



**Review and Evaluation of Proposed Legislation Entitled:
An Act to Provide Coverage for Hearing Aids
House Bill 3598**

**(Proposed substitution text submitted for review
by letter dated December 2, 2009)**

**Provided for
The Joint Committee on Public Health**

May 2010



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Substitution Text for House Bill 3598: An Act to Provide Coverage for Hearing Aids

Actuarial Review of Massachusetts House Bill 3598, An Act to Provide Coverage for Hearing Aids

Executive Summary

This report was prepared by the Division of Health Care Finance and Policy (DHCFP) pursuant to the provisions of M.G.L. c. 3 § 38C which requires DHCFP to evaluate the impact of mandated benefit bills referred by legislative committee for review, and to report to the referring committee. The Joint Committee on Public Health referred House Bill 3598 (H.3598) “An Act to Provide Coverage for Hearing Aids” to DHCFP for review.

Throughout this report, H. 3598 will refer to the substitution text, as requested by the Joint Committee on Public Health by letter to DHCFP dated December 2, 2009. See Appendix for substitution text for H. 3598. This text is not otherwise available.

Note that “hearing aid” is used throughout this report to include all air-conduction devices, digital hearing aids, and bone-anchored hearing aids. The interpretation of hearing aid is based on the language included in H.3598. Cochlear implants, which are used to treat severe to profound deafness, are considered to be excluded from this definition. It is important to note that coverage of cochlear implants varies among health plans, with some health plans providing coverage for the medical procedures and implants, when medically necessary. Other health plans cover only the medical costs associated with the implantation.

Definition of Hearing Aid

Note that “hearing aid” is used throughout this report to include all air-conduction devices, digital hearing aids, and bone-anchored hearing aids. The interpretation of hearing aid is based on the language included in H.3598. Cochlear implants, which are used to treat severe to profound deafness, are considered to be excluded from this definition. It is important to note that coverage of cochlear implants varies among health plans, with some health plans providing coverage for the medical procedures and implants, when medically necessary. Other health plans cover only the medical costs associated with the implantation.

Treatment of Insured Persons Ages 65 and Over

The proposed legislation applies to all persons, regardless of age, who are covered by private insurance coverage. However, since most individuals that are over age 65 are covered by Medicare and federally-regulated “medigap” policies rather than private insurance, House 3598 would have minimal impact on those over age 65. Medicare and other public programs are not subject to state mandate laws. Therefore, DHCFP did not include the over 65 age group in its fiscal impact review. It is important to note, however, that Medicare does not currently cover hearing aids.

Overview of Current Law and Proposed Mandate

Current law requires that health plans cover newborn screening tests and cover medically-necessary diagnosis and treatment of hearing disorders by audiologists. Current law does not mandate that

health insurers provide coverage for hearing aids and related services. Typically, health insurers in Massachusetts do not cover hearing aids and related services in their basic package of benefits.

House Bill 3598 (H. 3598), as proposed by substitution text, would mandate coverage for hearing aids for the full cost of a hearing aid per hearing-impaired ear every 3 years, and all related services required to assess, select, and appropriately adjust or fit the hearing aid. The proposed legislation does not define full cost, leaving the dollar value of full cost subject to interpretation by health plans and by covered individuals. Hearing aids can range in price from a low of \$500 to a high of \$4,000 or more.

The proposed bill applies to all ages, however, DHCFP's review and evaluation focuses on how H. 3598 applies to children and adults under 65 years of age, since those aged 65 and over are generally covered by Medicare and Medicare gap coverage plans that are not subject to state mandate laws. Medicare, however, does not currently cover hearing aids.

It is important to note that H. 3598 does not include a cap on coverage for hearing aids. Other states with a mandated hearing-aid laws have caps on the benefit that range from a low of \$1,400 to a high of \$4,000 (provided every 48 months). The Massachusetts Group Insurance Commission (GIC) provides coverage for hearing aids with a cap, providing up to a maximum of \$1,700 per hearing-impaired ear, every two years. The GIC maximum benefit of \$3,400 would subsidize approximately 80 percent of the average cost of a pair of hearing aids \$4,200.

Coverage of hearing aids under H. 3598 would be subject to all applicable co-payments, coinsurance, deductibles, and out-of-pocket limits. The intent of the legislation is to cover all parts of the hearing aid except batteries and all services that are necessary to ensure optimal performance of the hearing aid.

Because the substitution language of H.3598 modifies Chapters 175, 176A, 176B and 176G of the General Laws, the proposed mandate would apply to the fully-insured market, including health maintenance organizations (HMOs), and Blue Cross Blue Shield plans. The proposed mandate does not apply to self-insured plans, since these plans are exempt from state mandates under the federal Employment Retirement Income Security Act (ERISA) of 1974.

Methodology for Financial Impact Analysis

DHCFP prepared this review and evaluation of H. 3598 by conducting interviews with legislative staff and insurers, reviewing the relevant literature and interviewing industry experts relative to the demand of hearing aids, researching the marketplace for hearing aids, and conducting an actuarial analysis of the fiscal impact of H. 3598 (see appendix).

DHCFP's analysis focused on how the use and costs of hearing aids, including all related services, would be affected by H. 3598. The analysis was based on the following information and assumptions: (1) the prevalence of hearing loss; (2) the percentage of persons with monaural and binaural hearing loss; (3) the utilization and costs of services, including the percentage of covered persons who would use a hearing aid, and the average cost of hearing aids; and (4) coverage of services by insurers today.

Exhibit 1: Estimated Cost Impact of H. 3598 on Fully Insured Health Care Premiums (2011-2015)

	2011	2012	2013	2014	2015	5-Year Total
Fully Insured Enrollment	2,329,925	2,327,768	2,325,977	2,324,912	2,323,387	
Low Scenario						
Annual Impact Claims	\$35,188,105	\$25,367,073	\$31,309,235	\$35,545,719	\$24,278,010	\$151,688,142
Annual Impact Administration	\$4,798,378	\$3,459,146	\$4,269,441	\$4,847,143	\$3,310,638	\$20,684,747
Annual Impact Total	\$39,986,483	\$28,826,220	\$35,578,676	\$40,392,862	\$27,588,648	\$172,372,889
Premium Impact (PMPM)*	\$1.43	\$1.03	\$1.27	\$1.45	\$0.99	\$1.23
Middle Scenario						
Annual Impact Claims	\$71,320,835	\$44,537,272	\$42,365,413	\$82,409,057	\$51,482,390	\$292,114,968
Annual Impact Administration	\$9,725,568	\$6,073,264	\$5,777,102	\$11,237,599	\$7,020,326	\$39,833,859
Annual Impact Total	\$81,046,404	\$50,610,536	\$48,142,515	\$93,646,656	\$58,502,716	\$331,948,827
Premium Impact (PMPM)*	\$2.90	\$1.81	\$1.72	\$3.36	\$2.10	\$2.38
High Scenario						
Annual Impact Claims	\$140,212,573	\$74,554,834	\$56,469,910	\$171,447,516	\$91,208,393	\$533,893,226
Annual Impact Administration	\$19,119,896	\$10,166,568	\$7,700,442	\$23,379,207	\$12,437,508	\$72,803,622
Annual Impact Total	\$159,332,470	\$84,721,402	\$64,170,352	\$194,826,723	\$103,645,901	\$606,696,848
Premium Impact (PMPM)*	\$5.70	\$3.03	\$2.30	\$6.98	\$3.72	\$4.35

*5-Year Total is the average per member, per month cost across the 5 years.

Three different impact scenarios were developed – low, middle, and high – to present a range of the possible impact of the proposed mandate on premiums and total health plan expenditures.

Results of Financial Analysis

In 2011, the projected increase in spending that would result from H. 3598 ranges from 0.32% to 1.29% of premiums or \$40 million to \$159.3 million. The impact on per member per month (PMPM) premiums ranges from \$1.43 to \$5.70. Over a five-year period, the average of PMPM impact ranges from \$1.23 to \$4.35.¹

The five-year impact results are displayed in Exhibit 1. Three scenarios resulted in estimated increased total spending (including both claims spending and administrative expenses). These three scenarios reflect differences in assumptions for several factors influencing costs including the proportion of hearing impaired who will use hearing aids, the level of need for one or two hearing aids, and the average cost of a hearing aid. The “low” scenario, for example, assumes the lowest rates of use and cost. Table 2 in the Actuarial Assessment in the Appendix details the varying assumptions for each of the 3 levels of estimate.

Introduction

According to the National Institutes of Deafness and Communication Disorders (NIDCD) of the National Institutes of Health (NIH), approximately 1 in 10 persons in the entire population in the United States have some degree of hearing loss.² That includes all ages: children, adults and elderly persons. The prevalence of hearing loss varies by age group, with hearing loss increasing with age. Only a minority of those with hearing loss use a hearing aid, however. It is estimated that less than 20 percent of children and adults who are 65 years of age and younger with some degree of hearing loss use hearing aids. Precise estimates of use rates among children and adults were difficult to obtain for this report, since many of the sources include the elderly, who are largely unaffected by the proposed legislation. Please refer to the appendix of this report for more detail on the rate of hearing-aid use, which is referred to as the “hearing-aid adoption rate.”

H. 3589 would require health plans to provide coverage for the full cost of a hearing aid per hearing-impaired ear every 3 years, and all related services. The proposed bill provides for “full cost” of hearing aids. Such coverage could conceivably cover a range of hearing aids from a low of \$500 to a high of more than \$4,000 per hearing aid. The proposed bill would apply to all ages, including children and adults under age 65.

The proposed bill applies to all ages, however, DHCFP’s review and evaluation focuses on how H. 3598 applies to children and adults under 65 years of age since the proposed bill has minimal impact on those over 65 due to the near-universal levels of Medicare coverage in that age group. Medicare, however, does not currently cover hearing aids.

Fully-insured commercial plans do not typically provide coverage for hearing aids in the basic package today. Most fully-insured individuals must pay out of pocket for hearing aids. Certain insured individuals such as individuals covered under the Group Insurance Commission (GIC) and through MassHealth receive hearing aid benefits. Such benefits are provided on a capped basis, however. In addition, the Department of Public Health provides financial assistance program for the purchase of hearing aids to income-eligible infants and children.

The remainder of this introductory section summarizes the scope of the current law and describes how private insurance coverage might be affected by the proposed bill.

Summary of Current Law

Current law requires that health plans cover newborn screening tests and cover medically-necessary diagnosis and treatment of hearing disorders by audiologists.

Current law does not mandate that health insurers provide coverage for hearing aids and related services. Typically, health insurers in Massachusetts do not cover hearing aids and related services in their basic package of benefits. In contrast, the Group Insurance Commission (GIC) provides

coverage for hearing aids, but coverage is capped up to a maximum of \$1,700 per hearing-impaired ear, every 2 years.

Summary of Proposed Bill

H. 3598 would require health plans to provide coverage for the full cost of a hearing aid per hearing-impaired ear every 3 years, and all related services, that is prescribed by an audiologist or hearing impaired specialist and dispensed by an audiologist or hearing instrument specialist.

The proposed legislation defines hearing aid to include: “any wearable, non-disposable instrument or device designed to aid or compensate for impaired or diminished human hearing, or any part, attachment or accessories including ear molds.”³ This definition excludes batteries. DHCFP interpreted this language to include “air-conduction devices” such as conventional (analog) and digital hearing aids and “bone-conduction devices” such as bone-anchored hearing aids (BAHA) that are surgically implanted.

Related services are defined to include those services necessary to assess, select, and appropriately adjust or fit the hearing aid to ensure optimal performance.

The proposed legislation also requires that coverage be subject to all applicable co-payments, coinsurance, deductibles, and out-of-pocket limits.

Should H. 3598 become law, health insurers would be required to provide coverage for: (1) the full cost of a hearing aid per hearing-impaired ear every 3 years and (2) all related services that are prescribed by an audiologist or hearing-impaired specialist, and dispensed by an audiologist or hearing instrument specialist.

The proposed mandate would apply to the fully-insured market, including health maintenance organizations (HMOs), and Blue Cross Blue Shield plans. The proposed mandate does not apply to self-insured plans, since these plans are exempt from state mandates under the federal Employment Retirement Income Security Act (ERISA) of 1974.

Background

In this section, DHCFP provides: (1) an overview of the prevalence and types of hearing loss, (2) the marketplace for hearing aids, (3) a synopsis of existing health insurance coverage by insurers in Massachusetts, and (4) a summary of federal and state activity on hearing aid mandate laws. See Box 1 for a summary of the key highlights covered in this background section.

Box 1: Summary of Background Section

This summary provides the key points that are discussed in more detail with their sources in this background section.

Prevalence and Types of Hearing Loss: 1 in 10 persons have some degree of hearing loss. Hearing loss can range from mild to profound; hearing loss can affect one or both ears.

