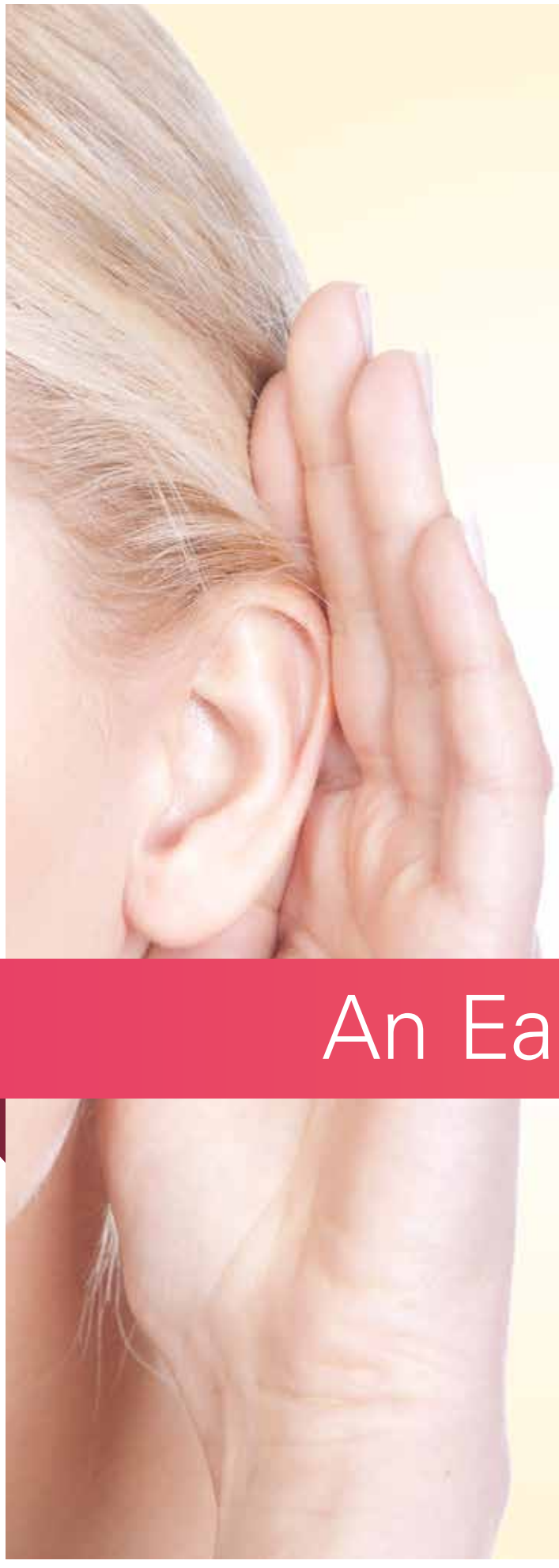

Environmental Scan on the Future of Audiology

An Ear to the Ground

AMERICAN ACADEMY OF AUDIOLOGY

www.audiology.org

CONTENTS

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INTRODUCTION

In 2011, the American Academy of Audiology revisited its strategic plan; the Forbes Group was engaged to help with the planning process. The Forbes Group is a 28-year-old strategic counseling firm that specializes in helping professional and trade association leaders think, plan, and act strategically. The Forbes Group's client concentration is in the health-care sector.

A major component of the strategic thinking function of an organization is embodied in an environmental scan, the process of assessing the forces that will affect its future. It is dangerous to project today onto tomorrow, no matter how thoughtfully it is done. The tendency is to assume that principles long accepted as true remain true and that the "future" runs in a straight line from the present. Consequently, forecasts tend to assume that the future will be like today, just more so. An environmental scan is not a forecast or a prediction. Management guru Peter Drucker, when asked how he makes such accurate predictions, said: *"I don't forecast. I identify what's visible but not yet seen."*

According to the American Society of Association Executives, an environmental scan focuses "associations on what is relevant to their strategy and future. By driving a team toward inventorying what is new, emerging and important, scanning and trend analysis help team members reach consensus on new policies." Typically, environmental scans identify changes in the sociodemographic, technology, environmental, economic, and political areas that may affect the organization's future in order to avoid being blindsided. These areas are called STEEP categories by futurists for the acronym spelled by the first letter of each area (this is described in greater detail in the Findings section on page 3).

Categories of Change

An environmental scan may address four categories of change:

Cycles—changes that occur over an observable time period and are rather predictable (i.e., seasons, ice ages, El Niño, etc.).

Trends—changes that move in a direction over time. Trends are not new; there is a lot of data and information about them, and they have been observed for a period of time (i.e., global warming, population changes, etc.).

Wild card events—sudden, discontinuous change; unexpected, unpredictable (i.e., the fall of the Berlin Wall, the September 11 tragedies, Hurricane Katrina, the financial services crisis, etc.).

Emerging issues—seeds of trends, the changes that will initiate a trend over time. This is the type of change that futurists are most interested in. Sniff out an emerging issue, and you have the potential for real leverage in how that issue eventually affects the organization.

Most of the types of changes covered in this scan are trends and emerging issues.

METHOD

This scan was conducted using largely secondary resources (the Internet, public databases [e.g., government, libraries, etc.], proprietary databases [e.g., those developed and owned by Forbes Group principals], university resource centers), information gleaned from the Forbes Group's work in the health-care sector over the years, and materials and research provided by the Academy. In addition, some primary research was conducted, such as interviews with several individuals identified by the Academy as thought leaders. These interviews gave direction for the research.

Obviously, there is an enormous volume of information that can be included in an environmental scan. Judgment must be applied to prevent the scan from duplicating other efforts, focusing on generic trends—such as the general economic situation—about which information is readily available elsewhere, and restating client-provided data.

To aid in determining the focus of the scan, several Academy leaders convened as a steering group and participated in a conference call with the Forbes team. The filters applied by the Forbes Group included the following:

- Does the trend or issue have a future effect? In other words, will it be felt beyond just what is presently known and being experienced?

- Does the trend or issue have a significant impact on the health-care sector generally and audiology specifically?

FINDINGS

Key findings of the scan research are organized under the five categories used by futurists as a "filing cabinet" for trend and issue information. As mentioned earlier, STEEP stands for sociodemographics, technology, economics, the environment, and politics/policy. Trends and issues are likely to fit in more than one category because all categories are interlinked. For simplicity, we have assigned trends and issues to only one category. STEEP categories for audiology are defined as follows:

- **Sociodemographics:** Aging population, teens (there are 75 million people under age 18 in the United States alone), immigration, rising Hispanic population (one in four kids under age five are Hispanic), workforce challenges (decline in people entering the medical profession, one in four U.S. doctors are foreign born, shortage of other health-care workers could result in expanded scope of practice for allied health professionals)
- **Technology:** Cilia replacement technology, telemedicine/telehealth, genomics, pharmacology, self-testing
- **Economics:** Changing health-care environment—Medicare/reimbursement/payment issues, paraprofessionals (audiology technicians), other competitors (ear, nose, and throat specialists [ENTs], dispensers), consumerism of health care
- **Environment:** Workplace/occupational hazards for hearing, increased noise pollution, personal listening devices
- **Political:** Health-care reform, direct access, scope of practice

Sociodemographics

Significant changes are taking place in the age and composition of the U.S. population and workforce that will materially affect the future of audiology and the Academy. Following are descriptions of several of these changes and their strategic implications.

The Generational Trough

Currently, there are four generational cohorts recognized by sociodemographics researchers. There are some modest differences among researchers about the dates and names of each cohort. However, for our purposes, we are using the date ranges identified by David Stillman and Lynn Lancaster in their book *When Generations Collide*. They are

- *Traditionals* (born before 1946)
- *Baby Boomers* (born between 1946 and 1964)
- *Generation Xers* (born between 1965 and 1981)
- *Millennials* (born after 1982)

What is important about these generational cohorts is their size. According to the U.S. Census Bureau, there are 78 million baby boomers, and nearly 8,000 of them turn 60 every day. By 2030, there will be nearly 58 million baby boomers still alive and ranging in age from 66 to 84. More than 55 percent will be women. Contrast the size of the baby boom with that of the following generation, generation X, of which there are about 46 million, 58 percent fewer. The next generation, the millennials, numbers nearly 80 million when immigration is included.

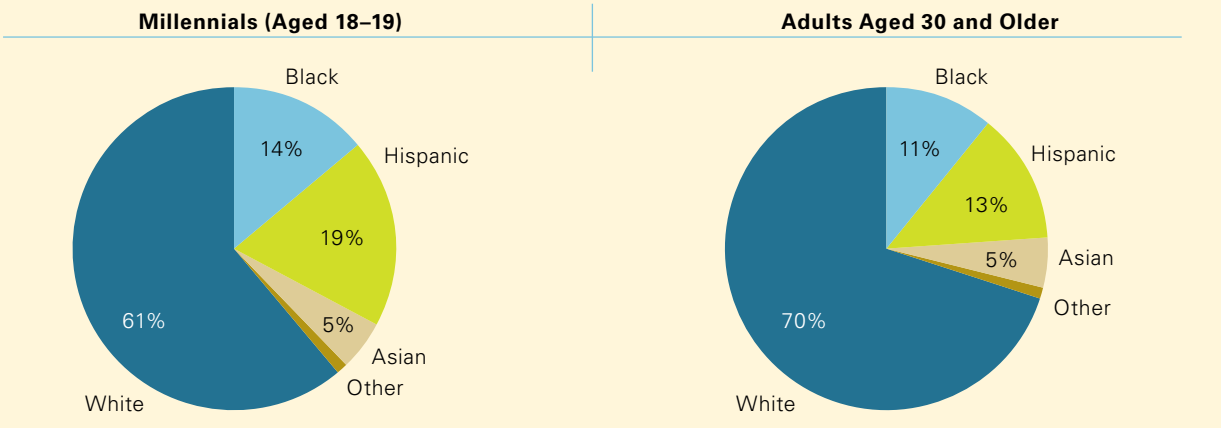
Aging: According to the U.S. Census Bureau, average life expectancy currently is 78.3 years (75.7 for men, 80.8 for women). By 2020, average life expectancy will be 79.5 (77.1 for men, 81.9 for women). Respected demographers calculate that half of the American girls born today will live to be 100. The number of people older than 100 in America has been increasing by more than seven percent per year since the 1950s.

Some in audiology believe that they should target assisted living and skilled nursing facilities because of the concentration of patients. That may be a good strategy, but the vast majority of mature Americans want to stay in their homes. This is especially true of baby boomers who do not want their parents' nursing home future. According to the Web site www.seniorresource.com, "Some 70% of seniors spend the rest of their life in the place where they celebrated their 65th birthday."

