California Health Benefits Review Program

Analysis of California Assembly Bill 1601
Hearing Aids: Minors

A Report to the 2017–2018 California State Legislature April 7, 2017

CALIFORNIA
HEALTH BENEFITS REVIEW PROGRAM

Key Findings:

Analysis of California Assembly Bill 1601
Hearing Aids: Minors

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CALIFORNIA HEALTH BENEFITS REVIEW PROGRAM

AT A GLANCE

Assembly Bill (AB) 1601 would require coverage for hearing aids when medically necessary for enrollees under 18 years of age in Department of Managed Health Care (DMHC)-regulated plans and California Department of Insurance (CDI)-regulated policies.

1. **Background on pediatric hearing loss.** Children may experience hearing loss in one or both ears. Nationwide, hearing loss in one ear (unilateral) occurs in about 2.7% of adolescents aged 12 to 19, whereas hearing loss in both ears (bilateral) is less common at 0.8% of adolescents (Shargorodsky et al., 2010). This prevalence accounts for congenital hearing loss (present at birth) and acquired.
2. **Enrollees covered.** CHBRP estimates that all state-regulated coverage (for 24.0 million Californians) would be subject to AB 1601.
3. **Impact on expenditures.** CHBRP estimates that AB 1601 would increase total net annual expenditures by $3,239,000 in the first year postmandate.

a. **Shifting costs.** Although CHBRP does not anticipate a major increase in utilization, there would be a shift in costs from enrollee out-of-pocket expenditures to costs paid by health plans and policies for children's hearing aids and services.

4. **Essential health benefits (EHBs).** Coverage required by AB 1601 could be interpreted to exceed EHBs as this benefit is not included in the state's benchmark plan. CHBRP estimates the total state-responsibility in the first year would be $5,593,000.
5. **Medical effectiveness.** It is generally accepted that the use of hearing aids improves the hearing of children with hearing loss. A preponderance of evidence suggests that hearing aids are effective in improving speech and language outcomes among children with hearing loss. Early and consistent use of hearing aids is associated with better speech and language outcomes.
6. **Benefit coverage.** Currently, CHBRP estimates that in privately funded plans and policies, about 10% of enrollees aged 0 to 17 have coverage for hearing aids and services. In publicly funded plans, CHBRP estimates that 100% of enrollees aged 0 to 17 have coverage for hearing aids and services.
7. **Utilization.** Postmandate, CHBRP estimates a modest increase in utilization of hearing aids and related services among enrollees who previously had no coverage for hearing aids and related services (2.4% increase).
8. **Public health.** CHBRP expects that speech and language skills would improve for a subset of children with hearing loss who were unable to afford hearing aids premandate. CHBRP estimates that this bill would reduce the financial burden on families currently without coverage for hearing aids who would gain coverage postmandate.
9. **Long-term impacts.** It is unknown to what degree AB 1601 would improve the future educational and employment outcomes of children who obtain hearing aids through new coverage. However, it stands to reason that those who need and use hearing aids at a young age would experience improved outcomes as compared with no hearing aid use.

BILL SUMMARY

AB 1601 would require DMHC-regulated plans and CDI-regulated policies issued, amended, or renewed on or after January 1, 2018, to include coverage for hearing aids for enrollees under 18 years when medically necessary. Coverage includes an initial assessment, new hearing aids at least every 5 years, new ear molds, new hearing aids if alterations to existing hearing aids cannot meet the needs of the child, a new hearing aid if the existing one is no longer working, and fittings, adjustments, auditory training, and maintenance of the hearing aids.

Hearing aids are defined in the bill as "an electronic device usually worn in or behind the ear of a deaf and hard of hearing person for the purpose of amplifying sound." The bill language does not specify a dollar amount coverage cap.

The bill would add a new section to the Health and Safety Code (1367.72) and to the Insurance Code (10123.72). AB 1601 excludes Medicare supplement, dental-only, and vision-only plans from the Health and Safety code provisions. The bill excludes accident-only, specified disease, hospital indemnity, Medicare supplement, dental-only, and vision-only policies from the Insurance Code provision.