Hearing Aids: Less than 20 percent of the population of children and adults with hearing loss use hearing aids. About 75 percent of those who do wear hearing aids wear two aids. The high out-of-pocket cost is the number one reason people cite for not using hearing aids. Hearing aids can range in price from \$500 (analog) to more than \$4,000 per hearing-impaired ear. Digital hearing aid technology represents over 90 percent of the devices sold, replacing the earlier analog technology.

Health Insurance Coverage: Typically, health insurers do not cover hearing aids.

Federal and State Activity: The FEHB program, TRICARE, the VA, and 15 states cover hearing aids at varying benefit levels.

Out-of-Pocket Costs: Individuals without coverage could presently pay, on average, \$4,200 out of pocket for a pair of hearing aids.

Hearing Loss

According to the National Institute on Deafness and Other Communication Disorders (NIDCD) of the National Institutes of Health, “hearing depends on a series of events that changes sound waves in the air into electrical signals. Our auditory nerve then carries these signals to the brain through a complex series of steps.”⁴ Hearing loss occurs when there is damage to this auditory system.

Hearing loss, or deafness, can be defined as the partial or total inability to hear sound in one or both ears. Hearing impairments are monaural or unilateral if present in one ear, or binaural or bilateral if present in both ears. Hearing loss can occur in frequency (pitch) or intensity (loudness). The severity of hearing loss is usually measured in terms of how well a person can hear the frequency or intensity in speech.

Prevalence

Approximately 1 in 10 persons in the United States have some degree of hearing loss, according to the National Institute of Deafness and Communication Disorders (NIDCD).⁵ Data compiled by the NIDCD based on the 2002 National Health Interview Survey indicates a strong relationship between the aging process and hearing loss. The age at which hearing loss begins occurs earlier for men than for women. More detail on the prevalence of hearing loss among age groups is available from the NIDCD.⁶

Types of Hearing Loss

According to the American Speech-Language Association, there are two basic types of hearing loss: conductive hearing loss and sensorineural hearing loss. Hearing aids are primarily useful for sensorineural hearing loss. Some individuals experience mixed hearing loss, which is when conductive hearing loss occurs in combination with sensorineural hearing loss.⁷

Hearing loss may be classified as normal, slight, mild, moderate, moderately severe, severe, or profound. These six descriptors correspond to the individual's degree of hearing loss, or the softest intensity at which sound is perceived.

- **Conductive hearing loss:** This type of hearing loss generally involves a reduction in sound level, or the ability to hear faint sound, and can often be medically or surgically corrected. Conductive hearing loss can be caused by many conditions ranging from an ear infection to the absence or malformation of the outer ear, ear canal or middle ear. A full listing of causes would include: cholesteatoma (noncancerous tumor in the middle ear caused by an ear infection), chronic middle ear fluid (otitis media with effusion), middle ear infection (otitis media), obstruction of external ear canal (for example, with wax, a tumor, or pus from an infection), otosclerosis (bony overgrowth of the ossicles), or perforated eardrum. See Box 2 for more information about otitis media.
- **Sensorineural hearing loss:** Sensorineural hearing loss represents between 80 and 85 percent of all hearing loss. This type of hearing loss involves damage to the inner ear (cochlea) or to the nerve pathways from the inner ear (retrocochlear) to the brain. Unlike conductive hearing loss, sensorineural hearing loss cannot be medically or surgically corrected: the loss is permanent. This type of hearing loss involves a reduction in sound level, or ability to hear faint sounds, and affects speech understanding, or ability to hear clearly. Sensorineural hearing loss can be caused by aging, brain tumors, certain drugs, childhood infections (mumps, meningitis), congenital infection (toxoplasmosis, rubella, cytomegalovirus, herpes, syphilis), congenital abnormality, demyelinating diseases (diseases that destroy the myelin sheath covering nerves), genetic factors, loud noise, Meniere's disease, sudden pressure changes, and viral infection of the inner ear (labyrinthitis). Noise-induced hearing loss (NIHL) is the number one cause of hearing loss. See Box 3 for more information about NIHL.

Box 2: Otitis Media in Children

The most common cause of hearing loss in young children is otitis media. According to the CDC, this type of hearing loss is generally temporary but can lead to permanent sensorineural hearing loss when otitis media occurs repeatedly. Such repeated episodes can lead to damage to the eardrum, the bones of the ear, or even the hearing nerve can occur and cause a permanent, sensorineural hearing loss. Otitis media refers to inflammation of the middle ear (the area behind the eardrum). When infection occurs, the condition is called “acute otitis media.” (Otitis media means middle-ear inflammation; acute means short-lived and severe, i.e. not chronic.) Colds, allergies or upper respiratory infection, and the presence of bacteria or viruses can lead to the accumulation of pus and mucus behind the eardrum. This accumulation blocks the Eustachian tube, which causes earache and swelling, and can lead to the formation of fluid in the middle ear. That condition is called “otitis media with effusion.” Otitis media with effusion can occur in a recovering ear infection or when one is about to occur.

Box 3: Noise-Induced Hearing Loss

According to the Better Hearing Institute, “excessive noise is the number one reason for hearing loss.” The National Institute on Deafness and Other Communications Disorders (NIDCD) reports that NIHL is the second most common self reported work-related illness or injury. The recommendation of the NIDCD is simple: “avoid noises that are too loud and too close or that last too long,” because the amount of time you listen to a sound affects how much damage it will cause.

What is NIHL? Exposure to some common sounds can cause permanent damage, while extended exposure to noises that reach a decibel level of 85 can cause hearing loss. NIHL can be caused by a one-time exposure to an intense “impulse” sound or by continuous exposure to loud sounds over an extended period of time.

The Marketplace for Hearing Aids

The definition of a hearing aid, according to the NIDCD, is a “small electronic device that you wear in or behind your ear. It makes some sounds louder so that a person with hearing loss can listen, communicate, and participate more fully in daily activities. A hearing aid can help people hear more in both quiet and noisy situations.”⁸

Types of Hearing Aids

Over hundreds of years, hearing aids have evolved from ear trumpets to electronic hearing aids.⁹ Future efforts may include continued focus on producing small, increasingly more powerful hearing aids.

Today, hearing aids vary greatly in comfort, style and functionality in response to the variation and treatment needs of the individual. Digital hearing aid technology now represents over 90 percent of the devices sold, replacing the earlier analog technology.¹⁰ The NIDCD provides the following understanding of how hearing aids work. “The hearing aid receives sound through a microphone, which converts the sound waves to electrical signals and sends them to an amplifier. The amplifier increases the power of the signals and then sends them to the ear through a speaker.” The new technology allows programming for an individual’s hearing loss and preferences. Digital-hearing aids are also much smaller in size and reportedly more comfortable to wear than the analog devices, with minimal feedback and background noise interference. See Box 4 for a description of hearing-aid technology and the styles available to individuals with hearing loss.

Box 4: Hearing Aids

Hearing aid technology includes three basic types: digital hearing aids, programmable hearing aids, conventional hearing aids.¹¹ According to the American Hearing Aid Association, digital hearing aids use the most advanced technology today. Over 90 percent of people who use a hearing aid wear a digital hearing aid. This type of hearing aid contains a computer chip that is programmed by a computer.

Selecting a hearing aid is based on several factors, including the degree or severity of hearing loss, and preference for style and comfort. Hearing aids come in many styles, including: (1) completely in the canal (CIC), which are custom made, almost invisible in the ear, and can fit completely in the canal; they are not considered suitable for persons with severe hearing loss; (2) in the canal (ITC), which also fit in the ear. They are considered suitable for mild to moderate hearing loss; (3) in the ear (ITE), which fit in the canal either “completely” or “partially;” they are considered suitable for a wide range of hearing losses; (4) behind the ear (BTE), which can either be open fit or used with an ear mold. These are most frequently used by children; and (5) Body CICs. Body hearing aids are housed in a special case that can be carried in a pocket; they are considered best for those with the most severe hearing losses.¹²

Use of Hearing Aids

According to the Massachusetts Commission for the Deaf and Hard of Hearing, 85 percent of those with hearing loss can be successfully treated with hearing aids.¹³ However, only a minority of those with hearing loss use a hearing aid. Data from NIDCD indicates that less than 20 percent of children and adults diagnosed with hearing loss use hearing aids. Precise estimates of use rates among children and adults were not available for this report, and use rates varied among sources.

- According to the Better Hearing Institute (BHI), about 1 in 4 persons who could benefit from a hearing aid wear a hearing aid.¹⁴ However, that estimate reflects the use rate for all age groups, including those over 65 years of age who are excluded from this legislation.

- Data from NIDCD indicates that fewer than 20 percent of adults with mild to moderate hearing loss use a hearing aid.¹⁵ The California Health Benefits Review Program suggests that 50 to 60 percent of children with hearing loss use hearing aids, while another source indicates that only 12 percent of children do.¹⁶

Hearing-aid use tends to correspond with the degree of hearing loss. Survey results indicate that among those who use aids: 75 percent use two hearing aids; and 25 percent use one hearing aid. Further, the Better Hearing Institute found that less than one in ten with mild hearing loss use a hearing aid, while just four in ten people with moderate-to-severe hearing loss use a hearing aid.¹⁷

The reasons cited for not using hearing aids included: (1) undiagnosed hearing loss and inadequate information about treatment; (2) concern about the stigma of wearing a hearing aid; (3) doubt that hearing aids would work; and finally, (4) the high out-of-pocket costs of hearing aid devices. The Better Hearing Institute also reports that there is an adjustment period for wearing hearing aids, and without adequate support and fitting help, many people fail to use them consistently.

The rate of hearing aid usage among those diagnosed with hearing impairment is factored into the financial impact analysis in this report through the hearing aid adoption rates (see Table 2 and 3 of the Actuarial Assessment in the Appendix).

Most hearing aids are fitted and dispensed by audiologists and hearing aid specialists who are employed in physician offices or by specialized hearing aid offices. Hearing aids can be purchased with a prescription from a variety of sources such as at hospital clinics, doctors' offices, hearing aid specialty stores, on-line dealers, and at discount stores such as Costco and Walmart. The quality of service (including fitting accuracy and support, style and brand variety, staff qualifications) from these different sources can vary as a result of having little standardization in the industry. Low-cost non-prescription hearing aids are available online but they generally do not include some of the standard features commonly available in prescription aids.

Cost of Hearing Aids

According to a survey published in Consumer Reports, the cost of a hearing aid varies widely.¹⁸ At the low end are analog hearing aids. These can cost \$500-\$800 for one, or \$1,000 to \$1,600 for a set of two. At the middle and high end, hearing aids can range in cost from \$1,300 to \$1,800 for one, or double those amounts for two. A set would run \$2,600 to \$3,600. Price variation reflects differences in features including those that can make the instruments more user friendly such as directional microphones which are helpful in noisy environments, telecoils which can pick up magnetic signals from phones and other sources, feedback suppression, remote controls, Bluetooth capabilities, FM systems, and more.

Survey of Health Insurers

Most health insurers in Massachusetts do not cover hearing aids and related services in their basic benefit package, including those services necessary to assess, select, and appropriately adjust or fit the hearing aid to ensure optimal performance.

DHCFP's consultants prepared a survey sent to seven health insurers in Massachusetts. All seven health insurers responded to this survey, including Blue Cross Blue Shield Plans, Fallon Community Health Plan, Harvard Pilgrim Health Care, Neighborhood Health Plan, Tufts Health Plan, Unicare, and United. The responses of the health plans were fairly similar. The following statements attempt to generalize the policies of the health insurers and are intended to clarify current health insurance coverage overall with respect to coverage in their basic benefit package for: (1) hearing aids; and (2) fitting and evaluation of hearing aids.

- All health plans reported compliance with two current and separate mandate laws involving coverage for hearing-related services, including: (1) coverage for the newborn hearing screening test;¹⁹ and (2) coverage for the medically-necessary diagnosis and treatment of hearing disorders by audiologists.²⁰
- All seven health plans indicated that the proposed bill would significantly expand the scope of current coverage.
- All seven health plans reported that they do not cover hearing aids in their basic benefit packages. Consistent with that response, all seven health plans reported that they do not cover the fitting and evaluation of hearing aids including hearing aid devices and accessories.
- Coverage for bone-anchored hearing aids seems to vary among the health plans. Some plans indicate that they provide coverage for medical procedures and devices associated with bone-anchored hearing aids. Other plans exclude the hearing devices from coverage.
- Most health plans indicated that they would provide coverage for hearing aids at the request of the employer group at an additional cost, but hearing aids are not included in the basic package. Health plans indicate that the addition of hearing aid coverage is not common.

Federal Activity

The following section outlines both legislative and administrative initiatives affecting Americans with hearing loss.

