperate in research and development, production, and eventually, commercial activities that are exported to developing countries. Examples of the products marketed and sold include the world's first effective meningitis vaccine, cancer vaccines, medications, and equipment. The biotechnology industry is a major player in the Cuban economy.

Cuban Neurosciences Center

One of the major centers of the scientific pole is the Cuban Neurosciences Center. The center conducts scientific research on the brain and develops neurotechnology to protect the "mental capital" of the nation. It has developed several generations of computer technology to analyze electrical brain activity, and markets

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this technology under the trademark of Neuronics. This equipment is used in neurophysiology laboratories across Cuba, and is marketed to developing countries, Europe, and Canada. With the use of this equipment, the institute designs and tests screening protocols and advises the government on public health policy.

The institute's public health focus is on neurodevelopmental milestones and assessment of a variety of neural disorders considered to have a great impact on Cuban society. Areas studied include early detection of hearing loss, cochlear implant technology, devices for the deaf-blind, screening for learning disabilities, autism, and other neurodevelopmental disorders, dementia, Alzheimer's disease, and schizophrenia. As a result of its research, the institute has taken on the responsibility for training and certifying neurophysicists, and has developed master's and doctoral degrees in neurophysiology.

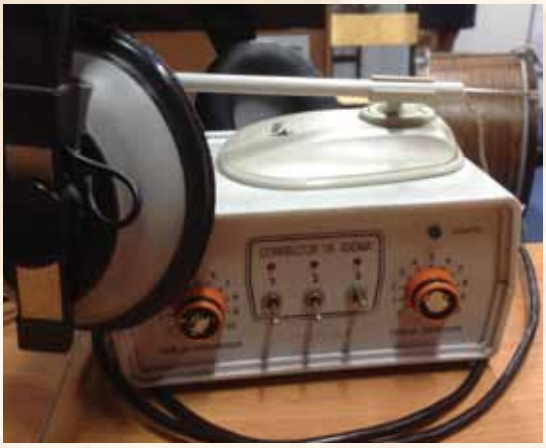
Specifically related to hearing health care, under the Neuronics and AUDIX labels, the institute has developed neurodiagnostic equipment, a portable otoacoustic emission (OAE) system, and an audiometer. It is currently developing a tool capable of simultaneous screening of both air and bone-conduction stimuli, and is working on the development of bio-implants. By developing its own cochlear implants and bone-conduction devices, the institute can reduce costs, provide more implantable devices around the country, reduce delays between diagnosis and treatment of hearing loss, and share these devices with developing nations.

One of the focuses of the institute has been on early detection of hearing loss. The identification work began in the 1970s at the request of the Cuba Ministry of Education. By 1983, a screening program ws initiated for infants at risk for hearing loss, using Cuban-designed and manufactured evoked-potential equipment. The initial program was implemented in Havana and available nationally by 1991, though uneven coverage is reported (Abalo et al, 2009). The addition of auditory steady-state-evoked potentials (ASSR) into the screening protocol was implemented in 1996 but required interpretation by a neurophysiologist. A semi-automated screening version has since been developed.

Infant Hearing Screening

Cuba has approximately 120,000 births per year. Infant hearing screening is initiated for children considered to be at high risk, using the Joint Committee on Infant Hearing (JCIH) identified risk factors. Cuba has extensive use of ototoxic medications, along with a heavy use of forceps at delivery, which is considered an additional risk factor. Babies identified at risk during the birth process are screened by three months of age as outpatients at a polyclinic.

The screening protocol currently uses a combination of frequency-specific transient-evoked otoacoustic emissions and lower frequency auditory steady-state response testing. Follow-up diagnostic evaluation is available at specialty hospitals for those who refer on the initial screening. Diagnostic testing includes ASSR and evoked-potential air and bone conduction threshold testing.



(Left) Auditory trainer, and (Right) teacher, principal, delegation guide, and students at the Rene Vilches Special School.

An infant or child (< three years) may also be referred from an intensive care unit, primary health clinic, or by a family physician due to later identification of at least one risk factor, signs of hearing loss, or speech delays. Universal birth screening (prior to discharge) is currently being piloted at two Havana hospitals with hopes to spread the program to all maternity hospitals throughout Cuba.

Once hearing loss is confirmed, the infant or child receives a multidisciplinary team developmental evaluation at a specialty hospital. This team consists of neurophysiologists, audio technicians, psychologists, neurologists, and language therapists.

Amplification

Monaural amplification is common, though binaural possible, for those with bilateral hearing loss of >35 dB HL. Hearing aids are not currently available for those with mild or unilateral hearing loss. Children with cerebral brain damage are not likely to receive hearing aids until about 10 years of age, although this is beginning to change. Parents are asked to pay about 35 Cuban pesos (about $1.50 US) for their hearing aid and, if unable to pay, the government provides the hearing aid. No equipment is available for verification of the fitting; hence adjustments are made based on parental report. Therapy is planned at the specialty hospitals and carried out in the communities, typically by the parents until the point at which children enter school. Follow-up is not a problem since families are not particularly transient and health-care workers can go to the homes if the parent or patient is not following up on services.