Some facts from the Aging in Place Initiative and the U.S. Census Bureau include the following:

- Today, there are nearly 40 million Americans age 65 or above—a 10-fold increase in the 65 and over population since 1900.
- By 2030, nearly one in five Americans—71.5 million people—will be over age 65. This number will jump to 88.5 million by 2050, more than double the number in 2008. The 85 and older population will triple from 5.4 million in 2008 to 19 million by 2050.
- The percentage of the population in the "working ages" of 18–64 is projected to decline from 63 percent in 2008 to 57 percent in 2050.

The New Face of America



Source: December 2009 Current Population Survey (CPS)

PewResearchCenter

- Contrary to popular belief, only a small minority move to warmer climates upon retirement. Fewer than five percent of the 65 and over population reside in nursing homes. Instead, most Americans choose to age in place within the same communities where they have long lived.

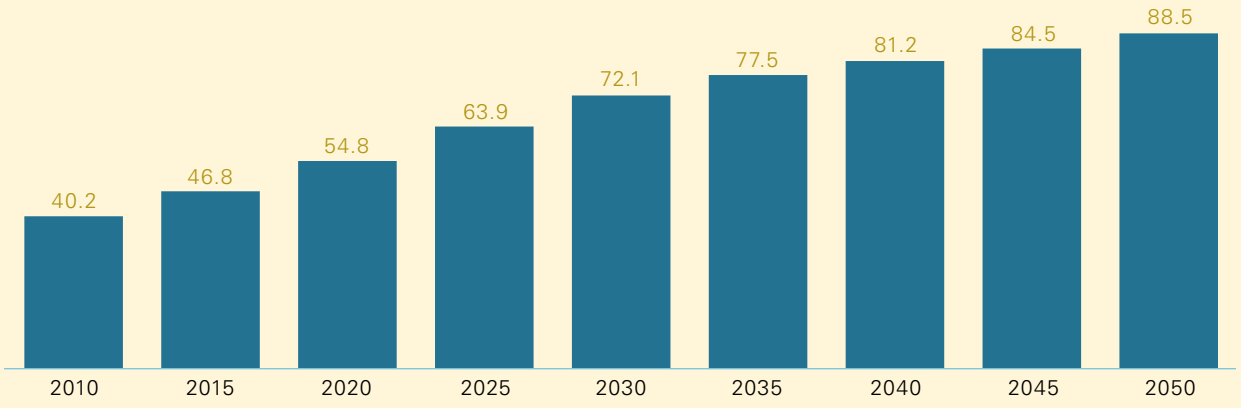
Loss of mobility and sensory diminution are significant contributors to the elderly becoming more isolated and less social, accelerating the onset of dementia. One in every four Americans over the age of 70 has had his or her driver's license revoked for medical reasons. Another 25 percent practice some self-imposed driving restrictions. Less mobile residents are unable to shop for fresh groceries and have difficulty obtaining health care, going to medical appointments, and refilling prescriptions, all of which reduce quality of life and life expectancy.

As people live longer, they also will have more years to deal with hearing loss and the cost of replacing hearing devices. Whether they age in place or enter assisted living and skilled nursing facilities, they will need and demand more on-site services. Technology-induced reductions in hearing device costs and more widely distributed testing offer an opportunity for audiologists to become more mobile and less location based.

Balance: In addition, on the balance side, the Centers for Disease Control and Prevention (CDC) says that the chances of falling and of being seriously injured in a fall increase with age. In 2008, the rate of fall injuries for adults 85 and older was almost four times that for adults 65 to 74. Many people who fall, even if they are not injured, develop a fear of falling. This fear may cause them to limit their activities, leading to reduced mobility and loss of physical fitness, which in turn increases their actual risk of falling. According to the CDC,

- One out of three adults age 65 and older falls each year.
- Among those age 65 and older, falls are the leading cause of injury-related death. They are also the most common cause of nonfatal injuries and hospital admissions for trauma.
- In 2007, over 18,000 older adults died from unintentional fall injuries.
- The death rates from falls among older men and women have risen sharply over the past decade.
- In 2008, 2.1 million nonfatal fall injuries among older adults were treated in emergency departments, and more than 559,000 of these patients were hospitalized.
- In 2000, direct medical costs of falls totaled a little over $19 billion—$179 million for fatal falls and $19 billion for nonfatal fall injuries.
- In 2007, 81 percent of fall deaths were among people 65 and older.
- Men are more likely to die from a fall. After adjusting for age, the fall fatality rate in 2007 was 46 percent higher for men than for women.

Projected U.S. Population Aged 65 and Older: 2010 to 2050 (in millions)



Source: Population Division, U.S. Census Bureau
Released: August 14, 2008

- People age 75 and older who fall are four to five times more likely than those age 65 to 74 to be admitted to a long-term care facility for a year or longer.

- Women are more likely than men to be injured in a fall. In 2008, women were 46 percent more likely than men to suffer a nonfatal fall injury.

- Rates of fall-related fractures among older women are more than twice those for men.

Cultural Intelligence

The working-age population of the United States is projected to become more than 50 percent nonwhite in 2039 and 55 percent nonwhite in 2050 (up from 34 percent in 2008). Also in 2050, it is projected to be more than 30 percent Hispanic (up from 15 percent in 2008), 15 percent African American (up from 13 percent in 2008), and 9.6 percent Asian (up from 5.3 percent in 2008).

Health-care experts have identified medical cultural competence as an important, but mostly ignored, barrier to managing national and transnational health-care networks. What is cultural intelligence? According to psychologist Daniel Goleman, all information we receive first goes through a cultural filter before it goes through an analytical filter. Cultural intelligence refines the cultural filter so that information is correctly interpreted before it is analyzed. Information, especially social cues, can be interpreted differently from one culture to another. Someone with a high degree of cultural intelligence will be able to recognize and interpret cues from other countries or cultures. To a lesser degree, cultural intelligence helps decision makers recognize and understand their own cultural preferences or blinders even if they are not knowledgeable about those of others. Goleman describes cultural intelligence at its most basic as "the ability to suspend judgment."

Immigration: Immigration accounted for half of all U.S. workforce growth from 1996 to 2000. It was 90 percent in New England, South Atlantic, and Pacific states. Nationally, immigrants accounted for one in four new professionals from 1996 to 2000. Immigrants are as likely to be college educated as the native-born population.

Of foreign-born workers, 13.5 percent are in professional occupations, compared with 15.9 percent of native-born workers. Immigrants account for 13.6 percent of the total workforce, according to the Bureau of Labor Statistics, but more than 18 percent of practicing physicians, according to the American Medical Association (AMA). Culturally, immigrants are less homogeneous and less Western in their orientation.

In 2050, the nation's population of children is expected to be 62 percent nonwhite, up from 44 percent today. Thirty-nine percent are projected to be Hispanic (up from 22 percent in 2008), and 38 percent are projected to be single-race, non-Hispanic white (down from 56 percent in 2008).

Immigration is expected to play an important role in how the age structure of the United States changes over the next four decades. The aging of the baby boomers increases the proportion of people in the older age groups, but projected immigration into the working-age groups tends to mitigate the impact. In other words, the country's aging is slowed somewhat by immigration of younger people.

Projections and Distribution of the Total Population by Age for the United States: 2010 to 2050
(Numbers in Thousands)

Age (years)	2010	2020	2030	2040	2050
Under 20	84,150	90,703	97,682	104,616	112,940
20 to 64	185,854	195,880	203,729	219,801	237,523
65 and over	40,229	54,804	72,092	81,238	88,547
65 to 69	12,261	17,861	20,381	18,989	21,543
70 to 74	9,202	14,452	18,404	17,906	18,570
75 to 79	7,282	9,656	14,390	16,771	15,964
80 to 84	5,733	6,239	10,173	13,375	13,429
85 to 89	3,650	3,817	5,383	8,450	10,303
90 and over	2,101	2,780	3,362	5,748	8,738
Total	**310,233**	**341,387**	**373,504**	**405,655**	**439,010**

Source: U.S. Census Bureau.

The Latino Factor: According to the U.S. Census Bureau, by 2050, the nonwhite population—everyone except for non-Hispanic, single-race whites—is projected to be 235.7 million out of a total U.S. population of 439 million. The nation is projected to reach the 400 million population milestone in 2039. This "majority minority" future already has arrived in more than 200 counties and several large cities. Today, the Latino population is the largest and fastest-growing minority, having surpassed African Americans a few years ago. According to Jeffrey S. Passel, senior demographer at the Pew Hispanic Center, Hispanics have a larger proportion of people in their childbearing years and tend to have slightly more children. He predicts that the Latino population will double from 15 percent today to 30 percent by 2050.

Hispanics now account for about one in four children younger than five in the United States, according to U.S. Census Bureau estimates. A recent report in the *Washington Post* said, "The increase from almost one in five in 2000 has broad implications for governments, communities and schools nationwide, suggesting that the meteoric rise in the Hispanic population that demographers forecast for mid-century will occur even sooner among younger generations." "So this means that in five years, a quarter of the 5- to 9-year-olds will be Hispanic, and in 10 years a quarter of the 10- to 14-year-olds will be Hispanic. It's just going to move up through the age distribution with each successive cohort being slightly more Hispanic," according to Passel.

Hispanics account for more than half of children younger than five in New Mexico and California, where their share of the overall state population is 44 and 36 percent, respectively. These second-generation children will account for one in nine school-age children through 2020 and will make up one in four new members of the nation's workforce.

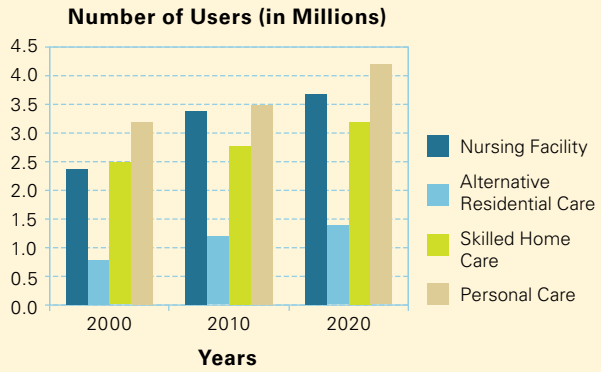
Second-generation children are different from their immigrant parents, according to the Pew Hispanic Center. They are likely to move closer to the mainstream than their parents—marrying people from other backgrounds, for example. Their political views are likely to change as well, becoming more liberal on abortion, experts say, but less supportive of affirmative action. Their earnings and education will surpass those of their parents, experts predict, but will not close the gap with the Anglo majority. Roberto Suro, the Pew Center's director, says, "The biggest difference is that we're shifting from a process where the largest component is Spanish-speaking immigrants—where language and immigration status were two enormous questions—to growth of a population that is English-speaking and native-born. You move away from the issues that have been dominant. They have a totally different set of issues than their parents do."

There is research to show that diabetes and obesity are factors in hearing loss and that 10.4 percent of Hispanics/Latinos ages 20 years or older have diagnosed diabetes. In an effort to address Latino health issues, the National Council of La Raza, the largest Hispanic organization in the United States, has an adjunct Institute of Hispanic Health, yet nowhere on its Web site is there information on hearing loss, testing, and treatment.