Hearing Aid Assistance Tax Credit Act

In the 111th session of Congress, 2009-2010, the "Hearing Aid Assistance Tax Credit Act" (H. 1646) was introduced in the House of Representatives by Representative Carolyn McCarthy (D-NY), along with numerous co-sponsors. The proposed federal legislation would amend the Internal Revenue Code of 1986 to allow individual taxpayers an income tax credit of up to \$500

for the purchase of a hearing aid, available once every five years. The tax credit would be available to those individuals who are 55 years of age or older, dependents of taxpayers, or taxpayers whose adjusted gross income is below \$200,000. The companion bill in the Senate, S. 1019, was introduced in the Senate by Senator Tom Harkin (D-IA). S. 1019 differs from the House bill by extending the tax credit to all individuals, with no restrictions based on age or income.

The National Institute on Deafness and Other Communication Disorders (NIDCD)

The National Institute on Deafness and Other Communication Disorders (NIDCD) was established in 1988 as one of the Institutes that comprise the National Institutes of Health (NIH). The mission of the NIDCD is to conduct and support biomedical and behavioral research and research training in the normal and disordered processes of hearing, balance, smell, taste, voice, speech, and language. The NIDCD is known for its health-education campaign called WISE EARS!®. This campaign is a collaboration sponsored by the NIDCD with the National Institute for Occupational Safety and Health (NIOSH) to educate the public that NIHL is preventable.

Coverage under Federal Programs

The following three programs cover hearing aids, including bone-anchored hearing aids, and cochlear implants.

- Federal Employees Health Benefits Program. Since 2008, health plans participating in the FEHB program have provided coverage of hearing aids to children of federal employees. In 2009, many health plans added coverage for adults, based on the urging of the Office of Personnel Management. Coverage for adults is optional and benefits vary. The largest insurer, Blue Cross Blue Shield, provides coverage up to \$1,000 per hearing-impaired ear every 2 years.
- Veteran's Administration. The VA provides nearly free if not entirely free coverage of hearing aids for persons with service-related hearing loss.
- Department of Defense. DoD's TRICARE program provides hearing-aid coverage for persons who qualify based on the degree of hearing loss.

State Activity

Massachusetts

Coverage for hearing aids, including bone-anchored hearing aids, and cochlear implants is provided under health insurance coverage in Massachusetts for individuals covered under GIC and MassHealth.

- Group Insurance Commission. The Group Insurance Commission provides coverage for hearing aids as follows. Health plans are required to cover 100 percent of the first \$500 and 80 percent coinsurance of the next \$1,500. The maximum benefit is \$1,700 every 2 years per hearing-impaired ear.

- MassHealth. MassHealth provides coverage for hearing aids under the following coverage types: MassHealth Standard, MassHealth Basic, Commonwealth and Family Assistance.. The maximum benefit is lower per hearing-impaired ear than the benefit offered by the GIC.

Most Massachusetts residents lack insurance coverage and must pay out of pocket for hearing aids. However, some individuals may be eligible for assistance from one of the following programs:

- The Hearing Aid Program for Infants and Children offers financial assistance for hearing aids to families with children with hearing loss. Children from birth to age 21 are eligible to apply. Eligibility for financial assistance is based on income among other factors. Assistance is subject to the availability of funding. All other sources of health insurance must be used first.
- The Massachusetts Rehabilitation Commission coordinates a federal program under Title VII Part B through the Independent Living Centers which assist eligible people to obtain hearing aids. Funding is limited and the waitlist is long, however.²¹
- National organizations offer hearing aids to income-eligible children and adults. The Lions Club and the Starkey Hearing Foundation Hear Now programs are two such examples.

State Mandates

Fifteen states have mandates that require insurance coverage of hearing aids. All of the states, except for Rhode Island, apply the mandate to children only, with varying definitions around age requirements. Some states apply the mandate to only children under 12, while other states apply the mandate to children up to 18 years of age. Coverage levels vary from \$1,000 to \$1,400 to \$2,000 to as high as \$4,000 per hearing-impaired ear in Oregon. Similarly, the frequency of the benefit varies from state to state, with states generally requiring coverage every 2, 3, or 4 years.

Rhode Island is the only state that includes coverage for both children and adults. Rhode Island provides coverage for hearing aids per hearing-impaired ear as follows: \$2,000 for those under the age of 19 and \$800 for those 19 and older, with coverage applying every three years.

A new law in Arkansas, which went into effect in January 2010, does not mandate coverage of the cost of hearing aids but rather requires insurance companies to offer coverage to employers in the state. If the employer chooses to add the option to their employee plan, the coverage must be no less than \$1,400 per year every three years for individuals of all ages.

Methodological Approach

Overview of Approach

The Division engaged a consulting team for this project, including the economics and actuarial firm of Compass Health Analytics, Inc. (Compass) to estimate the financial effects of the passage of H. 3598. Independent consultants Ellen Breslin Davidson of EBD Consulting Services, LLC (EBD) and Tony Dreyfus were hired to write the main report, which included reviewing and evaluating the legislation. Martha Grover, independent consultant, provided research on hearing loss and hearing aids. The Division, Compass and EBD worked together to evaluate the likely effects of the proposed bill on existing health insurance.

The following steps were taken to prepare the review and evaluation of H. 3598:

1. Conducted Interviews with Stakeholders.

DHCFP conducted interviews with stakeholders in the Commonwealth to ensure that it was accurately interpreting the proposed change in law, to understand the perceptions about how the law would be interpreted, if enacted, and expectations about its likely impacts. DHCFP completed interviews with legislative staff of Representative John Scibak. Meetings were also held with health insurers including Blue Cross Blue Shield of Massachusetts, the Massachusetts Association of Health Plans including representatives of member health plans, Unicare Life & Health, and United Healthcare.

2. Reviewed Literature.

DHCFP reviewed the literature to determine the context of the proposed mandate, including issues relative to the prevalence of hearing loss, types and costs of hearing aids, medical efficacy, and the federal and state landscape. This research included identification of parameters for estimating the cost impacts of H. 3598.

3. Prepared and Collected Survey Data from the Health Plans.

DHCFP requested that health plans respond to a survey developed by Compass and EBD to determine current coverage policies for hearing aids and related services.

4. Developed Baseline for Massachusetts.

DHCFP provided claims-level data from the health plans in the Commonwealth, using data from DHCFP's data warehouse, to establish a baseline of costs for those services that are currently covered by health insurance carriers. This data request was prepared by Compass.

5. Applied Assumptions and Sensitivity Analysis to Methodology.

Compass developed model parameters from a review of the literature and claims data from the Group Insurance Commission to produce an estimate of the marginal premium cost of

the proposed mandated benefits. The marginal premium cost estimate was driven by these components: (1) the prevalence of hearing loss; (2) the rate of use of hearing aids and related services among those with hearing loss; (3) the timing of purchase and replacement of hearing aids; (4) the cost of hearing aids; and (4) administrative costs. Baseline premium costs were added to the marginal premium costs to estimate the total premium cost of the proposed mandate.

Approach for Determining Medical Efficacy

M.G.L. c. 3 § 38C (d) requires DHCFP to assess the medical efficacy of mandating the benefit, including the impact of the benefit on the quality of patient care and the health status of the population, and the results of any research demonstrating the medical efficacy of the treatment or service compared to alternative treatments or services or not providing the treatment or services. To determine the medical efficacy of H. 3598, DHCFP relied heavily upon the substantial research that has been conducted on the efficacy of hearing aids and reviewed by the California Health Benefits Review Program (CHBRP).

Approach for Determining the Fiscal Impact of the Mandate

Legal Requirements

M.G.L. c. 3 § 38C (d) requires DHCFP to assess nine different measures in estimating the fiscal impact of a mandated benefit:

1. Financial impact of mandating the benefit, including the extent to which the proposed insurance coverage would increase or decrease the cost of the treatment or the service over the next five years;
2. Extent to which the proposed coverage might increase the appropriate or inappropriate use of the treatment or service over the next five years;
3. Extent to which the mandated treatment or services might serve as an alternative to a more expensive or less expensive treatment or service;
4. Extent to which the insurance coverage may affect the number or types of providers of the mandated treatment or service over the next five years;
5. Effects of mandating the benefit on the cost of health care, particularly the premium, administrative expenses and indirect costs of large employers, small employers and non group purchasers;
6. Potential benefits and savings to large employers, small employers, employees and non- group purchasers;
7. Effect of the proposed mandate on cost shifting between private and public payers of health care coverage;

8. Cost to health care consumers of not mandating the benefit in terms of out-of-pocket costs for treatment or delayed treatment; and
9. Effect on the overall cost of the health care delivery system in the Commonwealth.

Estimation Process

The steps required to identify the costs implied by this mandate were as follows:

- Estimate the size of the affected insured population, including the size of the population with hearing loss by age group;
- Estimate the utilization and costs for hearing aids and related services, based on the percentage of individuals with monaural or binaural hearing loss or the need for unilateral or bilateral hearing aids;
- Estimate the range of potential impact factors on claims costs if the mandate is passed; and
- Estimate the impact of administrative expenses of the relevant insurers.

Following these steps, estimates were made for a five-year timeframe (2011-2015) for a range of “low case” to “high case” scenarios. Differences were driven by these three factors, including: (1) the use hearing aids; (2) the average cost of hearing aids, taking into account how health plans might administer the benefit; and (3) the need for replacement of hearing aids during that time period.

For more detailed information on the methodological approach used to calculate the impact of H. 3598 (including the approach to calculating administrative costs), refer to the Appendix of this report.

Summary of Findings

Medical Efficacy

Many children and adults of varied age benefit from hearing aids, which are an established effective technology to improve hearing for the hearing impaired. The basic question about medical efficacy of hearing aids is well documented in the literature: hearing aids help people to hear more, thus providing benefits to those who wear them – in ability to enjoy recorded, televised and radio media; in safety; in ability to engage in school, work and personal communication.

Hearing loss is, of course, very varied, including mild deficits at one end of the spectrum and profound loss at the other extreme. Those with mild or moderate loss of hearing, may feel a hearing aid may not be worth the cost and trouble, while some with profound loss may be helped little by even the best current technologies. In between these two ends of the spectrum, a large proportion of people with moderate or severe hearing loss can enjoy great benefit from the use of hearing aids. As the convenience and technological finesse of hearing aids and implants continue to improve, additional people with hearing loss will also be able to benefit.

We see, however, several issues about the efficacy of hearing aids that may influence consideration of a mandate for expanded coverage of hearing aids. One very important consideration is the impact of hearing aids on children’s language development. A second consideration is the evolution of improved technologies for traditional in-ear hearing aids. A third consideration is reduced benefit from hearing aids due to non-use by their owners. We address these issues below.

Effect of Hearing Aids on Children’s Language Development

The effects of hearing aid use on children have recently been carefully analyzed by researchers for the state of California as part of that state’s proposed mandate of hearing aids for children.²² Their review was far more extensive than this one, including extensive and detailed evaluation of published research by a team of researchers. Those interested in understanding the research about children and hearing aids should certainly examine this report in detail.

The California analysis focused on language and social development outcomes from screening and treatment at different ages and with different hearing aid technologies. Because ethical concerns and parental preferences generally prevent withholding of interventions for children with hearing deficits, the evidence for the benefits of hearing aids come from observational studies rather than randomized, controlled studies. Thus the evidence for the benefits of hearing aids in children does not reach the high level of evidence that some other technologies or treatments can with randomized controlled studies.

The California analysis found that early treatment of hearing loss allows children to speak sooner and more clearly, with greater vocabulary and verbal reasoning skills. But the advantages cannot be attributed solely to the hearing aids, because most children were also participating in early

intervention programs.²³ Overall, the report concluded that the evidence “indicates that hearing aids are helpful to many children who have hearing impairments.”²⁴

Technological Advances in External Hearing Aids

Because innovation continues rapidly in hearing aid design, we can expect continued research into the relative benefits of different kinds of hearing aids. The transition from analog to digital hearing aids has largely been completed in the United States; almost all hearing aids in current use are now digital hearing aids.²⁵ The UK’s National Institute for Clinical Excellence (NICE), which provides independent advice to practitioners and users of the National Health Service, officially recognized in 2003 the benefits of digital hearing aids. NICE reported that investigations in the UK had established that “Digital hearing aids are a proven technology.”²⁶

Quebec’s advisory agency on health services and technology Agence d’évaluation des technologies et des modes d’intervention en santé (AETMIS) conducted detailed analysis of the research on the efficacy of directional-microphone hearing aids.²⁷ These hearing aids include a microphone oriented toward sound sources such as a person speaking in front of the user. The conclusion on the efficacy of directional-microphone hearing aids was that they can be shown to help people understand speech even with background noise if the speaker and listener face each other in an environment with limited reverberation. In more typical situations of diffuse background noise and some reverberation, the directional microphone hearing aids show little advantage over conventional hearing aids.²⁸

The California study also noted two research efforts on directional-microphone hearing aids and reported that they are effective in improving speech recognition. (Other technological issues are also addressed in the California report including compression amplification and digital feedback suppression.³⁰)

A technological innovation that blurs the line between hearing aids and implants is the bone-anchored hearing aid (BAHA). For individuals who cannot use or get a poor result from traditional hearing aids that channel sound through the ear canal, the bone-anchored hearing aid is a useful alternative. A screw is implanted through the skin behind the ear to make contact with the skull. An external device picks up sound vibrations and transmits them through the screw to the skull where it travels to the inner ear, bypassing the auditory canal and middle ear. Research suggests that the bone-anchored hearing aid is an effective approach for both adults and children. Snik and colleagues conclude that they “can be considered a new, indispensable tool for children with bilateral conductive hearing loss.”³¹ Linstrom and colleagues also find “short- and long-term efficacy for the BAHA in adults with single-sided deafness.”³²

Benefits of Hearing Aids Reduced by Non-Use

While hearing aids can benefit adults with hearing loss, not all those who obtain hearing aids continue to use them regularly. Discouragement with hearing aids can result from discomfort or limited functional improvement for a variety of reasons. When an adult discontinues use, the hearing aid is no longer effective in practice. In this sense, the efficacy of the hearing aid, like that

of prescriptions and other durable medical equipment, is limited by the individual's perception of benefit and willingness to continue its use. Because the one-time cost of the hearing aid is significant, substantial money may be spent without benefit if the user discontinues use. Similar issues might be raised about other durable medical equipment, such as wheelchairs or devices to assist patients with sleep apnea. A study for the New Hampshire Department of Insurance discusses this issue and reports survey data suggesting that one-fifth of owners dissatisfied with their hearing aids and that one-sixth of hearing aids were not being used. Rates of satisfaction have probably risen with the spread of digital and programmable hearing aids.³³

Financial Impact of Mandate

1. DHCFP is required to assess the extent to which the proposed coverage would increase or decrease the cost of the treatment or the service over the next five years.