CONTEXT

Newborn Screening Hearing Program and Coverage of Hearing Screening

Landmark research in the 1990s found that early identification and treatment of hearing loss in children prevented delays in speech, language, and cognitive development, which led to the implementation of universal newborn hearing screening programs in the United States.[1]

[1] Refer to CHBRP's full report for full citations and references.

The California Newborn Hearing Screening Program requires California hospitals to screen newborns for hearing loss before discharge. The program's goal is to identify infants with hearing loss before 3 months of age and subsequently link infants with hearing loss to intervention services by 6 months of age. The state also screens for hearing loss among school-aged children in public schools.

As for hearing screening more generally, this service is covered as a preventive service among qualified health plans[2] as an essential health benefit.

California Children's Services

California Children's Services (CCS) is a state program that provides coverage for children under age 21 years with certain eligible medical conditions, including qualifying hearing loss. Children may qualify for CCS by meeting certain age, residence, medical, and financial requirements. All children in Medi-Cal under age 21 (both fee-for-service and Medi-Cal managed care) receive medically necessary hearing aid services through this program.[3] Other children may be eligible, as described in the *Policy Context* section.

Types of Hearing Aids and Devices Considered

Based on the definition in the bill language, this analysis examines the use of conventional hearing aids and also the non-surgically implanted, wearable bone conduction hearing aids (BCHA) (including, but not limited to, the brand name "BAHA Softband"). Conventional hearing aids capture vibration through microphone(s) and play the sound back in the ear canal. Conversely, BCHA captures vibrations via microphone and transmits to the bones of the skull and thus to the inner ear. For the wearable BCHA, the device is worn on a removable headband, rather than surgically implanted. This analysis did not include cochlear implants.

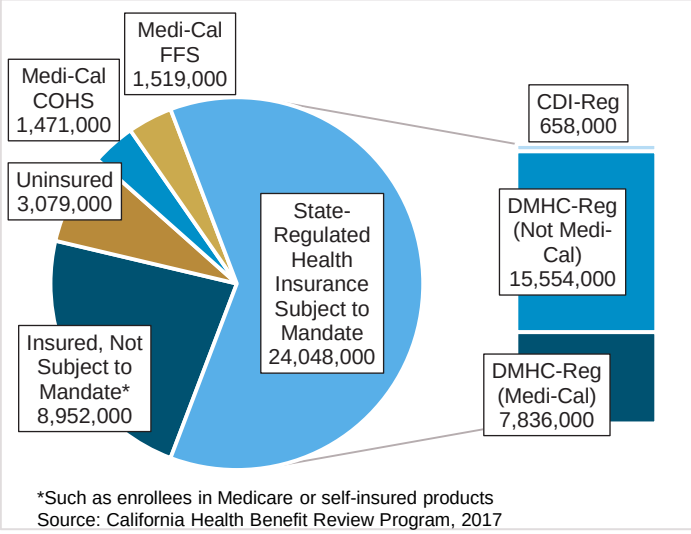
[2] In California, QHPs are nongrandfathered small-group and individual market DMHC-regulated plans and CDI-regulated policies sold in Covered California, the state's online marketplace.

[3] All Medi-Cal recipients younger than 21 years of age who require hearing services must be referred to California Children's Services (CCS) for hearing services.

IMPACTS

AB 1601 would apply to all state-regulated insurance (as shown in Figure 1), including DMHC Medi-Cal managed care.

Figure 1. Health Insurance in CA and AB 1601



Benefit Coverage, Utilization, and Cost

Benefit Coverage

CHBRP estimates that currently, approximately 52.9% of enrollees aged 0 to 17 years in California with health insurance have coverage that is compliant with AB 1601. This estimate includes children in both privately funded and publicly funded health insurance products regulated by DMHC or CDI. CHBRP estimates that approximately:

- 10% of enrollees aged 0 to 17 in privately funded products have coverage for hearing aids and services; and
- 100% of enrollees aged 0 to 17 in publicly funded plans have coverage for hearing aids and services.

Postmandate, 100% of enrollees aged 0 to 17 with health insurance would have mandate-compliant coverage of hearing aids.