Education Levels

Level	Total Population	Foreign Born
Less Than High School	15.4%	32.8%
High School Graduate	32.0%	24.5%
Some College	25.3%	15.5%
College Graduate	17.9%	17.2%
Advanced Degree	10.0%	9.3%

Projected Number of Seniors Using Supportive Services



Source: The Lewin Group analysis of the Long-Term Care Financing Model, supplemented by the National Long-Term Care Survey, prepared for the Commission on Affordable Housing and Health Facility Needs for Seniors in the 21st Century.

The Workforce Squeeze

The Medical School Investment Freeze: Due to sharp cuts in medical school support in response to the projected oversupply of physicians in the late 1970s, no new medical schools were opened in the United States from 1982 to 2005. With the domestic supply of new doctors fixed, while a larger and older patient population continues to demand more care, much of the increase in the supply

of physicians has come from outside the United States. Today, nearly a quarter of all practicing licensed surgeons in the United States are foreign born and educated.

The Aging Medical Workforce: According to AMA estimates, more than 40 percent of all "active physicians," those who work 20 or more hours per week, will be 55 years old or older by 2020. Although physicians tend to retire later than most workers (more than 40 percent of all male doctors between the ages of 70 and 75 are still in the workforce, compared with only 20 percent of all male workers), older physicians also are more likely to work fewer hours. So in terms of full-time equivalents (FTEs), the number of practicing physicians is actually lower than these doctors' numbers would suggest.

Until now, the number of recent medical school graduates and immigrants with medical degrees had offset declines from retirements. The U.S. Department of Health and Human Services (HHS) expects that the balance will tip in the next decade as the acceleration in retirements will outnumber medical school graduates, whose numbers have changed little from year to year since the 1982 establishment of a moratorium on new medical schools in the United States.

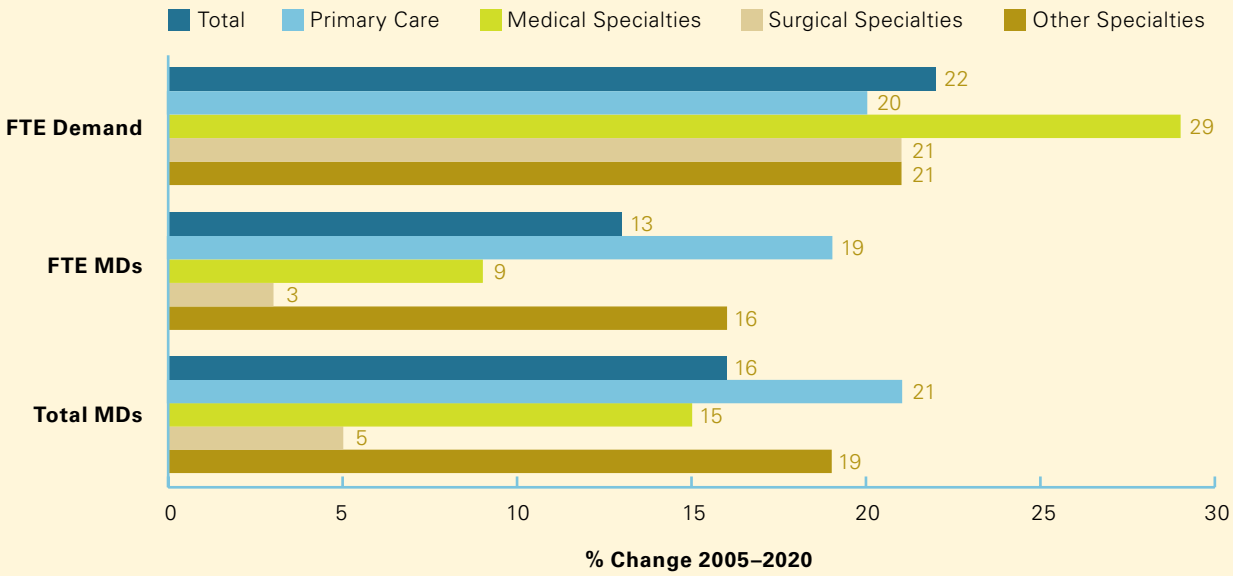
The Gender Factor: In addition, the growing proportion of women physicians is expected to exacerbate the doctor shortage. The proportion of new medical school graduates who are women has risen from just 10 percent in 1980 to close to half of all graduates today. So far, women have exhibited a tendency to retire slightly sooner, spend fewer hours providing patient care, and are less likely to work in rural areas. As their share of the over-55 workforce grows from one in eight today to one in four by 2020, the rate of retirements is expected to accelerate. It is not surprising that, in December 2003, the AMA abandoned its long-held prediction of a physician surplus and in 2006, for the first time, publicly stated that the nation may be facing a doctor shortage.

These projections by HHS are alarming in their stark contrast to anticipated increases in demand. The aging of the population, health-care reform, and anticipated medical breakthroughs and technological advances are expected to increase the demand for medical services well in excess of supply trends.

Health Worker Shortage: While much angst has been expressed about the loss of U.S. jobs, the health-care sector continues to be a strong job engine. According to the Bureau of Labor Statistics, "About 26 percent of all new jobs created in the U.S. economy (from now to 2018) will be in the healthcare and social assistance industry.... Employment growth will be driven by an aging population and longer life expectancies."

According to a 2008 paper by Dr. Robert H. Margolis of the University of Minnesota, the number of hearing-impaired persons in the United States will climb from 28 million in 2000 to more than 50 million by 2050. He contends that there is an insufficient number of audiologists

Changes in Supply and Demand for Physicians 2005–2020



Source: U.S. Department of Health and Human Services

to serve that population, and his views are seconded by Dr. Ronald B. Kuppersmith, past president of the American Academy of Otolaryngology, who said the same thing about ENTs. That said, there should be no concerns about "competition" among professionals and paraprofessionals for those needing hearing loss assessment and treatment.

The Bureau of Labor Statistics projects that employment of audiologists is expected to grow 25 percent from 2008 to 2018, much faster than the average for all occupations:

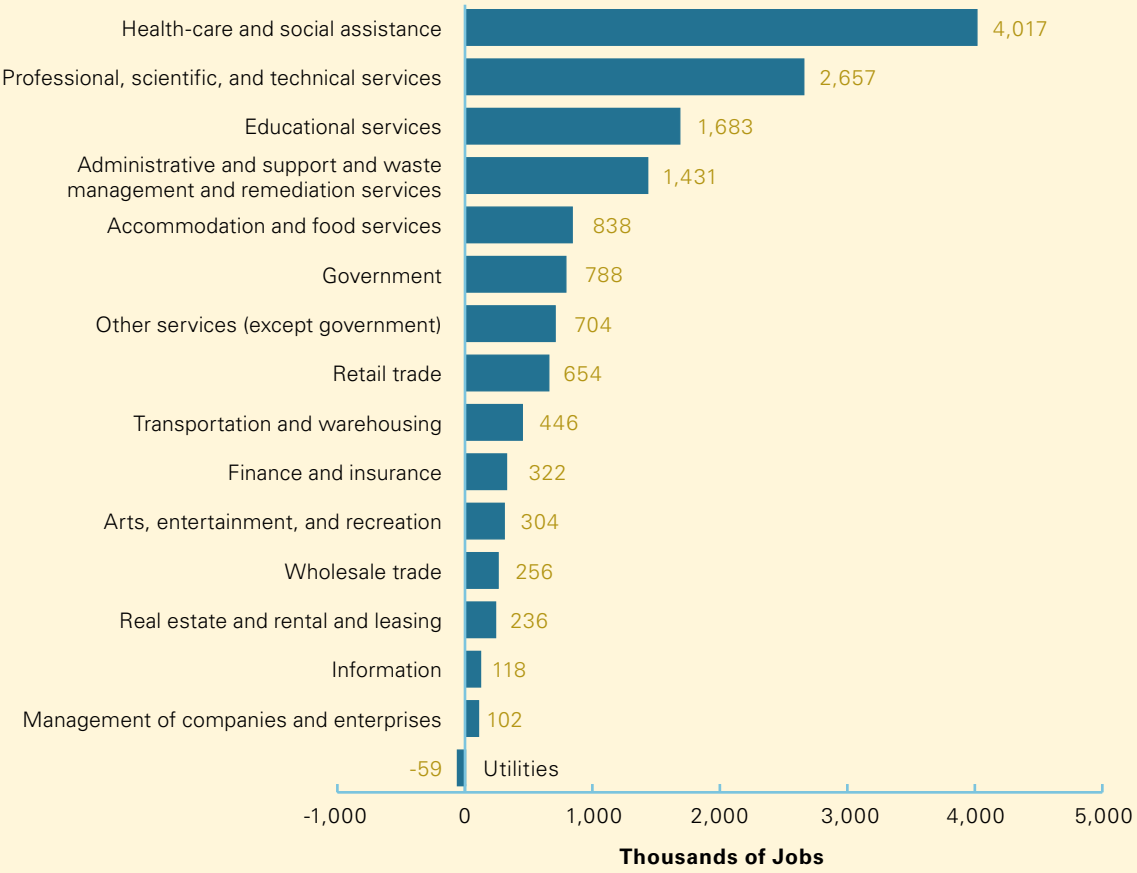
> However, because of the small size of the occupation, few job openings are expected. Job prospects will be favorable for those possessing the Au.D. degree. Only a few job openings for audiologists will arise from the need to replace those who leave the occupation, because the occupation is relatively small and workers tend to stay in this occupation until they retire. Demand may be greater in areas with large numbers of retirees, so audiologists who are willing to relocate may have the best job prospects.

While the Bureau of Labor Statistics employment assessment is interesting, the real projected increase in jobs between 2008 and 2018 amounts to just 3,200 positions, from 12,800 to 16,000. We could find no data for current or projected employment of audiology technicians.

Expanded Scope of Practice for Allied Health-Care Practitioners: Another consequence of the growing labor shortage is the expanded scope of practice for health-care professionals as a means of addressing access-to-care problems. Nurse practitioners, physical and occupational therapists, and other allied health-care professionals are growing in independence from physicians' oversight.

On October 5, 2010, the Institute of Medicine released a report, "The Future of Nursing: Leading Change; Advancing Health," that recommended a larger and more independent role for nurses in American health care and

Numeric Change in Wage and Salary Employment in Service-Providing Industries, 2008–2018 (projected)



Source: BLS National Employment Matrix

suggested that some nurses (e.g., nurse practitioners and nurse anesthetists) receive the same compensation as physicians (October 5, 2010, http://iom.edu/Reports/2010/The-Future-of-Nursing-Leading-Change-Advancing-Health.aspx). The American Medical Association was quick to blast the report. *FierceHealthcare*, a daily Web newsletter, suggested that the AMA was really more concerned about "turf and reimbursements" than about patient safety.