Should H. 3598 become law, DHCFP expects a volume increase in the number of hearing aids used by individuals with hearing loss. Current users of hearing aids would receive coverage under this bill, as well as persons with hearing loss who will be encouraged to use hearing aids as a result of coverage under this new law. In addition, the lack of a cap on coverage may cause the average unit price to increase since individuals purchasing hearing aids may desire a more sophisticated, higher cost unit. That is consistent with the financial analysis conducted as a part of this review and evaluation of H. 3598.

2. DHCFP is required to assess the extent to which the proposed coverage might increase the appropriate or inappropriate use of the treatment or service over the next five years.

Should H. 3598 become law, we would expect more individuals with hearing loss to use hearing aids. Assumptions about hearing-aid use are discussed in more detail in Appendix 1 (see discussion about hearing-aid adoption rates). There is no evidence available for DHCFP to quantify the extent to which the proposed coverage might affect the appropriate or inappropriate use of hearing aids over the next five years. However, the presence of insurance coverage could lead to an increase in the percentage of persons who try hearing aids and discontinue their use.

3. DHCFP is required to assess the extent to which the mandated treatment or services might serve as an alternative to a more expensive or less expensive treatment or service.

The mandated services would not serve as an alternative to a more expensive or less expensive treatment or service covered by the health plan.

4. DHCFP is required to assess the extent to which the insurance coverage may affect the number or types of providers of the mandated treatment or service over the next five years.

The proposed legislation requires that health insurers cover hearing aids and related services. DHCFP does not anticipate that H. 3598 would lead to an increase in the number or types of providers over the next five years.

5. DHCFP is required to assess the effects of mandating the benefit on the cost of health care, particularly the premium, administrative expenses and indirect costs of large employers, small employers and non-group purchasers.

DHCFP estimated the fiscal impact of the bill (see Appendix 1) relative to the effect this mandate bill would have on coverage for hearing aids and all related services.

- Estimated impacts of H. 3598 on Massachusetts health care premiums for fully-insured products were calculated assuming that the five-year average premium (2011-2015) for a fully-insured member is \$498 on a per member per month basis.
- Low, middle and high scenarios assumed varying use and costs.
- Utilization rates for low, middle and high varied based on assumptions about the percentage of diagnosed children and adults who would use hearing aids and their relative cost.
- The combination of these assumptions, as well as administrative expense assumptions produced estimates of the total cost of the mandated benefits.
- Baseline premium levels were subtracted from the estimated total premium cost, producing estimated five-year average impacts on the premium of \$1.23, \$2.38, and \$4.35 Per Member Per Month (PMPM), to determine the cost increase due to the proposed mandate.
- The PMPMs are multiplied by the fully-insured population projection for the corresponding year to arrive at estimated annual impact dollar.

The five-year impact results are displayed in Exhibit 2.

6. DHCFP is required to assess the potential benefits and savings to large and small employers, employees, and non-group purchasers.

It is unlikely that this mandate would produce any significant savings to private insurers, employers, employees, and non-group purchasers.

Many studies have been conducted that have linked untreated hearing loss to such effects as irritability, negativism, and anger; fatigue, tension, stress, and depression; avoidance or withdrawal from social situations; social rejection or loneliness; reduced alertness and increased risk to personal safety; impaired memory and ability to learn new tasks; reduced job performance and earning power; and diminished psychological and overall health.

In 2005, the Better Hearing Institute examined the impact on job performance and earning power due to hearing loss among working adults. They conducted a survey of 80,000 households and found that untreated hearing loss results in a loss of income per household of up to \$12,000 per year, depending on the degree of hearing loss. For the 24 million people with untreated hearing loss, underperformance on their job equated to \$122 billion in lost income and therefore \$18 billion in annual unrealized income taxes.³⁴

7. DHCFP is required to assess the effect of the proposed mandate on cost shifting between private and public payers of health care coverage.

The proposed mandate applies to fully-insured carriers, health maintenance organizations (HMOs), and Blue Cross Blue Shield plans. DHCFP expects some shift in costs from self pay and other charitable contributions to health insurers. There is also the possibility that costs will shift from the Department of Public Health to health insurers to the extent that individuals who benefit from the Hearing Aid Program for Infants and Children through the Department of Public Health are covered under this legislation.

8. DHCFP is required to assess the cost to health care consumers of not mandating the benefit in terms of out-of-pocket costs for treatment or delayed treatment.

Most persons with hearing-aid impairment pay out of pocket for treatment. Hearing aids may be unaffordable to many at roughly \$4,200 per pair. Should H. 3598 be enacted, out of pocket costs would decrease significantly for those who presently purchase their own hearing aids. Precise data is unavailable, however, to determine exactly how much is being paid today by consumers, charitable organizations, or other payers. The Division may be able to anticipate less delay for consumers in receiving hearing aids, due to the presence of insurance coverage in the future.

9. DHCFP is required to assess the effects on the overall cost of the health care delivery system in the Commonwealth.

Should H. 3598 be enacted, the overall cost of the health care delivery system in the Commonwealth will change in response to an increase in the overall level of hearing aid use among persons with hearing loss.

Coverage for hearing aids introduces the potential that health-care and special educational costs will decrease. The use of hearing aids corresponds to better speech and language development.

Exhibit 2: Estimated Cost Impact of H. 3598 on Fully Insured Health Care Premiums (2011-2015)

	2011	2012	2013	2014	2015	5-Year Total
Fully Insured Enrollment	2,329,925	2,327,768	2,325,977	2,324,912	2,323,387	
Low Scenario						
Annual Impact Claims	\$35,188,105	\$25,367,073	\$31,309,235	\$35,545,719	\$24,278,010	\$151,688,142
Annual Impact Administration	\$4,798,378	\$3,459,146	\$4,269,441	\$4,847,143	\$3,310,638	\$20,684,747
Annual Impact Total	\$39,986,483	\$28,826,220	\$35,578,676	\$40,392,862	\$27,588,648	\$172,372,889
Premium Impact (PMPM)*	\$1.43	\$1.03	\$1.27	\$1.45	\$0.99	\$1.23
Middle Scenario						
Annual Impact Claims	\$71,320,835	\$44,537,272	\$42,365,413	\$82,409,057	\$51,482,390	\$292,114,968
Annual Impact Administration	\$9,725,568	\$6,073,264	\$5,777,102	\$11,237,599	\$7,020,326	\$39,833,859
Annual Impact Total	\$81,046,404	\$50,610,536	\$48,142,515	\$93,646,656	\$58,502,716	\$331,948,827
Premium Impact (PMPM)*	\$2.90	\$1.81	\$1.72	\$3.36	\$2.10	\$2.38
High Scenario						
Annual Impact Claims	\$140,212,573	\$74,554,834	\$56,469,910	\$171,447,516	\$91,208,393	\$533,893,226
Annual Impact Administration	\$19,119,896	\$10,166,568	\$7,700,442	\$23,379,207	\$12,437,508	\$72,803,622
Annual Impact Total	\$159,332,470	\$84,721,402	\$64,170,352	\$194,826,723	\$103,645,901	\$606,696,848
Premium Impact (PMPM)*	\$5.70	\$3.03	\$2.30	\$6.98	\$3.72	\$4.35

*5-Year Total is the average per member, per month cost across the 5 years.

Hearing aids use has also been reported to lead to economic benefits as well.³⁵ However, many of the studies that have been conducted have focused on the benefits realized when persons with profound or severe hearing loss use hearing aids.

The Better Hearing Institute estimates that for the 24 million people with untreated hearing loss, underperformance on their job equated to \$122 billion in lost income and therefore \$18 billion in annual unrealized income taxes.³⁶

The Department of Public Health might also experience a reduction in costs resulting from lowered reliance on assistance from its Hearing Aid Program for Infants and Children to the extent that persons who are insured receive benefits today.

Endnotes

- ¹ See Appendix.
- ² <http://www.nidcd.nih.gov/health/statistics/>
- ³ H. 3598, as revised in November 2009.
- ⁴ National Institute on Deafness and Other Communication Disorders.
- ⁵ <http://www.nidcd.nih.gov/health/statistics/>
- ⁶ <http://www.nidcd.nih.gov/health/statistics/>
- ⁷ <http://www.asha.org/public/hearing/disorders/types.htm>
- ⁸ <http://www.nidcd.nih.gov/health/hearing/hearingaid.asp>
- ⁹ <http://deafness.about.com/cs/hoth/a/haidhistory.htm>
- ¹⁰ <http://www.hearingplanet.com/common/docs/buyer.guide.pdf>
- ¹¹ <http://www.ahaanet.com/hearingaidtypes.asp>
- ¹² <http://www.hearingloss.org/learn/factsheets.asp>
- ¹³ Massachusetts Commission on Deaf and Hard of Hearing, www.mass.gov/mcdhh
- ¹⁴ Better Hearing Institute.
- ¹⁵ NIDCD Working Group on Accessible and Affordable Hearing Health Care for Adults with Mild to Moderate Hearing Loss.
- ¹⁶ CHBRP 07-01
- ¹⁷ Kochin, MarkeTrakVIII page 28.
- ¹⁸ <http://www.consumerreports.org/cro/magazine-archive/july-2009/health/hearing-aids/overview/hearing-aids-ov.htm>
- ¹⁹ c. 243 (Chapter 243), requires coverage to be provided for the cost of a newborn hearing screening test performed before an infant is discharged from a hospital or birthing center.
- ²⁰ c. 345 (Chapter 345), An Act Providing that Certain Health Care Plans and Policies Shall Cover Payment for Costs Arising from Speech, Hearing and Language Disorders.
- ²¹ www.mass.gov/; Department of Health and Human Services; Financial Assistance, Exchange and Recycling Programs for Hearing Aids and Assistive Technology.
- ²² California Health Benefits Review Program (CHBRP). (2007). Analysis of Assembly Bill 368: Mandate to Offer Coverage for Hearing Aids for Children. Report to California State Legislature. Oakland, CA: CHBRP; 2007. CHBRP-07-01, pp. 16-33.
- ²³ Pages 27-28.
- ²⁴ Page 5.
- ²⁵ American Academy of Audiology consumer website <http://www.howsyourhearing.org/hearingaids.html> accessed March 9, 2010.
- ²⁶ May 3, 2003 press release. Andrew Dillon, Chief of NICE. Accessed on March 8, 2010 at http://www.nice.org.uk/niceMedia/pdf/Pressrelease013_HearingAidsWithdrawal.pdf
- ²⁷ <http://www.aetmis.gouv.qc.ca/site/download.php?f=b2d33ccc6bfac5fa2478c606c6256b87>
- ²⁸ Page vii.
- ²⁹ See the California report on the mandate to offer coverage for hearing aids for children (see prior section for description and citation), page 24.
- ³⁰ Pages 23-25.
- ³¹ A. Snik, J. Leijendeckers, M. Hol, E. Mylanus and C. Cremers, "The bone-anchored hearing aid for children: recent developments. International Journal of Audiology September, 2008, pp. 554-9.
- ³² C.J. Linstrom, C.A. Silverman and G.P. Yu, "Efficacy of the bone-anchored hearing aid for single-sided deafness," Laryngoscope, April 2009, pp. 713-20.
- ³³ Earl L. Hoffman, Reden and Anders, Ltd., "Study of the Impact of House Bill 159, Coverage of Hearing Aids and Instruments," for the New Hampshire Insurance Department. November 8, 2005, pp. 3 and 7, accessed at http://www.nh.gov/insurance/legal/documents/impact_sb159.pdf, March 9, 2010.
- ³⁴ Better Hearing Institute.
- ³⁵ http://www.chbrp.org/documents/ab_368_report_leg.pdf
- ³⁶ Better Hearing Institute.