Utilization

Given the necessity of hearing aids for children who need them, parents and guardians may find a way to obtain hearing aids even without insurance coverage. Some evidence suggests that hearing aids are largely price inelastic; in other words, the purchase and use of hearing aids may be largely unaffected by price.

- CHBRP estimates that the removal of a cost barrier when coverage is introduced for hearing aids would thus result in a modest increase in utilization of 2.4% among enrollees who *do not have* coverage for hearing aids and services postmandate.
- CHBRP estimates no change in utilization among the population with coverage postmandate.
- The combined rate of utilization for the total population of enrollees aged 0 to 17 postmandate is estimated 1.1% (see full *Benefit Coverage, Utilization, and Cost Impacts* section for description).

CHBRP estimates that an additional 195 children needing hearing aids or services would be newly covered under AB 1601 in the first year (17,839 children using hearing aids and services baseline to 18,034 children postmandate). For some, this permits first-time use of hearing aids, and for all newly covered hearing aid users, it permits more repairs, replacements, testing, and recasted ear molds, which improve the effectiveness of the hearing aids. All of these newly covered children would be in privately funded health insurance plans or policies since Medi-Cal and CalPERS currently cover hearing aids and services.

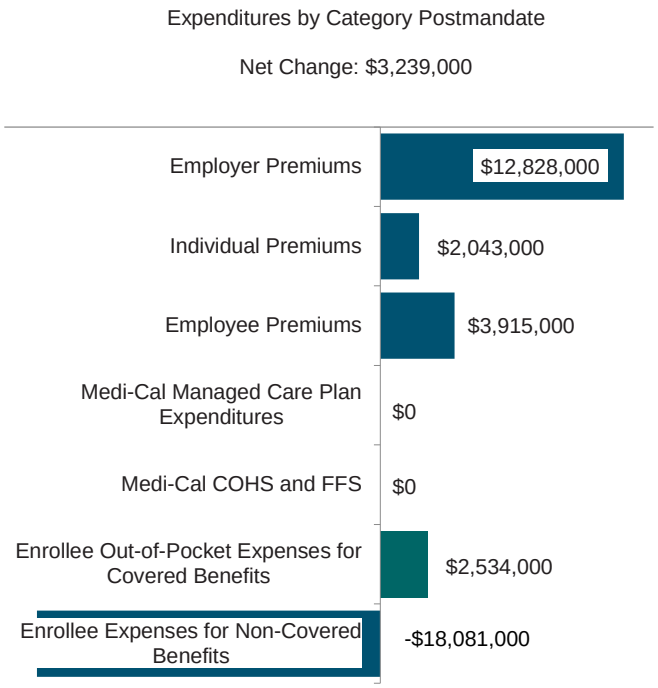
Postmandate, CHBRP estimates there would be no change in the average per enrollee cost of hearing aids and services. CHBRP estimates hearing aids and services cost on average $2,178 per enrollee, which includes children who may not have purchased a new hearing aid in the given year, but may use related hearing aid services in that year.

Expenditures

CHBRP estimates that AB 1601 would increase total net annual expenditures by $3,239,000 in the first year postmandate. Notably, although CHBRP does not anticipate a major increase in utilization, there would be a shift in costs from enrollee out-of-pocket expenditures to costs paid by health plans and policies.

Prior to the mandate, enrollees without coverage for AB 1601 incurred an estimated $18,081,000 in out-of-pocket expenses. Postmandate, that $18,081,000 in out-of-pocket expenses would be shifted to health plans and insurers. However, enrollees would incur $2,534,000 in copayments for the newly covered benefits (enrollee out-of-pocket expenses for covered benefits). See Figure 2.

Figure 2. Expenditure Impacts of AB 1601



Source: California Health Benefits Review Program, 2017.

Postmandate, CHBRP estimates that premiums would remain the same or increase per member per month (PMPM) as follows:

- Publicly funded plans (CalPERS HMO, Medi-Cal managed care plans): $0.00 change PMPM due to current coverage of hearing aids.
- Privately funded DMHC plans: PMPM increases range from $0.06 in the individual market, $0.11 in large group, to $0.12 in small group.
- Privately funded CDI policies: $0.12 PMPM increase in the individual market, $0.12 PMPM

increase in large group and $0.11 PMPM increase in small group.