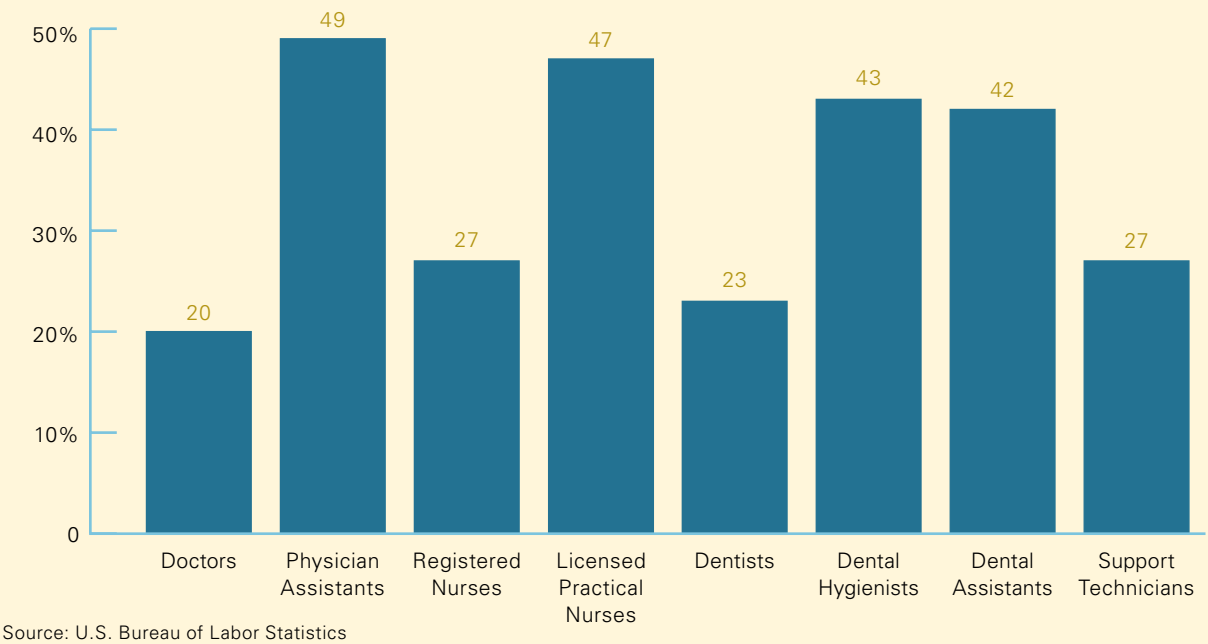
Allied health-care practitioners are outpacing professionals in higher special ties two or three to one. This means that there will be even keener competition across health-care disciplines for skilled workers. Several states have passed legislation allowing pharmacists limited ability to evaluate and manage drug regimens as well as dispense drugs. Contrary to the traditional purview of ophthalmologists, optometrists are increasingly successful in expanding their scope of practice to include LASIK surgery.

The domestic labor market is not generating enough workers to meet growing health-care demands. All health-care sectors are in fierce competition for physicians, nurses, and paraprofessionals. To meet rising demand for health and medical services, immigrants will account for a growing share of practitioners. They are up to the task: While 25 percent of the U.S. labor force is college educated, nearly 30 percent of immigrants hold bachelor's degrees or higher.

A growing percentage of health-care professionals will have English as a second language. They will come from different health-care systems—some employer-based (like the United States and Germany), others based on the national health model (like the United Kingdom). Their understanding of social and health-care priorities will be very different, and training will be required to integrate them into the U.S. approach. This is especially true of health-care professions and paraprofessions where developing markets, such as Central America and Southeast Asia (particularly the Philippines), are providing a major source of trained workers.

In developing countries, such as those in central Asia, Latin America, and the Pacific, where health-care worker shortages are nothing new, doctors are the tertiary care providers not the primary care providers. Lower-level health-care practitioners in developing markets have greater autonomy and responsibility in their practices. Midwives, nurses, and what we in the United States call physician assistants are the primary care providers, who are the gatekeepers who refer patients to doctors only as needed. Paradoxically, because development organizations such as the World Health Organization have aggressively moved to introduce new technologies to deal with life-threatening physician shortages, health-care workers from developing countries often have greater experience with telemedicine than their American counterparts. And they may resist deferring to other professionals.

Allied Health-Care Occupations Account for Most Job Growth



Source: U.S. Bureau of Labor Statistics

Technology

Several of the experts interviewed for this project believed that audiology's current business model is unsustainable because technological advances will bring down the cost of hearing devices as they have for other products (e.g., computers, smart phones, audio equipment, TVs). In addition, testing is migrating from the soundproof booth to the Internet and nonoffice settings. Bruce Butterfield, president of the Forbes Group, tested several online hearing checks, and all identified his hearing loss (he wears hearing aids) with varying degrees of sophistication. None suggested that they were definitive, and most suggested that he contact an audiologist or ENT for further evaluation.

Hear, Hear! Technological Advancements and Research

Technological advances for hearing loss have, for decades, centered on hearing devices and cochlear implants. Compounded by limited research funding for hearing-related disorders, new studies on hearing technologies have been few and far between. There are promising studies coming online that may point to technological advances beyond hearing devices and cochlear implants that can help those affected by hearing loss. Much of this research involves the study of inner ear hair cells, which is crucial to understanding hearing loss.

Rx for Hearing: According to the July 2010 *Technology Review,*

> Researchers are working on ways to treat hearing loss by engineering regenerated hair cell tissue, or by developing drugs which will stop the hair cells in the inner ear from breaking down. But finding ways to introduce the drugs to the hard-to-reach pocket of the inner ear remains a challenge. Drugs have to be injected into a space behind the eardrum and diffuse into the inner ear over time. With this method, however, there is no way of controlling the quantities of drug that reach the target site, or administering more than one drug at a time.

However,

> a device being developed at Draper Laboratory in Cambridge, MA, can deliver drugs in a controlled and timed manner to the inner ear. In combination with novel therapies capable of halting or repairing damage to the cells in the inner ear, the device could provide a more effective way to treat hearing loss….
>
> "There's really no treatment [for hearing loss] except hearing aids, and in severe cases cochlear implants," says Albert Edge, associate professor at Harvard Medical School and an investigator at [the Massachusetts Eye and Ear Infirmary]…. Hearing aids can be bulky, and cochlear implants destroy all residual hearing remaining in the ear, and neither device receives sound as well as the hair cells. (www.technologyreview.com/biomedicine/25683/?a=f)

The study concludes that

> one potential application of timed drug delivery would be stem-cell-induced growth of hair cells in the inner ear. "A potential scenario would be that it would deliver one drug for a couple of days, and then another," says Edge. "The first drug [would] help prime the cell types and help

> them divide and the other [would] help them differentiate."
>
> Recent advances in microfluidics technology have been combined with miniaturized electronics and to make this tiny pump a reality. The work was supported by the National Institute on Deafness and Other Communication Disorders. (www.technologyreview.com/biomedicine/25683/page2/)

It's All in the Genes: Other research is leading to important discoveries that may help individuals with specific hearing disorders:

> Researchers have identified a gene mutation that causes a rare form of hearing loss known as auditory neuropathy, according to [University of Michigan] Medical School scientists….Currently, diagnosing auditory neuropathy requires specific testing, and auditory neuropathy may be unrecognized if testing is not performed early in life. (*News-Medical*, July 13, 2010, www.news-medical.net/news/20100713/Gene-mutation-that-causes-auditory-neuropathy-identified.aspx)

"In the study," published in July 2010 in *Proceedings of the National Academy of Sciences USA,* Michigan's

> Marci Lesperance, M.D., and Margit Burmeister, Ph.D. led a team of researchers who examined the DNA of individuals from the same large family afflicted with the disorder.
>
> The researchers identified a mutation in the DIAPH3 gene that causes over-production of a compound known as a diaphanous protein. In previous studies, hearing loss has been linked to a related gene that also affects a diaphanous protein.

Researchers hope that "this discovery will be helpful in developing genetic tests in the future" (www.news-medical.net/news/20100713/Gene-mutation-that-causes-auditory-neuropathy-identified.aspx).

Additionally, genetic research is being conducted on hair cell regeneration. According to the American Hearing Research Foundation, researchers at Boston University's School of Medicine are studying birds for clues on hair cell regeneration in mammals:

> Birds can regenerate hair cells in the cochlea once they are lost—an ability that mammals do not possess. When hair cells are lost in birds, following loud noise exposure or administration of ototoxic drugs in the lab, the supporting cells around the hair cells turn into new hair cells. [Researchers] hope that by studying this process in birds, they will be able to induce the mammalian cochlear cells to undergo a similar regeneration. Specifically, the researchers will study the genetics involved in supporting cell transduction into hair cells in chicks and mice. They hope to gain understanding of the molecular processes involved in hair cell regeneration in order to cause the same regeneration in mammalian cells. (September 2010, www.american-hearing.org/category/news/)

Ear Chemistry: In a July 2010 study, Japanese scientists reported "that they have identified a long-elusive enzyme necessary for the proper regulation of cilia": "The Hamamatsu University School of Medicine team is optimistic that the discovery may aid in the development of therapies for those with visual and hearing maladies caused by cilia dysfunction." Researchers hope that the "finding might give insights into the sensory defects associated with problems in cilia function." For example, "age-dependent visual loss or hearing loss is known to be related to damage of the eye or ear sensory cilia." Scientists believe that enhancing or suppressing "the activity of the newly found enzyme might alleviate the symptoms through the proper regulation of cilia" (in *News-Medical*, July 8, 2010, www.news-medical.net/news/20100708/Japanese-scientists-identify-long-elusive-enzyme-necessary-for-proper-regulation-of-cilia.aspx).

Riding the Sound Wave—Advances in Telehealth

Telehealth is the provision of health services from one location to another using an electronic medium. Telehealth is an expansion of telemedicine, and unlike telemedicine (which more narrowly focuses on the curative aspect), it encompasses preventive, promotive, and curative aspects. Originally used to describe administrative or educational functions related to telemedicine, today *telehealth* stresses a myriad of technology solutions, according to the U.S. Department of Health and Human Services. Among these solutions is tele-audiology, the utilization of telehealth to provide audiological services.

According to a February 2010 article in the *Hearing Journal* (63, no. 2 [February 2010]: 19–20, 22–24), tele-audiology is quickly becoming a growing movement. The American Academy of Audiology hosted a breakout session on tele-audiology at its 2009 annual convention and

also published an article in the March/April 2010 issue of *Audiology Today* on the subject.

According to a study in the March 2010 *International Journal of Audiology*, permanent hearing loss is a leading global health-care burden, with one in 10 people affected to a mild or greater degree. Shortages of trained health-care professionals and associated infrastructure and resource limitations mean that hearing health services are unavailable to the majority of the world population. Utilizing information and communication technology in hearing health care (tele-audiology) combined with automation offers unique opportunities for improved clinical care, widespread access to services, and more cost-effective and sustainable hearing health care.