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Appendices

**Substitution Text for House Bill 3598:
An Act to Provide Coverage for Hearing Aids**

**Actuarial Review of Massachusetts House Bill 3598,
An Act to Provide Coverage for Hearing Aids**

Substitution Text for House Bill 3598: An Act to Provide Coverage for Hearing Aids
(submitted to DHCFP for review by letter dated December 2, 2009 from Jeffrey Sanchez, Chairman, Joint Committee on Public Health)

SECTION 1. Chapter 175 of the General Laws, as so appearing in the 2008 Official Edition, is hereby amended by inserting after section 47Z the following section: -

Section 47AA. Any individual policy of accident and sickness insurance issued pursuant to section 108, and any group blanket policy of accident and sickness insurance issued pursuant to section 110, shall provide coverage for the full cost of one hearing aid per hearing impaired ear, every 36 months for insured individuals and all related services which shall be prescribed by an audiologist or hearing impaired specialist as defined in section 196 of chapter 112, and dispensed by an audiologist or hearing instrument specialist as defined in said section. A hearing aid shall mean any wearable, non-disposable instrument or device designed to aid or compensate for impaired or diminished human hearing, and any part, attachment, or accessories including ear molds but excluding batteries. All related services shall mean those services necessary to assess, select, and appropriately adjust or fit the hearing aid to ensure optimal performance. In the event that any part of this definition of hearing aid conflicts with the definition of hearing aid in section 196 of chapter 112, this definition shall take precedent for the purposes of this section. This coverage is subject to all applicable co-payments, coinsurance, deductibles, and out-of-pocket limits.

SECTION 2. Chapter 176A of the General Laws, as so appearing in the 2008 Official Edition, is hereby amended by inserting after section 8CC the following section: -

Section 8DD. Any contract, except contracts providing supplemental coverage to medicare or other governmental programs, between a subscriber and the corporation under an individual or group hospital service plan that shall be delivered issued or renewed in the commonwealth shall provide, a basic benefit to all individual subscribers and members within the commonwealth and to all group members having a principal place of employment within the commonwealth, coverage for the full cost of one hearing aid per hearing impaired ear, every 36 months for insured individuals and all related services which shall be prescribed by an audiologist or hearing impaired specialist as defined in section 196 of chapter 112, and dispensed by an audiologist or hearing instrument specialist as defined in said section. A hearing aid shall mean any wearable, non-disposable instrument or device designed to aid or compensate for impaired or diminished human hearing, and any part, attachment, or accessories including ear molds but excluding batteries. All related services shall mean those services necessary to assess, select, and appropriately adjust or fit the hearing aid to ensure optimal performance. In the event that any part of this definition of hearing aid conflicts with the definition of hearing aid in section 196 of chapter 112, this definition shall take precedent for the purposes of this section. This coverage is subject to all applicable co-payments, coinsurance, deductibles, and out-of-pocket limits.

SECTION 3. Chapter 176B of the General Laws, as so appearing in the 2008 Official Edition, is hereby amended by inserting after section 4CC the following section: -

Section 4DD. Any subscription certificate under an individual or group medical service agreement, except certificates which provide supplemental coverage to medicare or other governmental programs, delivered, issued or renewed within the commonwealth shall provide as benefits to all individual subscribers and members within the commonwealth and to all group members having a principal place of employment within the commonwealth coverage for the full cost of one hearing aid per hearing impaired ear, every 36 months for insured individuals and all related services which shall be prescribed by an audiologist or hearing impaired specialist as defined in section 196 of chapter 112, and dispensed by an audiologist or hearing instrument specialist as defined in said section. A hearing aid shall mean any wearable, non-disposable instrument or device designed to aid

or compensate for impaired or diminished human hearing, and any part, attachment, or accessories including ear molds but excluding batteries. All related services shall mean those services necessary to assess, select, and appropriately adjust or fit the hearing aid to ensure optimal performance. In the event that any part of this definition of hearing aid conflicts with the definition of hearing aid in section 196 of chapter 112, this definition shall take precedent for the purposes of this section. This coverage is subject to all applicable co-payments, coinsurance, deductibles, and out-of-pocket limits.

SECTION 4. Section 4 of Chapter 176G of the General Laws, as so appearing in the 2008 Official Edition, is hereby amended by inserting after section 4U the following section: -

Section 4V. Any individual or group health maintenance contract shall provide coverage for the full cost of one hearing aid per hearing impaired ear, every 36 months for insured individuals and all related services which shall be prescribed by an audiologist or hearing impaired specialist as defined in section 196 of chapter 112, and dispensed by an audiologist or hearing instrument specialist as defined in said section. A hearing aid shall mean any wearable, non-disposable instrument or device designed to aid or compensate for impaired or diminished human hearing, and any part, attachment, or accessories including ear molds but excluding batteries. All related services shall mean those services necessary to assess, select, and appropriately adjust or fit the hearing aid to ensure optimal performance. In the event that any part of this definition of hearing aid conflicts with the definition of hearing aid in section 196 of chapter 112, this definition shall take precedent for the purposes of this section. This coverage is subject to all applicable co-payments, coinsurance, deductibles, and out-of-pocket limits.

**Actuarial Assessment of House Bill 3598:
An Act to Provide Coverage for Hearing Aids**

Prepared for

**Commonwealth of Massachusetts
Division of Health Care Finance and Policy**

Prepared by

Compass Health Analytics, Inc.

March 2010



**Actuarial Assessment of House Bill 3598:
An Act to Provide Coverage for Hearing Aids**

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This report was prepared by James Highland, PhD, MHSA, Lisa Manderson, ASA, MAAA, Joshua Roberts.

March, 2010



**Actuarial Assessment of House Bill 3598:
An Act to Provide Coverage for Hearing Aids**

EXECUTIVE SUMMARY

House Bill 3598¹, before the 2009-2010 Session of the Massachusetts legislature, mandates insurance coverage hearing aid devices and related services. The Massachusetts Division of Health Care Finance and Policy (the Division) engaged Compass Health Analytics, Inc. to provide an actuarial estimate of the effect that enactment of the bill would have on the cost of health care insurance.

Compass analyzed the language of H.B. 3598 and its relationship to existing mandate laws to determine the net effect of the proposed bill on coverage requirements. We conclude that the primary impact of the bill is to cover hearing aids and associated fitting services, with hearing evaluations already covered by existing mandates. This interpretation, and the lack of voluntarily-provided coverage for hearing aids, was confirmed by analysis of claims data for 2007 and 2008 from the fully-insured commercial segment subject to the Commonwealth's benefit mandate laws. Claims for hearing evaluation averaged \$0.37 per member per month (PMPM), while claims for hearing aids averaged less than \$0.01 PMPM.

To estimate the cost of hearing aid devices and associated fitting services Compass used the following approach:

Cost = Covered population
x Hearing loss prevalence
x Hearing aid adoption rate among hard of hearing
x Binaural rate (1 + percentage with correction in both ears)
x Cyclical replacement factor (e.g., replacement time > 3 years)
x Unit cost of hearing aid (and associated costs)

¹ As revised with substituted text for consistent wording. See the general report on H.B. 3598 to which this report is attached to see the version of the bill upon which this analysis is based.

The population for purposes of this analysis is the approximately 2.3 million persons insured under fully-insured products subject to the Commonwealth's statutory and regulatory authority. Published sources were used to estimate the rate of hard-of-hearing individuals in the population, the rate at which those individuals adopt hearing aid use, and the proportion of those individuals using hearing aids in both ears (i.e., the binaural rate). The resulting number of potential hearing aids covered by insurance was modeled over the five year time horizon based on assumptions about how quickly eligible individuals begin using the benefit, and about the frequency with which the benefit would be accessed (no more than once per three years per ear, as specified in the bill).

The cost of this projected hearing aid utilization was estimated using average price data from the Division's claim database, confirmed by published sources. Cost estimates produced were adjusted to reflect increases in hearing aid testing, in the hearing aid adoption rate among hard-of-hearing individuals, and in higher average unit costs, all in response to the presence of insurance coverage. Finally, Compass added adjustments for administrative expense and risk/profit estimates for insurers to arrive at the total cost to premium payers.

The average net premium cost of H.B.3598 over the next five years for fully-insured plans that would be subject to the proposed mandate is \$66.4 million, or 0.48% of premium. Due to the uncertainty associated with the degree to which hearing aid adopters exist in the population, and the behavioral response associated with the availability of an insurance benefit with no per-device price cap (but a once per 36 month limit on replacement), the range of estimates is between 0.25% of premium and 0.88% of premium. Table E-1 below summarizes the five-year effect on costs.

The three scenarios assume that the lack of a price cap on hearing aid devices results in average insurer-paid baseline cost per device of \$1910, \$2182, and \$2469 for the low, medium, and high scenarios respectively. Application of a cap would affect the projected costs directly by the proportion of the cap to these average prices. For example, under the mid-level scenario, a cap of \$1500 per device would reduce the cost projection to

approximately 69% ($1500/2182=0.69$) of the \$66 million 5 year average above, or about \$46 million².

Table E-1
Summary of Cost Projection Scenarios for H.B. 3598

	-2011 -	-2012 -	-2013 -	-2014 -	-2015 -	- Average -	5 Year Total
Members	2,329,925	2,327,768	2,325,977	2,324,912	2,323,387		
Med Exp Low	\$ 35,188,105	\$ 25,367,073	\$ 31,309,235	\$ 35,545,719	\$ 24,278,010	\$ 30,337,628	\$ 151,688,142
Med Exp Mid	\$ 71,320,835	\$ 44,537,272	\$ 42,365,413	\$ 82,409,057	\$ 51,482,390	\$ 58,422,994	\$ 292,114,968
Med Exp High	\$ 140,212,573	\$ 74,554,834	\$ 56,469,910	\$ 171,447,516	\$ 91,208,393	\$ 106,778,645	\$ 533,893,226
Premium Low	\$ 39,986,483	\$ 28,826,220	\$ 35,578,676	\$ 40,392,862	\$ 27,588,648	\$ 34,474,578	\$ 172,372,889
Premium Mid	\$ 81,046,404	\$ 50,610,536	\$ 48,142,515	\$ 93,646,656	\$ 58,502,716	\$ 66,389,765	\$ 331,948,827
Premium High	\$ 159,332,470	\$ 84,721,402	\$ 64,170,352	\$ 194,826,723	\$ 103,645,901	\$ 121,339,370	\$ 606,696,848
Low PMPM	\$ 1.43	\$ 1.03	\$ 1.27	\$ 1.45	\$ 0.99	\$ 1.23	\$ 1.23
Mid PMPM	\$ 2.90	\$ 1.81	\$ 1.72	\$ 3.36	\$ 2.10	\$ 2.38	\$ 2.38
High PMPM	\$ 5.70	\$ 3.03	\$ 2.30	\$ 6.98	\$ 3.72	\$ 4.35	\$ 4.35
Est Mo. Premium	\$ 442	\$ 468	\$ 496	\$ 526	\$ 558	\$ 498	\$ 498
Premium % Rise Low	0.32%	0.22%	0.26%	0.28%	0.18%	0.25%	0.25%
Premium % Rise Mid	0.66%	0.39%	0.35%	0.64%	0.38%	0.48%	0.48%
Premium % Rise High	1.29%	0.65%	0.46%	1.33%	0.67%	0.88%	0.88%

² Note that this is an approximation in that the average price per unit might be somewhat lower than the cap if some units cost less than the cap. For \$1500 and lower caps generally, the formula suggested would be quite close to the impact; for higher caps the reduction in cost would be larger than this approximate method would produce.

Actuarial Assessment of House Bill 3598: An Act to Provide Coverage for Hearing Aids

1. INTRODUCTION

House Bill 3598³, before the 2009-2010 Session of the Massachusetts legislature, mandates insurance coverage hearing aid devices and related services. The Massachusetts Division of Health Care Finance and Policy (the Division) engaged Compass Health Analytics, Inc. to provide an actuarial estimate of the effect that enactment of the bill would have on the cost of health care insurance.

Assessing the cost impact entails analyzing the incremental impact of the proposed law on spending for those insurance plans subject to the law. This in turn requires estimating costs under the provisions of the law and comparing that projection to costs under current statutes and current benefit plans, for the relevant services.

Section 2 outlines the provisions of the bill. Section 3 discusses the methodology and important considerations in translating H.B. 3598's language into estimates of incremental benefit use. Section 4 describes the data sources used for the calculations in Section 5, which steps through analysis and its results.