Medi-Cal

Because children in Medi-Cal (both fee-for-service and Medi-Cal managed care) receive medically necessary hearing aid services through CCS, there would be no measurable impact on Medi-Cal as a result of AB 1601.

CalPERS

CHBRP estimates no measureable impact on state-regulated CalPERS plans.

Number of Uninsured in California

AB 1601 would have no measureable impact projected on the number of uninsured in California.

Medical Effectiveness

It is generally accepted that the use of hearing aids improves the hearing of children with hearing loss. As a result, there have been few recent studies on the impact of hearing aids on hearing in children.

CHBRP concludes that there is a preponderance of evidence from studies with moderately strong research designs that:

- Hearing aids are effective in improving speech outcomes in children. In particular, evidence suggests that earlier age of fitting with hearing aid is associated with greater gains in speech outcomes.

- Hearing aids are effective in improving language development outcomes in children. In particular, risk for language delays in children with hearing loss may be mitigated from an early age of fitting and consistent use of hearing aids.

Conversely, there is insufficient evidence that hearing aids are effective in improving nonverbal outcomes (e.g., motor behavior) in children. There is conflicting evidence that hearing aids are effective in improving personal and social development outcomes in children.

Public Health

Hearing loss may be congenital (present at birth) or acquired later during childhood. Children may experience hearing loss in one or both ears, and may require either one or two hearing aids. Nationwide, hearing loss in one ear (unilateral) occurs in about 2.7% of adolescents aged 12 to 19, whereas hearing loss in both ears (bilateral) is less common at 0.8% of adolescents (Shargorodsky et al., 2010). This overall prevalence rate of 3.5% among adolescents includes both congenital and acquired hearing loss.

CHBRP projects that AB 1601 would increase the first-time use of hearing aids and services by 195 children (all in the privately funded insurance market) in the first year postmandate; thus, assuming new coverage is similar to premandate cost sharing, hearing and speech and language skills would be expected to improve for this subset of newly covered children with hearing loss who were unable to afford hearing aids premandate.

No literature was found that discussed the receipt of hearing aids and its effect on ameliorating existing disparities in hearing loss by gender, income, and maternal education (as described in the *Medical Effectiveness* section). CHBRP estimates that AB 1601 would reduce the net financial burden of out-of-pocket expenses by approximately $15.5 million for the families of 18,034 children who use hearing aids and services in the first year, postmandate. CHBRP estimates that the annual out-of-pocket costs for families of the 195 newly covered children would decrease from about $1,980 to $290.

Long-Term Impacts

Regarding utilization impacts, CHBRP estimates AB 1601 would have minimal impacts on utilization. Premium expenditures by payer increase with AB 1601. However, as technology changes, it is possible that unit costs of these devices will change. In the absence of data on likely changes to unit cost of hearing aids, the long-term impact is not quantifiable.

Regarding public health impacts, It is unknown the degree to which the passage of AB 1601 would improve the future educational attainment and employment status of children who obtain hearing aids through the new coverage. However, it stands to reason that those who use hearing aids at a young age and maintain their communication

skills into adulthood would experience improved outcomes as compared with not using hearing aids.

Essential Health Benefits and the Affordable Care Act

The state's benchmark plan, which determines which services are included as a part of California's essential health benefits, does not include coverage for hearing aids.

Coverage for children's hearing aids and associated services (e.g., replacement, repair) mandated by AB 1601 appears to exceed EHBs, and therefore would appear to trigger the ACA requirement that the state defray the cost of additional benefit coverage for enrollees in qualified health plans (QHPs) in Covered California. A state that requires QHPs to offer benefits in excess of the EHBs must make payments to defray the cost of those additionally mandated benefits, either by paying the purchaser directly or by paying the QHP.