Tele-audiology demonstrates significant potential in areas such as education and training of hearing health-care professionals, paraprofessionals, parents, and adults with hearing disorders; screening for auditory disorders; diagnosis of hearing loss; and intervention services. Global connectivity is rapidly growing into underserved communities where audiological services may be facilitated through telehealth models. Although many questions related to aspects such as quality control, licensure, jurisdictional responsibility, certification, and reimbursement still need to be addressed, no alternative strategy can currently offer the same potential reach for impacting the global burden of hearing loss in the near and foreseeable future (*International Journal of Audiology* 49, no. 3 [March 2010]: 195–202).

> "In the first decade of the 21st century, genomics will be about disease diagnosis; in the second and third decades, it will be about treatment and prevention."

Beyond the Ear—What's Happening Elsewhere?

In 2000, at a conference on the future of pharmaceutical science, Dr. Wolfgang Sadee, a professor of pharmacy, psychiatry, and medical genetics at Ohio State University (OSU) and director of the OSU Program in Pharmacogenomics, said, "In the first decade of the 21st century, genomics will be about disease diagnosis; in the second and third decades, it will be about treatment and prevention." In a recent interview, he stuck by his prediction.

Experts interviewed for this project agreed that regeneration of hair cells is many years away. Their view matches that of experts in other professions such as dentistry and organ transplantation. However, as one wag put it, just like the legend on a car's side view mirror, things may be closer than they appear.

The Academy of Osseointegration, an organization of tooth replacement dentists, held a conference in summer 2010 on the regeneration of teeth, which once was thought to be two or more decades in the future. However, recent advances have changed the time line to less than 10 years.

Likewise, work is continuing apace in organ regeneration fueled by the Department of Defense's Armed Forces Institute for Regenerative Medicine (AFIRM), whose goal is "to develop clinical therapies over the next five years that will focus on the following five areas: burn repair; wound healing without scarring; craniofacial reconstruction; limb reconstruction, regeneration or transplantation; and compartment syndrome, a condition related to inflammation after surgery or injury that can lead to increased pressure, impaired blood flow, nerve damage and muscle death." One of the codirectors of the AFIRM, Dr. Anthony Atala, head of Wake Forest University's Institute for Regenerative Medicine, has successfully grown and implanted bladders, which grew to normal size and function within a few weeks. Dr. Atala also is working on using patients' cells to regenerate 22 tissue types, including kidney, lung, esophagus, bladder, smooth muscle, cartilage, urethra, vessels, salivary glands, trachea, bone, breast, uterus, and retinal tissue. In addition, using stem cells, largely drawn from amniotic fluid and placental blood, he is working to reproduce heart, liver, pancreas, and nerve tissue.

Organovo, a San Diego–based company that specializes in regenerative medicine, has announced a new $200,000 bioprinter that prints artificial organs using inkjet technology. Partner engineering firm Invetech in Melbourne, Australia, designed and developed what may well turn out to be the world's first production model 3-D bioprinter. Dr. Gabor Forgacs, the founder and chief scientific officer of Organovo, ultimately foresees a future where fully implantable organs can be printed from a patient's own cells.

Economics

I Can't HEAR You! Consumer Sentiment in the NEW Health-Care Environment

"Americans continue to express serious concerns about their ability to access healthcare," according to the Thomson Reuters Consumer Healthcare Sentiment Index, which measures U.S. consumers' current and future ability to use and pay for health care. Not surprisingly, the availability of insurance tops the list. As people continue to pay more and more out of pocket for health services, having adequate insurance coverage is a huge factor in access to health care. Generational position also affects consumer sentiment, with those in the "Silent Generation" being more positive than others—no surprise, as this generation is on the Medicare rolls (www.healthleadersmedia.com/archive/ffl/factfile).

As competition for health-care dollars increases and fewer services are covered by insurance and Medicare, consumers are required to make tough choices. Many postpone having diagnostic tests, preventative check-ups, and various procedures. Noncovered services, including hearing testing and aids, will be among those services that are delayed or excluded altogether. Health-care providers will be called upon to increase the value proposition of their services so that patients see a return on their health-care dollar investment.

We Are Family—The Medical Home

Shifts in the health-care environment over the years have created a growing need for a "Medical Home," a place where patients and providers can coexist, communicate, and collaborate. The idea isn't new, but it is morphing from one of gatekeeper in the HMO model to one of a collective of providers: "The medical home, also known as the patient-centered medical home..., is defined as 'an approach to providing comprehensive primary care'" "that facilitates partnerships between individual patients, their personal providers, and when appropriate, the patient's family" (http://en.wikipedia.org/wiki/Medical_home). Developed in the late 1960s by the American Academy of Pediatrics, the concept of the Medical Home is now being embraced by leading primary care physician organizations, including the American Academy of Family Physicians, the American Academy of Pediatrics, the American College of Physicians, and the American Osteopathic Association.

According to Wikipedia, in 2007 these organizations released the "Joint Principles of the Patient-Centered Medical Home." The principles are

- **Personal physician**: "each patient has an ongoing relationship with a personal physician trained to provide first contact, continuous and comprehensive care."
- **Physician directed medical practice**: "the personal physician leads a team of individuals at the practice level who collectively take responsibility for the ongoing care of patients."
- **Whole-person orientation**: "the personal physician is responsible for providing for all of the patient's health care needs or taking responsibility for appropriately arranging care with other qualified professionals."
- **Care is coordinated and/or integrated**, for example, across specialists, hospitals, home health agencies, and nursing homes.
- **Quality and safety** are assured by a care planning process, evidence-based medicine, clinical decision-support tools, performance measurement, active participation of patients in decision-making, information technology, a voluntary recognition process, quality improvement activities, and other measures.
- **Enhanced access** to care is available (e.g., via "open scheduling, expanded hours and new options for communication").
- **Payment**..."appropriately recognize[s] the added value provided to patients who have a patient-centered medical home." For instance, payment should reflect the value of "work that falls outside of the face-to-face visit," should "support adoption and use of health information technology for quality improvement," and should "recognize case mix differences in the patient population being treated within the practice." (http://en.wikipedia.org/wiki/Medical_home)

An August 2, 2010, article from *HealthLeaders Media* noted that physician compensation was on the rise in some specialties. The largest increases were among pulmonary disease, dermatology, urology, family medicine, hypertension, nephrology, and cardiac and thoracic surgery. This is good news for family medicine, which has typically posted the lowest salaries among the specialties. Family practitioners are going to be important advocates for patients with hearing loss, and improved compensation will help ensure an adequate pool of these providers.

Can You Speak Up? I Wasn't Listening—The Primary Care Approach to Hearing Loss

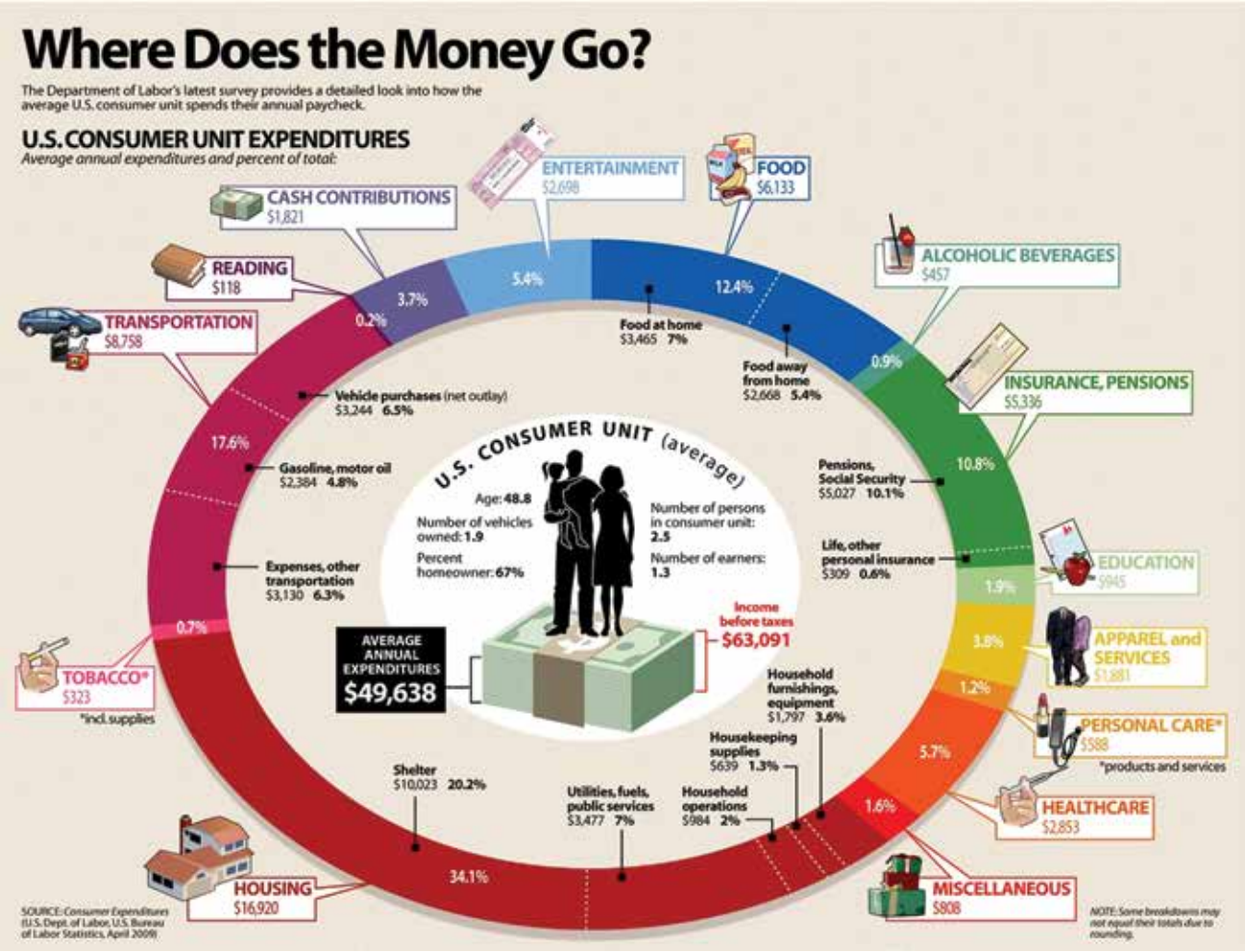
A January 2005 article in *ENT—Ear, Nose and Throat Journal* finds that while primary care physicians (PCPs) have a unique opportunity to identify patients with hearing loss and direct them to appropriate treatment, they are not necessarily evaluating hearing loss. Based on a survey of just under 300 primary care physicians, over 97 percent noted that hearing loss affected patients' quality of life. Yet only 60 percent assessed patients for hearing loss. The most common reasons given for the lack of evaluation were lack of time and more pressing medical issues. The following table illustrates the barriers preventing physicians from evaluating hearing loss:

Further, despite recommendations from the American Academy of Family Physicians to screen for hearing loss during annual physicals, 40 percent of respondents reported that they did not conduct this screening.