Cochlear implants have been available since 2000 and are prioritized for deaf-blind patients first, and then those with a single morbidity of profound hearing loss. Approximately 250 children, about 30 of which are deaf-blind, have been fitted since the inception of the program. Pre-implant intensive therapy and a six-month trial with amplification are necessary before a child is considered for implantation. Other health and socioeconomic factors further influence prioritization of candidates on the list for cochlear implants.

Education

Deaf schools are available in each province, with the largest being the Rene Vilches Special School in Havana. The school offers classrooms for kindergarten through ninth grade (education is compulsory through the ninth grade). Some students receive their full education at the deaf school while others, following extensive evaluation and family agreement, are mainstreamed into the public schools. Desktop auditory trainers are used in auditory

"...HOW ADVANCED THEY WERE, ESPECIALLY IN REGARD TO TECHNOLOGY..."

DELEGATE ADVICE

"Go with an open mind, open heart, and a full wallet!"

"Go with an open and respectful mind, different is not necessarily bad."

"Bring items that you can leave behind. Find out what the needs are there. Study the language—even if it means just to say hello and thank you. It means a lot to people that you cared enough to try."

"It is well worth the experience."

"Go! Don't even think about it, just sign up as soon as you can! It may be an experience never available to you again!"

"Take the time to understand the culture and how that impacts services, the challenges they face and the creative solutions they provide. An amazing experience."

"The trip left an impact on me to the point that I shared my experience with my family, friends, and colleagues. I have already encouraged many colleagues to consider participating in such a unique opportunity."

skills training but FM systems are not available. The Soviet education model influences the teaching techniques, and much of the auditory training equipment and acoustical treatment of some rooms within the school is purchased from and serviced through Japan.

Community

The National Association of the Deaf of Cuba (ANSOC) was founded in 1978 and aims to provide social care for those with hearing loss, deafness, and with co-morbidities of deafness and blindness. ANSOC has a membership of approximately 23,500 and includes educators, interpreters, and individuals with hearing loss. There are chapters in every province that focus on education of human rights and ensure the integration of people into society. Functioning primarily within the adult community, ANSOC also helps to support newly identified children, ensuring that amplification is available, and through its input into the education system. More than 200 Cubans with deafness have university degrees and have further access to advanced degrees.

Essential communication was believed to be oral for many years, and the movement to a total communication model did not begin until 1994. ANSOC is working to have Cuban sign language certified as an officially recognized international language and expects that designation within the next year. In 2004, university training of teachers of the deaf started and there are now both technical and bachelor's degrees in sign language.

Sign outside the entrance of the National Association of the Deaf of Cuba.

Radio Havana is a public radio station with the purpose of communicating historical and cultural offerings in Old Havana. It concentrates on social and humanitarian work, and realized that it was missing the deaf in the communication efforts. As the "voice" of what is happening in Havana, Radio Havana changed its focus to an audio/visual mode and initiated a "Culture in the Hands" project in which the deaf could enjoy the culture of the city with interpreters on walking tours, in visual materials, captioning, and live interpreting on some TV programs. It has continued to work closely with ANSOC to reach the deaf community, identify needs, and offer sign language classes to the general public.

Cuba, a small, somewhat isolated country, has a long and early history of meeting the challenges of identification of infant hearing loss and aggressive follow-up for those identified. The close family; community culture; accessible education; and prevention, community-based health-care system encourages acceptance and support for those with hearing loss or deafness. The high levels of knowledge, training, and development of technology in Cuba are impressive, and have led to well-established and thoroughly researched identification protocols. However, definitive limitations remain in resources available for widespread implementation, as well as in available options for management of those with hearing loss. Additional challenges in clinic conditions and aging equipment remain evident. Vestibular assessment and management are not currently addressed in the Cuban health-care system.

This delegation was eye-opening, thought provoking, and valued by all. A few surprises, memories, and lessons learned are shared from our colleagues in the accompanying sidebars. As in humanitarian missions, participants are ready for the next opportunity. In partnership with ATA, the Academy plans to continue to offer annual professional exchange opportunities.

Deborah L. Carlson, PhD, is the director of the Center for Audiology and Speech Pathology and Associate Professor of Otolaryngology at the University of Texas Medical Branch. She served as the delegation leader in her role, at the time, as the immediate past president of the Academy.

Acknowledgements: The information in this article is the culmination of the presentations of those serving the various needs of individuals with hearing loss in Cuba, along with the dialog among these individuals and our delegates. Supplemental information was obtained from references cited.

Note

1. Due to scheduling conflicts, this delegation was not able to visit an adult clinic and learn about access to hearing health care and amplification. Information related to adult hearing health-care services and management is therefore not addressed in this article.

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