2. INTERPRETATION OF H.B. 3598

Interpreting H.B. 3598 entails identifying the insured populations it covers in its provisions and the benefit requirements it adds beyond existing mandates.

³ As revised with substituted text for consistent wording. See the general report on hearing aids to which this report is attached to see the version of the bill upon which this analysis is based.

2.1 Insurance entities subject to H.B. 3598: Fully-insured plans

H.B. 3598 amends the statutes that regulate insurers providing health insurance in Massachusetts. The bill has the following four sections, each addressing statutes dealing with a particular type of health insurance policy:

- Section 1: Accident and sickness insurance policies (creating G.L. c. 175, § 47AA)
- Section 2: Contracts with non-profit hospital service corporations (creating G.L. c. 176A, § 8DD)
- Section 3: Certificates under medical service agreements (creating G.L. c. 176B, § 4DD)
- Section 4: Health maintenance contracts (creating G.L. c. 176G, § 4V)

Sections 1 and 4 apply to all individuals covered under the plan, and sections 2 and 3 apply to plan members who are residents or who have a principal place of employment in the Commonwealth. H.B. 3598 effectively applies to insurance regulated by (issued in) Massachusetts, and residents who commute to other states and are insured in those states are generally not included in insurance roles, nor in this analysis.

Health insurance plans operated as self-insured entities (i.e., the employer policy holder retains the risk for medical expenditures and uses the insurer to provide administrative functions) are subject to federal law, and not to state-level mandates. Finally, this bill excludes state-regulated Medicare supplement policies, as described in G.L. c. 176K, and does not reach individuals with Medicare coverage and federally-regulated “medigap” policies, as these are not subject to state law.

2.2 Services mandated by H.B. 3598

For the four insured groups described above, H.B. 3598 mandates coverage for the following:

- One hearing aid per hard-of-hearing ear every 36 months. It defines a hearing aid as a "wearable, non-disposable instrument or device" to aid hearing,

including accessories such as earmolds but not batteries. It does not include cochlear or other implanted devices.

- Related services including assessment and fitting.

Hearing aids and services must be prescribed and dispensed by a licensed audiologist or hearing impairment specialist, but the bill places no limit on the cost of the device or services. The coverage is subject to “all applicable co-payments, coinsurance, deductibles, and out-of-pocket limits”.

2.3 Existing health benefit mandates relevant to treatment for hearing loss

Under current law, insurers offering fully-insured health insurance plans (plans under which the insurance company bears the risk of medical expense) in Massachusetts are already required to provide at least some services related to hearing loss.

- Early childhood sensory screening is mandated through age six for all dependent children of members of insurance plans.⁴
- Diagnosis and treatment of speech, hearing, and language disorders by speech-language pathologists or audiologists.⁵ The mandate applies to residents and those having a principal place of employment within the Commonwealth. Hearing aid coverage is not included in the mandate.

H.B. 3598 mandates coverage for hearing aids, which are not covered under existing mandates. It mandates coverage for services related directly to the selection and fitting of a hearing aid. These costs, which are incremental to the evaluation and diagnosis of hearing loss included in existing mandates, are the focus of this cost analysis.

3. METHODOLOGY AND FACTORS AFFECTING THE ANALYSIS

The approach used for estimating the baseline costs of hearing aid use in the population is to calculate the following equation:

⁴ G.L. c. 175, § 47C, G.L. c. 176A, § 8B, G.L. c. 176B, § 4C, G.L. 176G, § 4.

⁵ G.L. c. 175, § 47U, G.L. c. 176A, § 8U, G.L. c. 176B, § 4U, G.L. 176G, § 4N.

$$\begin{aligned}
\text{Cost} &= \text{Covered population} \\
&\times \text{Hearing loss prevalence} \\
&\times \text{Hearing aid adoption rate among hard of hearing} \\
&\times \text{Binaural rate (1 + percentage with correction in both ears)} \\
&\times \text{Cyclical replacement factor (e.g., one replacement per 3 years)} \\
&\times \text{Unit cost of hearing aid (and associated costs)}
\end{aligned}$$

We discuss each of these factors below, and the relationships between them.

3.1 Covered Population

H.B. 3598 applies to the commercial fully-insured, under-65 population, estimated to be 2.3 million persons in the first projection year of this analysis (2011).

3.2 Hearing Loss and Hearing Aid Adoption

In examining data on rates of hearing loss and hearing aid adoption, it is important to pay attention to the age groups described in each specific data source. The rates for both factors increase significantly with age, and much of the available data presents statistics for the entire population. It is very important to make sure that the data describe the under-65 population covered by the mandate, and that data for individuals 65 and over are excluded.

In addition, it is important that assumptions about how the population with hearing loss is defined are clear, or, more to the point for this analysis, that the definition used is the same one used to calculate the proportion of those with hearing loss who adopt hearing aid use. Ultimately we are concerned about the number of hearing aids purchased with insurance coverage. As long as the rate of adoption is calculated from the same data or using the same definition, the combination of the two rates will produce the rate of hearing rate users required for the analysis.

3.3 Degree of Binaural Hearing Aid Adoption

Once we identify the number of covered individuals who are hard-of-hearing and are hearing aid adopters, we need to calculate the number of hearing aids they will use. Many, but not all, persons use aids in both ears, so we need to apply a multiplier to the number of individuals adopting hearing aids to estimate the number of aids purchased.

3.4 Unit Costs

The number of hearing aids to be purchased under coverage is converted to cost by applying the average unit cost of the devices. Since the nature of the devices and their features vary widely, and the prices associated with them vary widely along with their technical sophistication and features, this average unit cost should reflect the likely mix of devices to be purchased under the proposed coverage, and should reflect the level of payment carriers would be likely to make under the coverage for any given device.

3.5 Useful Life of Devices

Hearing aids have a technical useful life and a coverage useful life. The technical useful life will depend on their design, the degree to which they may undergo abuse (e.g., in use by children), and innovation in the field. Hearing aids may be replaced more or less frequently than their technical useful life, in part depending on the availability of insurance coverage. The analysis must make assumptions about how often individuals with hearing aids will replace their units under the mandated coverage.

3.6 Impact of insurance coverage

Clearly the presence of insurance coverage will cause those who are hearing aid users to purchase their units and associated covered items with their coverage rather than paying

out of pocket. The calculations described in the preceding sub-sections attempt to identify those costs. In addition, the presence of insurance coverage is known to increase use of services.⁶ For purposes of this analysis, it is important to consider the additional effects the presence of coverage would likely have on both the decision to adopt use of a hearing aid and on the average features and cost of units purchased. While individuals may choose not to wear hearing aids for many reasons that have nothing to do with cost, the cost of the hearing aids will have an effect on the margin for some people and thus will affect the average adoption rate. More significant, particularly given H.B. 3598's lack of a cap on the price of hearing aids, the presence of coverage will almost certainly increase the average cost of hearing aids above the levels observed when the purchases are made out of pocket. The analysis includes adjustments that attempt to capture this effect.

3.7 Costs in addition to device purchase

H.B. 3598 requires coverage for accessories (but not batteries), as well as services to assess, select, adjust, or fit the hearing aid. Additional costs for these related items and services need to be considered. In addition, the hearing testing that is already covered under Massachusetts law may increase somewhat as coverage encourages non-adopters to initiate the process of testing and fitting.

4. DATA SOURCES

The Division maintains a health care claims database collected from carriers. An extract for calendar years 2007 and 2008 was requested and used by Compass for purposes of estimating the impact of H.B. 3598. The claim data were used primarily to evaluate current average unit costs for devices paid for under current coverage, and to evaluate the costs for services and accessories other than the device itself. Responses submitted by

⁶ Manning WG, Newhouse JP, Duan N, Keeler EB, Benjamin B, Liebowitz A, et al. Health insurance and the demand for medical care. Evidence from a randomized experiment. Santa Monica, CA: RAND Corporation, 1988. Report R-3476-HHS. ISBN 0-8330-0864-1.

the carriers to a request from the Division for information related to this mandate analysis were also used.

Published literature on a variety of parameters, including prevalence of hearing loss, hearing aid adoption rates, and the rate of binaural hearing aid use was reviewed and parameters from those sources were incorporated into the analysis. Literature on average unit costs for devices and the technologies associated with their prices was also reviewed.

5. ANALYSIS AND RESULTS

5.1 Existing Coverage

Table 1 below was prepared using the Division’s claim database for 2008. It displays per member per month (PMPM) costs for categories of services related to hearing and hearing aids. The existing mandates related to hearing screening for children and the services of audiologists for diagnosis of hearing-related problems is apparent in the significant costs associated with hearing tests.

**Table 1
Annual Claim Costs with Existing Coverage
Massachusetts Fully Insured Commercial**

2008 PMPM Costs			
	CHILD (0-19)	ADULT (20-64)	Total < 65
Accessories	\$ 0.000577	\$ 0.000034	\$0.000186
Assessment or Fitting	\$ -	\$ 0.000010	\$0.000007
Device - Binaural	\$ 0.002325	\$ 0.001371	\$0.001638
Device - Monaural	\$ 0.008692	\$ 0.001147	\$0.003256
Dispensing Fee	\$ -	\$ 0.000111	\$0.000080
Hearing Aid Check	\$ 0.000165	\$ 0.000017	\$0.000058
Hearing Aid Repair	\$ 0.000404	\$ 0.000027	\$0.000132
Hearing Aid Services	\$ 0.000191	\$ 0.000076	\$0.000108
Hearing Tests	\$ 0.812523	\$ 0.203282	\$0.373559
	\$ 0.83	\$ 0.21	\$ 0.38

The results of the carrier survey indicated that none of the participating carriers covers hearing aids or associated services as part of their standard benefit packages. Most indicated that they offer hearing coverage as an optional rider for large employers interested in including this coverage. That coverage typically involves fairly restrictive caps on per device costs. The coverage provided by the Group Insurance Commission (GIC) for state and selected local municipality employees is illustrative⁷. Their benefit pays for 100% of the first \$500 and 80% of the next \$1500, once every two years for one hearing aid.

The limited availability of coverage for hearing aids is reflected in the PMPMs for the rows in Table 1 other than testing. These numbers reflect the total amount of hearing aid and associated service in the population (for those limited number having the benefit) divided by the entire fully insured population. As a result, the PMPM levels are nearly immaterial. Since we do not have information on specific carrier accounts and their associated members and costs, we cannot isolate subsets of claims and members with a hearing aid benefit in force to get representative PMPM values that might be used as estimates of the PMPM costs for the whole population. And, as noted, those plans that have a hearing aid benefit have more limited coverage than that contemplated by H.B. 3598. In the next subsection we use specific facts that we can calculate from the claims (such as per-device allowed charges) and use those in conjunction with information from the published literature to construct hearing aid device costs as the key input into estimating insurance coverage costs for H.B. 3598.

5.2 Calculation of Hearing Aid Device Costs

As discussed in Section 3, the basic approach taken in this analysis to calculating hearing aid costs uses the following formula:

⁷The GIC plans are largely self-insured and therefore most of the information on access to their benefit is not reflected in Table 1. In any case, the GIC is not separately identifiable in the data.

$$\begin{aligned}
 \text{Cost} &= \text{Covered population} \\
 &\times \text{Hearing loss prevalence} \\
 &\times \text{Hearing aid adoption rate among hard of hearing} \\
 &\times \text{Binaural rate (1 + percentage with correction in both ears)} \\
 &\times \text{Cyclical replacement factor (e.g., one replacement per 3 years)} \\
 &\times \text{Unit cost of hearing aid (and associated costs)}
 \end{aligned}$$

In this section we develop baseline estimates of the costs for the Massachusetts fully insured population, and in Section 5.3 address adjustments to this baseline to reflect the behavioral effects associated with the presence of insurance coverage.

Table 2 summarizes the assumptions developed on hearing loss prevalence, adoption rates, binaural rates, and unit costs (replacement cycles are discussed in the following section). The table summarizes these four key parameters for children and adults separately, and for the three scenarios (low, medium, high) developed in this analysis.

Table 2
Summary of Key Assumptions for Hearing Aid Device Costs

Baseline Data for Cost Calculations		Children	Adults <65	Overall <65
Hearing Loss Rate	Low	1.4%	10.0%	7.6%
	Medium	1.7%	11.5%	8.7%
	High	2.0%	13.0%	9.9%
Hearing Aid Adoption Rate	Low	14.0%	11.0%	11.2%
	Medium	16.0%	13.0%	13.2%
	High	18.0%	15.0%	15.2%
Binaural Rate	Low	1.75	1.75	1.75
	Medium	1.80	1.80	1.80
	High	1.85	1.85	1.85
Average Unit Cost	Low	\$ 1,500	\$ 1,600	
	Medium	\$ 1,650	\$ 1,750	
	High	\$ 1,800	\$ 1,900	

The proportion of the population with hearing loss increases from between 1-2% for children, to somewhat over 10% for non-elderly adults, and over one third of elderly adults. In Table 2, ranges of hearing loss for children and adults were developed from

available sources⁸. As with other hearing-related statistics, it is important for us to exclude the elderly from the calculations because they are not affected by the provisions of H.B. 3598, and because their hearing-related characteristics are so different. This analysis breaks out children and non-elderly adults, but it should be noted that the prevalence of hearing-related problems in children is much lower, meaning that most of the cost implications of H.B. 3598 stem from the coverage provided to non-elderly adults.