The study concluded that the potential exists to improve the means of evaluating adults, especially elderly patients, for hearing loss. As the primary patient advocates, PCPs must play an essential role in identifying patients with hearing loss and referring them for intervention. The study also noted that otolaryngologists and audiologists need to advocate for patients with hearing impairment and educate PCPs about the continually improving technology designed for auditory rehabilitation. Furthermore, hearing screening techniques, basic disease entities, and therapeutic options should be part of the curriculum for residents in family medicine.

Hold On a Minute! A Different Approach to Health-Care Delivery

As reported in an August 1, 2010, online issue of the *Wall Street Journal*, CVS Caremark's MinuteClinic® visits were up 36 percent in the second quarter of 2010. This



followed the company's announcement after passage of the Patient Protection and Affordable Care Act that it plans to double the number of in-store clinics from 500 today to 1,000 by 2015.

Further, according to *Drugstore News*, consumers seem to be shifting their demand away from expensive physician offices with limited hours to affordable, convenient retail clinics. As a result, companies such as Wal-Mart, Target, Walgreen's, and even Kroger grocery stores are opening convenient care clinics, as are providers such as Mayo and the Cleveland Clinic. A 2010 report, "Policy Implications of the Use of Retail Clinics," by the RAND Corporation suggests that its future could include chronic disease management and telehealth.

Americans may be cutting back on doctors' appointments and hospital visits, but that doesn't mean that they are necessarily consuming less health care. Consumers who spend out-of-pocket money for health care are more likely to be drawn to affordable, convenient options like retail clinics over conventional physician offices.

Tom Ryan, chairman and CEO of CVS Caremark, told analysts during a recent second-quarter conference call, "[Patients] are visiting fewer primary care doctors and specialists. Obviously, the sluggish economy and continued high unemployment has impacted peoples' ability to afford physician visits." Ryan attributed the strong growth of MinuteClinic to its expanded services and better consumer awareness of clinical offerings.

North American Industry Classification System Data

The North American Industry Classification System (NAICS) was developed as the standard for use by federal statistical agencies in classifying business establishments for the collection, analysis, and publication of statistical data related to the business economy of the United States. NAICS was developed under the auspices of the Office of Management and Budget and was adopted in 1997 to replace the old Standard Industrial Classification (SIC) system. It was also developed in cooperation with the statistical agencies of Canada and Mexico to establish a three-country standard that allows for a high level of comparability in business statistics among the three countries. NAICS is the first economic classification system to be constructed based on a single economic concept.

Audiology does not have its own NAICS code but, instead, is identified together with the offices of physical, occupational, and speech therapists, as outlined below:

> **621340 Offices of Physical, Occupational and Speech Therapists, and Audiologists**
> This industry comprises establishments of independent health practitioners primarily engaged in one of the following: (1) administering medically prescribed physical therapy treatment for patients suffering from injuries or muscle, nerve, joint, and bone disease; (2) planning and administering educational, recreational, and social activities designed to help patients or individuals with disabilities, regain physical or mental functioning or to adapt to their disabilities; and (3) diagnosing and treating speech, language, or hearing problems. These practitioners operate private or group practices in their own offices (e.g., centers, clinics) or in the facilities of others, such as hospitals or HMO medical centers.

Audiologists must have AuD or PhD degrees, yet they are included in a classification system that also includes art, dance, music, and exercise therapists, all of which require master's level degrees. Interestingly, optometry has its own NAICS code. What helps differentiate

Reasons for Not Evaluating Hearing Loss

Reasons	Number	Percentage
Not enough time	13	38.2
More pressing issues	13	38.2
Unsure of best method	9	26.5
Evaluate only if patient reports problem	6	17.6
No local otolaryngologist/audiologist	3	8.8
Cost of testing equipment	1	2.9

optometry in its own industry classification is the level of education/degree required:

> **621320 Offices of Optometrists**
> This industry comprises establishments of health practitioners having the degree of O.D. (Doctor of optometry) primarily engaged in the independent practice of optometry. These practitioners provide eye examinations to determine visual acuity or the presence of vision problems and to prescribe eyeglasses, contact lenses, and eye exercises. They operate private or group practices in their own offices (e.g., centers, clinics) or in the facilities of others, such as hospitals or HMO medical centers, and may also provide the same service as opticians, such as selling and fitting prescription eyeglasses and contact lenses.

Holding Down Health-Care Costs

Increasing Provider Accountability: The Centers for Medicare and Medicaid Services (CMS) is increasingly using pricing policies to discourage consumption of medical and health services. While constraining consumption of medical services, CMS also is trying to increase accountability among physicians through pay-for-performance (P4P) plans, which will financially reward or punish providers based on cost per outcome. P4P programs require developing quantifiable measures of performance. Driving the P4P movement, which is being embraced by some private insurers as well, is the simple fact that while health-care spending per person in the United States is twice that of most other Western countries, there is scant evidence that Americans are measurably healthier or at least less sick. Evaluating the quality of health care through "evidence-based" population health statistics has

NAICS Codes

2002 NAICS	1997 NAICS	1987 SIC	Corresponding Index Entry
621340	621340	8049	Art therapists' offices (e.g., centers, clinics)
621340	621340	8049	Audiologists' offices (e.g., centers, clinics)
621340	621340	8049	Dance therapists' offices (e.g., centers, clinics)
621340	621340	8049	Exercise physiologists' offices (e.g., centers, clinics)
621340	621340	8049	Hearing testing services by offices of audiologists
621340	621340	8049	Industrial therapists' offices (e.g., centers, clinics)
621340	621340	8049	Music therapists' offices (e.g., centers, clinics)
621340	621340	8049	Occupational therapists' offices (e.g., centers, clinics)
621340	621340	8049	Pathologists', speech or voice, offices (e.g., centers, clinics)
621340	621340	8049	Physical equestrian therapist offices (e.g., centers, clinics)
621340	621340	8049	Physical therapists' offices (e.g., centers, clinics)
621340	621340	8049	Physical therapy offices (e.g., centers, clinics)
621340	621340	8049	Physical-integration practitioners' offices (e.g., centers, clinics)
621340	621340	8049	Physiotherapists' offices (e.g., centers, clinics)
621340	621340	8049	Recreational (e.g., art, dance, music) therapists' offices (e.g., centers, clinic)
621340	621340	8049	Speech clinicians' offices (e.g., centers, clinics)
621340	621340	8049	Speech defect clinics
621340	621340	8049	Speech pathologists' offices (e.g., centers, clinics)
621340	621340	8049	Speech therapists' offices (e.g., centers, clinics)
621340	621340	8049	Sports physical therapists' offices (e.g., centers, clinics)
621340	621340	8049	Voice pathologists' offices (e.g., centers, clinics)

proved elusive. First, most measures of "health" implicitly involve environmental factors beyond the influence of the health-care system. Second, the metrics of care currently used to manage P4P schemes—the right care at the right time and place—are open to substantial interpretation. Consequently, many health quality plans eventually involve some input measures as proxies for outcomes.

Changing Consumer Lifestyles: An emerging trend is consumer empowerment. Several health experts believe that the lack of market incentives for insured patients to live a healthy lifestyle has led to overconsumption of medical and health services. If this is the case, a potential way of blunting the impact of the coming "age wave" and reducing health-care demand would be to encourage more proactive consumer behaviors and more healthy lifestyles now. This concept is being manifested through consumer-driven health-care plans and employer-driven wellness programs.

As health consumerism expands oversight of lifestyles beyond compliance with wellness standards, calls will increase for data on behaviors as well as physical and mental conditions. The Health-Care Consumerism Grid shows how the second generation of consumerism, which we are now entering, is only the beginning of the changes in lifestyle management and health information management.

Even supporters of health consumerism admit that financial carrots and sticks alone will not be enough to reduce health-care demand without lifestyle changes.

Emory University health economist Kenneth E. Thorpe, PhD, has tracked 370 conditions and found that 15 accounted for 56 percent of the $200 billion rise in health spending between 1987 and 2000. Five conditions accounted for one-third of the increase, with heart disease at the top of the list, followed by pulmonary conditions, mental disorders, cancer, and hypertension. These are the targets of wellness programs. Three of the most important factors in dealing with these conditions are obesity, smoking, and a sedentary lifestyle. Obesity alone, according to research by Dr. Thorpe, is responsible for 27 percent of the rise in medical costs from 1987 to 2001. What makes this important to audiology is that studies—such as one

done by researchers at the University of Antwerp, Belgium, and published in the *Journal of the Association for Research in Otolaryngology* in 2008—show a clear link between obesity and smoking and hearing loss.

The Wellness Carrots (and Sticks): Investment in wellness is taking off as companies, insurers, and governments promote and demand healthy lifestyles. Complementing plans to make patients more "rational consumers" of health care is a growing movement to give employers more control over health insurance premiums. According to the Kaiser Foundation, employer health insurance premiums have climbed at double-digit rates in eight of the last 10 years. Insurers, in addition to trying to contain or shift costs, also are more aggressively seeking

NAICS Codes

2002 NAICS	1997 NAICS	1987 SIC	Corresponding Index Entry
621320	621320	8042	Doctors of optometry (ODs) offices (e.g., centers, clinics)
621320	621320	8042	ODs' (doctors of optometry) offices (e.g., centers, clinics)
621320	621320	8042	Optometrists' offices (e.g., centers, clinics)

ways to reduce the calculated risks of their insured pools through lifestyle management efforts.

In March 2008, Chicago-based Healthcare Service Corp., parent of Blue Cross and Blue Shield of Illinois, added the word *wellness* to the mission statements of its four health plans. The company, which has more than 12 million members, also operates Blue Cross and Blue Shield health plans in Texas, New Mexico, and Oklahoma. This is more than lip service. According to the company's announcement, it "has embarked on a variety of wellness initiatives, including incorporating wellness programs in basic health benefit packages it sells, just like hospitalization coverage and physician care has been for years."

As well as financial carrots, employers are creating numerous sticks to improve their employees' aggregate health and lower premiums. While some now reward employees for better lifestyle behaviors—such as maintaining healthier weights, being physically active, or quitting smoking—through bonuses and lower employee contributions to premiums, others, like agrochemical giant Cargill, are engaging lifestyle coaches and health counselors and are requiring compliance with their recommendations as a condition of employment for at-risk employees. Scott's Lawn Care Products requires employees to partake of weight loss and smoking cessation programs subsidized by the company or risk losing their jobs. Risk-reduction policies by employers that focus on changing lifestyles and anticipate health problems, while sure to face legal challenges regarding civil liberties, are the wave of the future.

The private sector is not alone in developing lifestyle management practices. Non-health-care public institutions are being used to deliver lifestyle changes. Public schools have proved a controversial venue in trying to combat growing childhood obesity and adult-onset diabetes among children. Schools in Campbell County, Wyoming, met with outrage when they recommended training for obese children. Schools in several states now include body mass index numbers on report cards. A new federal rule requires that all school districts receiving meal subsidies create a "wellness policy" outlining goals for nutrition and fitness. Meanwhile, a growing number of communities are using senior centers as venues to collect health information, encourage greater health self-management, and encourage more screenings and tests in hopes that more preemptive treatment will reduce the amount of health care consumed by the elderly, who consume 65 percent of health-care services.

The Health-Care Consumerism Grid

	1st Generation Consumerism Focus on Discretionary Spending	2nd Generation Consumerism Focus on Behavior Changes	3rd Generation Consumerism Integrated Health and Performance	4th Generation Consumerism Personalized Health and Health Care
Personal Care Accounts	Initial account only	Activity and compliance rewards	Individual and group corporate metric rewards	Specialized accounts, matching HRAs, expanded QME
Wellness/ Prevention Early Intervention	100 percent basic preventive care	Web-based behavior changes support programs	Worksite wellness, safety, stress and error reduction	Genomics, predictive modeling push technology
Disease and Case Management	Information, health coach	Compliance awards, disease-specific allowances	Population management, integrated health management, integrated back to work	Wireless cyber-support, cultural DM, holistic care
Information Decision Support	Passive information discretionary expenses	Personal health management, information with incentives to access	Health and performance information, integrated health work data	Arrive in time information and services, information therapy
Incentives and Rewards	Cash, tickets, trinkets	Health incentive accounts, activity-based incentives	Non-health corporate metric-driven incentives	Personal development plan incentives, health status related

Source: Center for Health Transformation, "Health-Care Consumerism: The Basis for a 21st Century Intelligent Health System."

Environment

Does Anybody Hear Me? Hearing as a Public Health Issue

Just over a decade ago, the World Health Organization (WHO) declared that, worldwide, noise-induced hearing impairment is the most prevalent irreversible occupational hazard. In the WHO's 1999 "Guidelines for Community Noise," it was estimated that over 120 million people worldwide had disabling hearing difficulties (*Environmental Health Perspectives* 113, no. 1 [January 2005]). The causes of the growing noise pollution problem include increased population growth, urban sprawl, lack of noise-reduction regulations, an increasing number of vehicles and air traffic, and human dependence on noise-producing electronics.

In Gordon Hempton's *One Square Inch of Silence*, the author identifies silence as an endangered species. Indeed, he quotes Nobel Prize–winning bacteriologist Robert Koch to reinforce the potential future impact of noise pollution: "The day will come when man will have to fight noise as inexorably as cholera and the plague." In his pursuit of silence, Hempton traverses the United States measuring the decibel levels of machines, cars, airplanes, rain, and even deer trekking through the woods. He visits state parks and federal buildings/department offices (the Federal Aviation Administration, for example). He informs, educates, and attempts to increase awareness of noise pollution and prevention. He perseveres, undaunted and optimistic in a time when, as he notes, noise is so prevalent, it's taken for granted—so much so that noise is not among the 25 metrics that constitute the Environmental Performance Index rankings issued annually by Yale University's Center for Environmental Law and Policy. Those rankings include drinking water, indoor air pollution, industrial CO_2 emissions, and pesticide regulation. The reason that noise pollution is excluded, according to the center's director, is lack of consistent data collected methodologically among more than 150 countries.

> "...over 120 million people worldwide had disabling hearing difficulties"

Additionally, the National Institute for Occupational Safety and Health (NIOSH) estimates that over 30 million U.S. workers are exposed to hazardous sound levels on the job ("Work Related Hearing Loss," NIOSH Publication No. 2001-103, www.cdc.gov/niosh/docs/2001-103/). While the Occupational Safety and Health Administration (OSHA) requires employers to provide hearing protection to workers who are overexposed to noise on the job, OSHA recognizes that the problem is difficult to monitor. In spite of requirements that include employer implementation of a continuing, effective hearing conservation program, the problem is not abating. Worse, noise pollution, both on and off the job, has a growing impact on quality of life.

Chew Faster, the Noise Is Killing Me—Purposeful Noise: Some workplace and environmental noise is purposeful. In April 2010, CNN aired a segment on how restaurants use loud music to help turn over tables and increase consumption. According to the segment, "In the mid-1980s, researchers at Fairfield University demonstrated that people increased their rate of chewing by almost a third when listening to faster, louder music, accelerating from 3.83 bites a minute to 4.4 bites a minute. A 2008 study in France further found that when music decibels are amped up, men not only consumed more drinks but consumed them in less time."

Anti-noise activists describe the effect of "secondhand noise" as similar to that of secondhand smoke. In an article published in the July/August 2010 issue of *Audiology Today*, a study on the effects of utility-scale wind turbines shows that the production of low-frequency noise and vibration from these turbines can have negative effects on people living and working near them. While the noise produced is not believed to cause hearing loss, it is known that the "emissions" do cause sleep disturbances. Coined "Wind-Turbine Syndrome," other symptoms include headache, visceral vibratory vestibular disturbance, dizziness, tinnitus, ear pressure/pain, external auditory canal sensation, memory and concentration deficits, irritability, and fatigue. On October 6, 2010, the *New York Times* online business feed reported on efforts in a small Maine community to remove a new local wind farm. According to the article, "Lawsuits and complaints about turbine noise, vibrations and subsequent lost property value have cropped up in Illinois, Texas, Pennsylvania, Wisconsin and Massachusetts, among other states. In one case in DeKalb County, Ill., at least 38 families have sued to have 100 turbines removed from a wind farm there. A judge rejected a motion to dismiss the case in June."

It's Hear, It's Everywhere: And the United States is not alone. Other countries are also plagued by increased noise pollution. According to the European Environment Agency, over 65 percent of the population is exposed to ambient sound at levels above 55 dBA, while over 17 percent is exposed to levels above 65 dBA (*Environmental Health Perspectives* 113, no. 1 [January 2005]). This exposure can lead to hearing loss as well as other health and learning problems. It's not just about hearing loss prevention and restoration—it's a matter of systemic health and well-being.

La-La-La-La…I'm Not Listening! Adolescent Hearing Loss and Behavior

According to a widely publicized August 2010 article in the *Journal of the American Medical Association* (*JAMA*), researchers concluded that the prevalence of hearing loss in American adolescent study participants aged 12 to 19 years increased significantly from 14.9 percent in 1988–1994 to 19.5 percent in 2005–2006. The study also showed that in 2005–2006, hearing loss was more commonly unilateral and involved the high frequencies. The assumption is that this increase in hearing loss is due to the increase in the use of MP3 players and headphones, especially when these devices are set at unsafe decibel levels. In the July/August 2010 issue of *Audiology Today*, a study performed on a small sample of middle school–aged children (12 to 14 years old) indicated that the majority of those sampled were listening to MP3 devices at volumes that could be considered unsafe. The article also showed that there is an increase in monaural listening. In the article's discussion, it was noted that while participants may have been using MP3 devices at unsafe levels, the participants did not view their listening behavior as risky.

The *JAMA* research has some challengers, such as Robert Schlauch, lead author of a new study in the *Journal of Speech, Language, and Hearing Research* and a professor in the University of Minnesota's Department of Speech Language Hearing Sciences. He claims that 10 percent of the hearing deficits reported in the article are due to "measurement errors" and believes that there is no more threat to hearing from today's personal listening devices than from the Sony Walkman–type devices of the 1980s and 1990s. He contends that fewer than 20 percent of teenagers in the United States have a hearing loss resulting from exposure to loud sounds.

The research offers a different analysis of the data reported in the *JAMA* article referenced above. The researchers at the University of Minnesota concede, however, that though their findings differ from those of previous studies on MP3-induced hearing loss in U.S. teenagers, people must still be concerned about exposure to loud noise.

Yet concern over a risky behavior and changes to that risky behavior are two very different things. According to a Delphi study published in the May 2009 issue of *Pediatrics*, researchers determined that it was not expected that adolescents would perform necessary protective behaviors to prevent MP3-induced hearing loss. The study objective was to identify parties involved in the prevention of MP3-induced hearing loss among adolescents and potentially effective prevention strategies and interventions. Researchers identified two environmental health protection measures that could be both relevant and feasible for helping change adolescent behavior with regards to MP3 listening devices. The first was persuading authorities to encourage manufacturers to produce safer products. The second was the creation of public health campaigns to help improve knowledge of the risks of high-volume music, including potential preventative measures.

Politics/Policy

Politics and health care have a close yet adversarial relationship. Health-care practitioners accuse politicians of making decisions that compromise their ability to provide appropriate care without giving them the protection they feel they need to be safe from frivolous malpractice lawsuits. Politicians in turn criticize the health-care system for skyrocketing medical costs. They claim that this is making health care in the United States an elitist system, one that provides less affordability and accessibility to the people who need it most. Meanwhile, drug companies and drug lobbyists pressure both politicians and health-care professionals in their home arenas in order to gain greater market shares.

With every political election, health issues—such as rising drug costs, long-term care for aging baby boomers, and Medicare reform—continue to receive greater press coverage. The 2010 passage of the Patient Protection and Affordable Care Act (PPACA) has added to the maelstrom and uncertainty. While major restructuring or repeal of the act is an election issue, the health-care sector already is making changes to address the requirements of the program. There are various views even among those who want changes in the law. For example, the health insurance industry, through its trade association, America's Health Insurance Plans, wants to keep the mandate that all Americans have insurance or pay a penalty. The mandate is the subject of state challenges to the law in court.

Back to the Future—Health-Care Reform

Just ahead of passage of the PPACA, the Urban Institute, a nonpartisan public policy organization, did an exhaustive study of the impact of failure to pass comprehensive health-care reform. It looked at three scenarios:

1. **Worst case**—slow growth in incomes and continuing high growth rates for health-care costs;
2. **Intermediate case**—somewhat faster growth in incomes but a lower growth rate for health-care costs;
3. **Best case**—full employment, faster income growth, and even slower growth in health-care costs.

According to the study,

Under any scenario, the analysis shows a tremendous economic strain on individuals and businesses in all 50 states and the District of Columbia if reform is not enacted. While all income levels would be affected, middle-class working families would be hardest hit. Within 10 years, under the worst-case scenario, we estimate that:

In 29 states, the number of people without insurance would increase by more than 30 percent. Under this worst-case scenario, the number of uninsured could grow by at least 10 percent in every state. All told, the number of uninsured Americans would reach 65.7 million.

Businesses would see their premiums continue to increase—more than doubling in 27 states. Even in the best case scenario, 46 states would see employer premium costs increase by more than 60 percent.