Many of those who have hearing loss that might benefit from hearing aids do not use them. The “adoption rate” is the proportion of those who could be helped who wear hearing aids. In developing this assumption, we also used available information, and chose to use the same source as that used for the hearing loss rates so that the numerator of “hearing loss rate” and the denominator of “adoption rate” are handled consistently⁹. Table 3 shows how adoption rates vary with age, again requiring us to be careful to exclude the elderly from our calculations.

Table 3
Hearing Aid Adoption by Age Group

<18	16.20%
18-34	13.50%
35-44	10.70%
45-54	11.20%
55-64	16.70%
65-74	29.40%
75-84	46.50%
85+	64.30%

The adoption rate assumptions in Table 2 were developed from the data in Table 3¹⁰.

⁸ Kochkin, Sergei, “MarkeTrak VII: 25-Year Trends in the Hearing Health Market,” HearingReview.com, 2009.

⁹ Kochkin, op. cit.

¹⁰ The approximate values assumed are confirmed by data from the NIDCD which indicates an adoption rate of 0.15 for the under-65 population.

The rate of binaural hearing correction in effect converts “bodies” into “ears”. That is, all hearing aid adopters who use two hearing aids account for use of two rather than one per person, which must be factored in when converting from hearing aid users to hearing aids purchased. Available data suggest approximately 80% of hearing aid users are binaural¹¹.

From the rate of hearing loss, the rate of hearing aid adoption, and the rate of binaural use, we can calculate an approximate number of “hearing aids in use”. To develop cost estimates we then need to apply per-device costs. From the Division’s claim data we calculated a per device billed unit cost of just over \$2,000 for the under-65 population, which is nearly identical to the prices documented by Strom.¹² Given that Strom’s information comes from a survey of dispensers, the billed amount in the Division’s claim database and the dispenser’s price should be measuring the same or similar concept. Also on the claim information available for the analysis is the allowed charge, which is the amount (typically lower than the billed charge) that the insurer will pay for an approved service or device¹³. As such, it is the appropriate cost measure to apply to the device volume estimates. The average approved charge in 2008 was approximately \$1,750 for adults and \$1,650 for children, as reflected in Table 2.

For purposes of developing an impact estimate, the calculations described above fail to reflect three important factors:

- The behavioral impact on device volumes and average prices induced by coverage will increase costs;
- The additional costs associated with device purchase, fitting, and maintenance will involve some additional costs; and
- The timing of hearing aid purchases (not all will happen at once), will significantly reduce the annual outlay required.

These issues and their impact are addressed in the next section.

¹¹ Strom, Karl E., “The HR 2006 Dispenser Survey,” HearingReview.com, 2006.

¹² Strom, op. cit. Billed unit cost is the price charged by the hearing aid provider, not the price paid by the carrier.

¹³ The allowed charge is the full price paid, before consideration of co-pays or other cost-sharing features.

5.3 Adjustments for Coverage Behavior Effects and Timing

While, in general, the presence of insurance coverage clearly affects consumer behavior, we are not aware of information that provides clear evidence of how much hearing aid coverage specifically affects behavior. The methodology used above to estimate hearing aid costs already captures the costs for hearing aid adopters in the population. The question then is to what extent non-adopters will be converted to adopters due to the presence of coverage. Many factors prevent people with hearing loss from wearing hearing aids; the removal of cost as a barrier could be expected to induce some to become adopters, but we assume for this analysis that the effect is relatively modest (between zero and 10% for children, and between 5% and 15% for adults)¹⁴. These assumptions are reflected in Table 4.

Table 4

Insurance Coverage Impact on Use and Price		Children	Adults <65	Overall <65
Hearing Aid Adoption Rate	Low	1.00	1.05	
	Medium	1.05	1.10	
	High	1.10	1.15	
Average Unit Cost	Low	1.10	1.20	
	Medium	1.20	1.25	
	High	1.30	1.30	

In addition to an effect on the number of units covered, the availability of coverage, particularly given H.B. 3598's absence of a price cap on coverage for the devices, could be expected to have a stronger effect on the average features and purchase price of the units. That is, we would expect individuals to consider and purchase more expensive units when their marginal cost is zero or 20% under coverage than they would when a cap makes their out of pocket marginal cost 100% of the additional price. Again, specific data to make these adjustments are lacking, but failing to reflect the effect would likely lead us to underestimate the cost. While the data used for average unit cost comes from

¹⁴ Note that the data used for the baseline adoption rate comes from a general population which is generally lacking in coverage for hearing devices. As a result, we believe making the adjustment for the effect of coverage is appropriate.

insurance claims/coverage data, as noted these purchases were made under benefits that are relatively restricted (particularly price caps) compared to the provisions of H.B. 3598. As a result, we have assumed that the average purchase price of units would be between 10% and 30% higher for children, and between 20% and 30% for adults, still well below the higher end of the range of price for available devices. Table 4 displays these assumptions.

Table 5 displays our original assumptions from Table 2, adjusted for the behavioral responses displayed in Table 4.

Table 5
Adjusted Assumptions for Hearing Aid Cost Calculations

Assumptions for Cost Calculations (2008 Basis)		Children	Adults <65	Overall <65
Hearing Loss Rate	Low	1.4%	10.0%	7.6%
	Medium	1.7%	11.5%	8.7%
	High	2.0%	13.0%	9.9%
Hearing Aid Adoption Rate	Low	14.0%	11.6%	11.7%
	Medium	16.8%	14.3%	14.4%
	High	19.8%	17.3%	17.4%
Binaural Rate	Low	1.75	1.75	1.75
	Medium	1.80	1.80	1.80
	High	1.85	1.85	1.85
Average Unit Cost	Low	\$ 1,654	\$ 1,928	\$ 1,910
	Medium	\$ 1,988	\$ 2,195	\$ 2,182
	High	\$ 2,340	\$ 2,478	\$ 2,469

The basic population characteristics related to hearing loss rate and binaural rate have not changed, but the behavioral parameters related to adoption rate and average unit cost (related to the features and expense of the unit) have increased relative to Table 2.

We can combine the assumptions in Table 5 reflecting the behavioral effects on adoption rates and unit costs into a cost estimate which gives us a starting point for estimating the coverage costs for H.B. 3598. The costs calculated and displayed in Table 6 illustrate the use of the mid-level assumptions for the cost calculation and represent the “immediate

replacement cost for all hearing aids in use.” That is, based on the estimated number of hearing aids in use in the affected population and the average prices as reflected in the current limited number of cases where coverage is provided, we calculate the costs that would be incurred for devices if all were purchased at one time. Under the mid-level scenario assumptions, total replacement cost is approximately \$123 million.

Table 6
Cost for Immediate Replacement for All Adult and Child Hearing Aid Users
Mid-Level Scenario

User Cost Calculation - SFY 2011	Children	Adults	Overall
Enrollment	660,893	1,669,032	2,329,925
Hearing Loss Rate	0.02	0.12	0.09
Adoption Rate	0.17	0.14	0.14
Binaural Rate	1.80	1.80	1.80
Net Hearing Aid Unit Usage Rate per Thousand	5.14	29.60	22.66
Hearing Aids in Use (after coverage)	3,398	49,405	52,803
Average Unit Cost	\$ 2,130	\$ 2,352	\$ 2,338
Total Replacement Cost	\$ 7,235,500	\$ 116,202,917	\$123,438,417

5.4 Annual Costs: Purchase timing and associated service costs

Not all devices will be purchased simultaneously. To arrive at annual cost estimates, we need to make an assumption about what proportion of potential purchases would occur in the first year the coverage became available (assumed to be 2011), and also about how often they are subsequently replaced. The overall five year average costs are affected by the initial purchase rate assumption, but in a dampened way since anyone purchasing in year 1 cannot purchase in years 2 and 3. So, for example, if 100% of potential units were purchased in the first year, the numbers purchased in years 2 and 3 would be zero.

Consequently, this assumption is material but not critical to the overall results. For the three scenarios, we have assumed the initial purchase rate is 40%, 50%, and 60% for the low, medium, and high scenarios respectively.

The frequency of replacement also requires assumption. H.B.3598 allows coverage for purchase for each affected ear once every 36 months. Strom¹⁵ indicates the average life of a device is approximately 4.5 years. Replacement under this coverage cannot occur more often than once every 3 years, but could occur on a longer cycle based on the technical useful life of the device. In Table 7 below we display the mid-level assumptions, in which we assume children replace at the earliest opportunity (36 months) and that adults replace on a somewhat longer cycle than the minimum.

Table 7
Assumed Replacement Schedule for Adult and Child Hearing Aid Users
Mid-Level Scenario

Initial Year Purchase Rate:		0.50				
Year	2011	2012	2013	2014	2015	
Adult	0.50	0.25	0.25	0.50	0.25	
Child	0.50	0.50	-	0.50	0.50	
Total	0.50	0.27	0.23	0.50	0.27	

Table 8 displays conversion of the full-population replacement costs in Table 6 and timing assumptions in Table 7 into five year projections of cost. The row displaying “Hearing Aid Claim Dollars from Assumptions” reflects the calculations using the assumptions discussed and displayed above for the mid-level scenario. Note that the assumptions about replacement and the 36 month requirement make the annual costs for this mandate “lumpy” or variable from year to year.

¹⁵ Strom, op. cit.

Table 8

**Five-Year Projection of Purchase Behavior and Associated Cost for Hearing Aids, All Ages
Mid-Level Cost Scenario**

	2011*	2012	2013	2014	2015	5 Year Ave.
Hearing Aids in Use	52,803	52,754	52,713	52,689	52,654	
Replacement Ramp up/down factor	0.50	0.27	0.23	0.50	0.27	
Units purchased with coverage	26,401	14,037	12,330	26,344	14,011	
Unit Cost/Technology Inflation	1.07	1.05	1.05	1.05	1.05	
Average Unit Cost	2,338	2,455	2,577	2,706	2,842	
Hearing Aid Claim Dollars From Assumptions	\$ 61,719,209	\$ 34,455,564	\$ 31,779,620	\$ 71,293,974	\$ 39,811,553	
Allowance for additional non-device costs*	\$ 9,601,627	\$ 10,081,708	\$ 10,585,793	\$ 11,115,083	\$ 11,670,837	
Net Claim Dollars	\$ 71,320,835	\$ 44,537,272	\$ 42,365,413	\$ 82,409,057	\$ 51,482,390	\$ 58,422,994
Total Dollars with Administrative Loading	\$ 81,046,404	\$ 50,610,536	\$ 48,142,515	\$ 93,646,656	\$ 58,502,716	\$ 66,389,765
Membership	2,329,925	2,327,768	2,325,977	2,324,912	2,323,387	
PMPM with Administrative Loading	\$ 2.90	\$ 1.81	\$ 1.72	\$ 3.36	\$ 2.10	
Premium	\$ 441.87	\$ 468.38	\$ 496.48	\$ 526.27	\$ 557.85	
Percent of Premium	0.66%	0.39%	0.35%	0.64%	0.38%	0.48%

Table 8 also displays the effects of two additional factors we must consider to estimate the cost of the mandate. First, costs for related services required by the mandate (in addition to the devices themselves) must be considered, and second, insurers' administrative cost, a fundamental component of premium cost, must be added in.

Additional costs for related items and services required by the mandate were estimated by calculating the non-device, non-testing costs illustrated in Table 1 as a percentage of device costs, and applying that percentage to the additional device costs just calculated. We also added testing costs for new adopters based on the number of new adopters calculated, and on the average testing cost per person in the claim database. Finally, we subtracted the nearly immaterial amount of existing hearing aid purchases paid for by insurance so as not to double count.

Using historical retention data, we estimated retention ratios – the portion of premiums that represent administration costs and profit for bearing risk on the covered members – of approximately 12%. Table 8 displays the resulting net effect on premiums, showing the net increase measured on a per-member per-month (PMPM) basis and an increase as a percentage of estimated premiums for the mid-level scenario.

Table 9 displays the summary of costs for all three scenarios. Five year average percent of premium impacts are estimated to be 0.48% in the mid-level scenario, with an average PMPM of \$2.38. The percent of premium ranges from 0.25% in the low-level scenario to 0.88% in the high-level scenario.