Every state would see a smaller share of its population with employer-sponsored insurance (ESI). Half of the states would see the number of people with ESI coverage fall by more than 10 percent.

Every state would see its Medicaid/CHIP [Children's Health Insurance Program] spending rise by more than 75 percent by 2019. Half the states would face cost increases of more than 100 percent.

The amount of uncompensated care in the health system would more than double in 45 states. Even in the best case, uncompensated care would increase by more than 50 percent in 48 states.

The study concluded that

> without significant reform that makes health insurance more accessible and affordable and reduces the rate of healthcare cost growth over time, the number of uninsured will increase and healthcare spending will increase dramatically. Without reform, the cost of financing public program growth will place added burden on taxpayers. The rising cost of caring for a growing number of uninsured through safety net programs will also add to taxpayer burdens. Employers will face sharply increasing healthcare premiums. This will eventually get passed onto the workforce in terms of lower wages, but that will not happen instantaneously. In the short-term, business profitability is adversely affected. Finally, individuals and families will face higher out-of-pocket costs for premiums and for services along with higher tax burdens.
>
> We recognize that health reform itself will be costly. If enacted, government expenditures will increase by more than shown here because of increases in Medicaid enrollment and subsidies to low-income people—how much more depends on the cost containment provisions ultimately enacted. Employer spending will also grow, though it should be lower for small firms who have access to exchanges. Health reform will stem the continuous erosion in the number of Americans with healthcare coverage and reduce spending for a large number of lower income families. Reform will also decrease financial pressures on the hospitals and clinics that provide care to the uninsured, reduce many system inefficiencies, and ultimately improve the health and financial security of Americans. While enacting health reform will be difficult and expensive, the cost of failure is substantial and will be felt in every state. ("The Cost of Failure to Enact Health Reform")

> "Under any scenario, the analysis shows a tremendous economic strain on individuals and businesses in all 50 states and the District of Columbia if reform is not enacted."

The Insured Tsunami

As 32 million Americans become newly insured, the pace, magnitude, and redistribution of this population among care delivery sites make up one of the greatest unknowns, according to Thompson Reuters. The new demand adds more consumers to the health-care marketplace, and those consumers have more choice in how their care is delivered. Incentives for and increased payments to primary care physicians will continue to move profitable outpatient care to nonhospital settings. Consumers' need for affordable care also will drive nontraditional health-care delivery models, such as the rise in convenient care clinics throughout the United States and the larger role of nurses and other nonphysician professionals in transforming health care in America.

The one certainty surrounding health-care reform is that the playing field will change. The specific details are still unclear, yet there is little doubt that with health-care reform come opportunities for paraprofessionals, telehealth, and new modes for delivery of care. Additionally, performance metrics based on achieving quality health outcomes will become the gold standard as government-mandated pay-for-performance requirements come online. Hospitals are already bracing for the impact, according to Thompson Reuters Healthcare. They have identified key areas for hospital administrators, including performance metrics that focus on improving clinical and operational efficiencies, reducing costs, and patient safety. They are also preparing for shifts in reimbursement and tougher payer negotiations ("Impact of Reform on Hospitals," September 20, 2010).

Insurance coverage is another factor with many uncertainties. Reform legislation will reduce the number of uninsured Americans and increase the number of Medicaid enrollees. Estimates from the Congressional Budget Office, the Centers for Medicare and Medicaid Services, and the RAND Corporation show that the number of Medicaid enrollees will increase by 11 to 25 million, while the number of uninsured will decrease by 24 to 28 million by 2019 (Thompson Reuters on Healthcare Reform, "Predicting Local Changes in Coverage and Utilization," 2010). As more people are insured, more will seek health-care services. Yet changes in coverage and payments will decrease service demands in some areas. And much of how these changes

will play out is based on how health-care reform will operate in each state, especially where Medicaid is concerned. According to Thompson Reuters Healthcare, these differences in state implementation will occur because all programs will be state-based, all states have different numbers of uninsured, current Medicaid program policies and rates of participation differ throughout the states, and many states already have extended Medicaid coverage. Regardless of state-specific implementation, it is expected that there will be increases in demand for preventative and diagnostic services across the board.

Direct access for Medicare patients is another area that is gaining momentum among certain health-care providers, including audiologists. Direct access would enable Medicare patients to see an audiologist without a referral, and studies conducted by the Academy have concluded that audiology direct access is a cost-effective service delivery model that poses no safety risk to Medicare patients dealing with hearing loss (*Journal of the American Academy of Audiology* 21, no. 6 [2010]).

Another push for direct access is coming from physical therapists, with the American Physical Therapy Association putting legislation before Congress to enable outpatient physical therapy patients to self-refer. Gains have been made here, with 45 states having removed provisions requiring a referral by a physician from their statutes (American Physical Therapy Association, www.apta.org/AM/Template.cfm?Section=Resources_for_Chapters&TEMPLATE=/CM/ContentDisplay.cfm&CONTENTID=18064). Still, questions arise about the profitability of direct access, given that Medicare reimbursements are low and expected to decline further.

The biggest political issue, and wild card, facing U.S. health care is who will finance and deliver it in the future. What is emerging, as is always true with environmental scans, is a clear interconnection among the STEEP (sociodemographics, technology, economy, environment, and politics/policy) categories. Trends and issues are not just isolated in one of these five "file drawers."

Many of the strategic questions and conclusions we have raised so far also apply in this section because they have political ramifications for the audiology community and the Academy. As the Academy's leaders ponder these questions in their deliberations, a pattern of strategies will emerge that can focus the association's future activities at a higher level.

Hear Ye, Hear Ye—Behave or Beware

Since the Enron scandal in 2001, there has been increasing scrutiny of corporate ethics, beginning with passage of the Sarbanes-Oxley Act of 2002 that required, among other things, disclosure of companies' codes of ethics and variances. Increasingly, ethics concerns are moving out of the corporate C-suite. In health-care ethics there are three principal areas of concern: research, continuing education, and incentives. A good deal of work has been done on the first two, but in all cases, it tends to focus on *physician* relationships with industry.

According to a September 2010 posting on *Health Reform Watch*, a blog of the Seton Hall University School of Law, Health Law and Policy Program, a few states have required drug and medical device companies to disclose their relationships with physicians. The blog goes on to say that the Patient Protection and Affordable Care Act

> takes it to the next level, requiring "drug, device, biological, or medical supply" companies to report all of the payments they make to physicians and teaching hospitals in all of the 50 states. The Secretary of Health and Human Services is required to make the payment information public "through an Internet website," in a form that is clear, understandable, and searchable, and in a format that is easily aggregated and downloaded. While drug and device companies do not need to submit their first reports under PPACA until March 31, 2013, those reports are to include all payments made to physicians and teaching hospitals in 2012. As a result, drug and device companies are hard at work right now putting systems in place to accomplish the information gathering and organizing that nationwide reporting will require.

The problem with all such ethics and disclosure requirements is consistency and enforcement. In an article in the *Virginia Law Review* in March 2010, the authors identify the difficulty public companies have in complying with disclosure requirements and the myriad opportunities for obfuscation either inadvertent or purposeful. The Seton Hall blog picks up on that view in relation to the requirements of the PPACA, saying,

> With regard to physician payments, a valuable cross check would be provided by the draft Public Health Service conflict regulations' requirement (published in the *Federal Register* on May 21, 2010) that "any significant financial interest that (1) is still held by a principal investigator or senior/key person, (2) is related to government-funded research, and (3) is a financial conflict of interest must be disclosed to the public via the world wide web; the disclosures that physician-investigators must make to medical journals will also serve this function."

The focus on these approaches tends to spotlight the integrity of researchers. But there is concern among health-care associations regarding the influence of pharmaceutical companies, medical device manufacturers, and other corporate sponsors on continuing medical educational activities. This concern is valid, especially amid growing scrutiny of drug companies' and medical device manufacturers' financial ties to physicians and other outside groups that have included consulting fees paid to doctors, free trips to exotic locales, and sponsorships of education conferences attended by physicians.

One area undergoing sweeping reform is continuing medical education (CME), which has long been a bastion of corporate support. A U.S. Senate Finance Committee report concluded that some continuing medical education activities were marketing vehicles for drug companies.

With this increased pressure from Congress and watchdog groups, pharmaceutical companies and other corporate entities are changing how they spend grant monies and are becoming far more transparent in their reporting processes. Pharmaceutical giant Pfizer announced in 2008 that it will no longer support CME provided by medical education firms. It will continue to support CME programs of academic medical centers and teaching hospitals, associations, medical societies, and community hospitals.

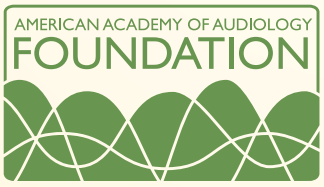
Companies that support continuing medical education activities, such as those provided by nonprofit associations, are now moving the support function out of marketing departments and into grant departments and are disclosing grants given to such activities. Company grantors are funding programs with outcomes measurement ability as a way to justify their investment, and many are directing money to those CME providers that have full Accreditation Council for Continuing Medical Education (ACCME) accreditation.

Support from industry is critical for associations providing CME activities, and even with increased oversight, industry is spending considerable amounts of money on CME. It is unrealistic to expect that health-care associations can provide the level of CME that members have become accustomed to without industry support. However, associations can and should develop policies, procedures, and guidelines to help manage industry relationships and ensure that CME activities are unbiased and free of commercial influence.

Associations that provide continuing medical education are working to implement principles and guidelines to help manage industry relationships. The American Heart Association and the American College of Cardiology, for example, have both instituted strong policies regarding commercial support. Both groups adhere to ACCME standards for CME activity and are fully transparent in their industry relationships.

The area of ethics and incentives is murkier. For example, the American Medical Association inserted a section on the subject in its *Code of Medical Ethics* in 1996 and last updated it in 2002. However, the section is fairly general and largely refers to reimbursements and relationships with health plans. What most concerns the American Academy of Audiology is the audiologist's relationship with hearing aid manufacturers. As a result, the Academy created a set of voluntary guidelines. In an interesting development, on December 6, 2010, the *Baltimore Sun* published a story about a Senate Finance Committee report that detailed a conflict of interest relationship between a cardiologist and the maker of a particular stent. While in this case a physician was the focus of ethical questions, it cannot be long before all health-care professionals are subject to similar scrutiny and perhaps legal consequences.

Where do the Academy's ethical relationship guidelines stand in comparison with those of other health-care associations whose professionals dispense (e.g., the Academy of Osseointegration, which represents implant dentists, and the American Optometric Association)? At this time, the Academy of Osseointegration does not have similar guidelines, and there is no move to create them, although there are concerns about the incentives offered by dental implant manufacturers to professionals and the "leasing" of endorsements by implant dentists. Likewise, the American Optometric Association does not have relationship guidelines and sees no need for them at this time.



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