Table 9
Summary of Cost Scenarios for H.B. 3598

	-2011 -	-2012 -	-2013 -	-2014 -	-2015 -	- Average -	5 Year Total
Members	2,329,925	2,327,768	2,325,977	2,324,912	2,323,387		
Med Exp Low	\$ 35,188,105	\$ 25,367,073	\$ 31,309,235	\$ 35,545,719	\$ 24,278,010	\$ 30,337,628	\$ 151,688,142
Med Exp Mid	\$ 71,320,835	\$ 44,537,272	\$ 42,365,413	\$ 82,409,057	\$ 51,482,390	\$ 58,422,994	\$ 292,114,968
Med Exp High	\$ 140,212,573	\$ 74,554,834	\$ 56,469,910	\$ 171,447,516	\$ 91,208,393	\$ 106,778,645	\$ 533,893,226
Premium Low	\$ 39,986,483	\$ 28,826,220	\$ 35,578,676	\$ 40,392,862	\$ 27,588,648	\$ 34,474,578	\$ 172,372,889
Premium Mid	\$ 81,046,404	\$ 50,610,536	\$ 48,142,515	\$ 93,646,656	\$ 58,502,716	\$ 66,389,765	\$ 331,948,827
Premium High	\$ 159,332,470	\$ 84,721,402	\$ 64,170,352	\$ 194,826,723	\$ 103,645,901	\$ 121,339,370	\$ 606,696,848
Low PMPM	\$ 1.43	\$ 1.03	\$ 1.27	\$ 1.45	\$ 0.99	\$ 1.23	\$ 1.23
Mid PMPM	\$ 2.90	\$ 1.81	\$ 1.72	\$ 3.36	\$ 2.10	\$ 2.38	\$ 2.38
High PMPM	\$ 5.70	\$ 3.03	\$ 2.30	\$ 6.98	\$ 3.72	\$ 4.35	\$ 4.35
Est Mo. Premium	\$ 442	\$ 468	\$ 496	\$ 526	\$ 558	\$ 498	\$ 498
Premium % Rise Low	0.32%	0.22%	0.26%	0.28%	0.18%	0.25%	0.25%
Premium % Rise Mid	0.66%	0.39%	0.35%	0.64%	0.38%	0.48%	0.48%
Premium % Rise High	1.29%	0.65%	0.46%	1.33%	0.67%	0.88%	0.88%

6. CONCLUSION

Hearing aids are rarely covered by commercial insurance currently in Massachusetts. Hearing testing, covered by existing mandates, is a frequently used benefit in the fully insured population, with annual users approaching 100,000 persons. Passage of H.B. 3598 would provide insurance coverage for devices and associated services that are fairly well understood with respect to their average cost per device (approximately \$2,000). Less well understood is how the presence of insurance coverage would affect that average cost, and what proportion of the population would benefit and decide to proceed with the use of one or two hearing aids. Based on published rates of hearing loss and hearing aid adoption, a sensitivity analysis suggests that the projected per member per month costs would have a mid-level PMPM cost of \$2.38, which represents approximately ½ percent of annual premium. Due to the uncertainty associated with degree to which hearing aid adopters exist in the population, and the behavioral response

associated with the availability of an insurance benefit with no per device price cap (but a once per 36 month limit on replacement), the range of estimates is between 0.25% of premium and 0.88% of premium.

As noted in the analysis, the three scenarios assume that the lack of a price cap on the hearing aid device results in baseline average insurer-paid cost per device of \$1910, \$2182, and \$2469 for the low, medium, and high scenarios respectively. Application of a cap would affect the projected costs directly by the proportion of the cap to these average prices. For example, under the mid-level scenario, a cap of \$1500 per device would reduce the cost projection to approximately 69% ($1500/2182=0.69$) of the \$66 million 5 year average above, or about \$46 million¹⁶.

¹⁶ Note that this is an approximation in that the average price per unit might be somewhat lower than the cap if some units cost less than the cap. For \$1500 and lower caps generally, the formula suggested would be quite close to the impact; for higher caps the reduction in cost would be larger than this approximate method would produce.

APPENDICES

Appendix A: Calculations for Three Cost Scenarios

Low-Level Scenario

Cost for Immediate Replacement for All Adult and Child Hearing Aid Users Low-Level Scenario

User Cost Calculation - SFY 2011	Children	Adults	Overall
Enrollment	660,893	1,669,032	2,329,925
Hearing Loss Rate	0.01	0.10	0.08
Adoption Rate	0.140	0.116	0.12
Binaural Rate	1.75	1.75	1.75
Net Hearing Aid Unit Usage Rate per Thousand	3.43	20.21	15.45
Hearing Aids in Use (after coverage)	2,267	33,735	36,002
Average Unit Cost	\$ 1,829	\$ 2,132	\$ 2,112
Total Replacement Cost	\$ 4,145,352	\$ 71,907,172	\$ 76,052,524

Assumed Replacement Schedule for Adult and Child Hearing Aid Users Low-Level Scenario

Initial Year Purchase Rate: 0.40						
Year	2011	2012	2013	2014	2015	
Adult	0.40	0.24	0.36	0.40	0.24	
Child	0.40	0.60	-	0.40	0.60	
Total	0.40	0.26	0.34	0.40	0.26	

Five-Year Projection of Purchase Behavior and Associated Cost for Hearing Aids, All Ages Low-Level Cost Scenario

	2011*	2012	2013	2014	2015	5 Year Ave.
Hearing Aids in Use	36,002	35,969	35,941	35,925	35,901	
Replacement Ramp up/down factor	0.40	0.26	0.34	0.40	0.26	
Units purchased with coverage	14,401	9,448	12,124	14,370	9,430	
Unit Cost/Technology Inflation	1.11	1.03	1.00	0.98	0.95	
Average Unit Cost	2,112	2,165	2,165	2,111	2,006	
Hearing Aid Claim Dollars From Assumptions	\$ 30,421,010	\$ 20,456,965	\$ 26,251,823	\$ 30,336,584	\$ 18,912,602	
Allowance for additional non-device costs**	\$ 4,767,096	\$ 4,910,109	\$ 5,057,412	\$ 5,209,134	\$ 5,365,408	
Net Claim Dollars	\$ 35,188,105	\$ 25,367,073	\$ 31,309,235	\$ 35,545,719	\$ 24,278,010	\$ 30,337,628
Total Dollars with Administrative Loading	\$ 39,986,483	\$ 28,826,220	\$ 35,578,676	\$ 40,392,862	\$ 27,588,648	\$ 34,474,578
Membership	2,329,925	2,327,768	2,325,977	2,324,912	2,323,387	
PMPM with Administrative Loading	\$ 1.43	\$ 1.03	\$ 1.27	\$ 1.45	\$ 0.99	
Premium	\$ 441.87	\$ 468.38	\$ 496.48	\$ 526.27	\$ 557.85	
Percent of Premium	0.32%	0.22%	0.26%	0.28%	0.18%	0.25%

*Inflation for 2011 covers the 2008 to 2011 period to inflate the 2008 data source 2011 dollars

** Includes Fitting, accessories, repairs, etc., as well as additional testing costs associated with increased demand

Mid-Level Scenario

Cost for Immediate Replacement for All Adult and Child Hearing Aid Users Mid-Level Scenario

User Cost Calculation - SFY 2011	Children	Adults	Overall
Enrollment	660,893	1,669,032	2,329,925
Hearing Loss Rate	0.02	0.12	0.09
Adoption Rate	0.17	0.14	0.14
Binaural Rate	1.80	1.80	1.80
Net Hearing Aid Unit Usage Rate per Thousand	5.14	29.60	22.66
Hearing Aids in Use (after coverage)	3,398	49,405	52,803
Average Unit Cost	\$ 2,130	\$ 2,352	\$ 2,338
Total Replacement Cost	\$ 7,235,500	\$ 116,202,917	\$123,438,417

Assumed Replacement Schedule for Adult and Child Hearing Aid Users Mid-Level Scenario

Initial Year Purchase Rate: 0.50						
Year	2011	2012	2013	2014	2015	
Adult	0.50	0.25	0.25	0.50	0.25	
Child	0.50	0.50	-	0.50	0.50	
Total	0.50	0.27	0.23	0.50	0.27	

Five-Year Projection of Purchase Behavior and Associated Cost for Hearing Aids, All Ages Mid-Level Cost Scenario

	2011*	2012	2013	2014	2015	5 Year Ave.
Hearing Aids in Use	52,803	52,754	52,713	52,689	52,654	
Replacement Ramp up/down factor	0.50	0.27	0.23	0.50	0.27	
Units purchased with coverage	26,401	14,037	12,330	26,344	14,011	
Unit Cost/Technology Inflation	1.07	1.05	1.05	1.05	1.05	
Average Unit Cost	2,338	2,455	2,577	2,706	2,842	
Hearing Aid Claim Dollars From Assumptions	\$ 61,719,209	\$ 34,455,564	\$ 31,779,620	\$ 71,293,974	\$ 39,811,553	
Allowance for additional non-device costs*	\$ 9,601,627	\$ 10,081,708	\$ 10,585,793	\$ 11,115,083	\$ 11,670,837	
Net Claim Dollars	\$ 71,320,835	\$ 44,537,272	\$ 42,365,413	\$ 82,409,057	\$ 51,482,390	\$ 58,422,994
Total Dollars with Administrative Loading	\$ 81,046,404	\$ 50,610,536	\$ 48,142,515	\$ 93,646,656	\$ 58,502,716	\$ 66,389,765
Membership	2,329,925	2,327,768	2,325,977	2,324,912	2,323,387	
PMPM with Administrative Loading	\$ 2.90	\$ 1.81	\$ 1.72	\$ 3.36	\$ 2.10	
Premium	\$ 441.87	\$ 468.38	\$ 496.48	\$ 526.27	\$ 557.85	
Percent of Premium	0.66%	0.39%	0.35%	0.64%	0.38%	0.48%

*Inflation for 2011 covers the 2008 to 2011 period to inflate the 2008 data source 2011 dollars

** Includes Fitting, accessories, repairs, etc., as well as additional testing costs associated with increased demand

High-Level Scenario

Cost for Immediate Replacement for All Adult and Child Hearing Aid Users High-Level Scenario

User Cost Calculation - SFY 2011	Children	Adults	Overall
Enrollment	660,893	1,669,032	2,329,925
Hearing Loss Rate	0.02	0.13	0.10
Adoption Rate	0.20	0.17	0.17
Binaural Rate	1.85	1.85	1.85
Net Hearing Aid Unit Usage Rate per Thousand	7.33	41.49	31.80
Hearing Aids in Use (after coverage)	4,842	69,242	74,084
Average Unit Cost	\$ 2,580	\$ 2,732	\$ 2,722
Total Replacement Cost	\$ 12,489,586	\$ 189,168,999	\$201,658,585

Assumed Replacement Schedule for Adult and Child Hearing Aid Users High-Level Scenario

Initial Year Purchase Rate:		0.60				
Year	2011	2012	2013	2014	2015	
Adult	0.60	0.24	0.16	0.60	0.24	
Child	0.60	0.40	-	0.60	0.40	
Total	0.60	0.25	0.15	0.60	0.25	

Five-Year Projection of Purchase Behavior and Associated Cost for Hearing Aids, All Ages High-Level Cost Scenario

	2011*	2012	2013	2014	2015	5 Year Ave.
Hearing Aids in Use	74,084	74,015	73,958	73,924	73,876	
Replacement Ramp up/down factor	0.60	0.25	0.15	0.60	0.25	
Units purchased with coverage	44,450	18,538	11,060	44,355	18,503	
Unit Cost/Technology Inflation	1.10	1.07	1.07	1.07	1.07	
Average Unit Cost	2,722	2,913	3,116	3,335	3,568	
Hearing Aid Claim Dollars From Assumptions	\$ 120,995,151	\$ 53,992,192	\$ 34,467,883	\$147,905,348	\$ 66,018,272	
Allowance for additional non-device costs*	\$ 19,217,422	\$ 20,562,642	\$ 22,002,027	\$ 23,542,169	\$ 25,190,121	
Net Claim Dollars	\$ 140,212,573	\$ 74,554,834	\$ 56,469,910	\$171,447,516	\$ 91,208,393	\$ 106,778,645
Total Dollars with Administrative Loading	\$ 159,332,470	\$ 84,721,402	\$ 64,170,352	\$194,826,723	\$103,645,901	\$ 121,339,370
Membership	2,329,925	2,327,768	2,325,977	2,324,912	2,323,387	
PMPM with Administrative Loading	\$ 5.70	\$ 3.03	\$ 2.30	\$ 6.98	\$ 3.72	
Premium	\$ 441.87	\$ 468.38	\$ 496.48	\$ 526.27	\$ 557.85	
Percent of Premium	1.29%	0.65%	0.46%	1.33%	0.67%	0.88%

*Inflation for 2011 covers the 2008 to 2011 period to inflate the 2008 data source 2011 dollars

** Includes Fitting, accessories, repairs, etc., as well as additional testing costs associated with increased demand

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