CHBRP estimates that the state would be required to defray the following amounts due to AB 1601:

- $0.12 PMPM for each QHP enrollee in a small-group DMHC-regulated plan;
- $0.06 PMPM for each QHP enrollee in an individual market DMHC-regulated plan;
- $0.11 PMPM for each QHP enrollee in a small-group CDI-regulated policy; and
- $0.09 PMPM for each QHP enrollee in an individual market CDI-regulated policy.

CHBRP estimates that this translates to a state-responsibility of $5,593,000 total, which includes:

- $3,840,000 in payments to DMHC-regulated small group plans;
- $1,508,000 in payments to DMHC-regulated individual plans;
- $190,000 in payments to CDI-regulated small group policies; and
- $55,000 in payments to CDI-regulated individual policies.

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California Health Benefits Review Program
1111 Broadway, Suite 1400
Oakland, CA 94607
Tel: 510.287.3876
Fax: 510.763.4253
www.chbrp.org

ABOUT CHBRP

The California Health Benefits Review Program (CHBRP) was established in 2002. As per its authorizing statute, CHBRP provides the California Legislature with independent analysis of the medical, financial, and public health impacts of proposed health insurance benefit bills. The state funds CHBRP through an annual assessment on health plans and insurers in California.

An analytic staff in the University of California's Office of the President supports a task force of faculty and research staff from several campuses of the University of California to complete each CHBRP analysis. A strict conflict-of-interest policy ensures that the analyses are undertaken without bias. A certified, independent actuary helps to estimate the financial impact, and content experts with comprehensive subject-matter expertise are consulted to provide essential background and input on the analytic approach for each report.

More detailed information on CHBRP's analysis methodology, authorizing statute, as well as all CHBRP reports and other publications are available at www.chbrp.org.

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Table 1. AB 1601 2018 Impacts on Benefit Coverage, Utilization, and Cost

	Baseline	Postmandate	Increase/ Decrease	Change Postmandate
Benefit coverage				
Total enrollees with health insurance subject to state-level benefit mandates (a)	24,048,000	24,048,000	0	0%
Total enrollees aged 0–17 years with health insurance subject to AB 1601	6,688,000	6,688,000	0	0%
Percentage of enrollees aged 0–17 years with coverage for hearing aids and services (i.e., health insurance compliant with AB 1601) (b)	52.9%	100.0%	47.1%	89.1%
Utilization and unit cost				
Total enrollees aged 0–17 years subject to AB 1601 using hearing aids and/or related services	17,839	18,034	195	1.1%
Hearing aid & services count of enrollees aged 0–17 (number of enrollees)				
Hearing aids	9,213	9,314	101	1.1%
Hearing aid maintenance & repair	1,455	1,471	16	1.1%
Replacement	102	103	1	1.1%
Ear mold	5,130	5,186	56	1.1%
Diagnostic tests and hearing aid checks, fittings, and adjustments	9,392	9,494	103	1.1%
Hearing aid and/or services Average annual unit cost/user (c)	$2,178	$2,178	$0	0.00%
Expenditures				
Private employers for group insurance	$64,820,615,000	$64,833,443,000	$12,828,000	0.0198%
CalPERS HMO employer expenditures (d) (e)	$4,884,262,000	$4,884,262,000	$0	0.0000%
Medi-Cal Managed Care Plan expenditures (f)	$27,983,856,000	$27,983,856,000	$0	0.0000%
Enrollees for individually purchased insurance	$14,608,214,000	$14,610,257,000	$2,043,000	0.0140%
Individually purchased – outside Exchange	$6,304,061,000	$6,305,593,000	$1,532,000	0.0243%
Individually purchased – Covered California	$8,304,153,000	$8,304,664,000	$511,000	0.0062%
Enrollees with group insurance, CalPERS HMOs, and Covered California (a) (e)	$20,387,090,000	$20,391,005,000	$3,915,000	0.0192%
Enrollee out-of-pocket expenses for covered benefits (deductibles, copayments, etc.)	$13,565,623,000	$13,568,157,000	$2,534,000	0.0187%
Enrollee expenses for noncovered benefits (g)	$18,081,000	$0	–$18,081,000	−100.0000%
Total expenditures	$146,267,741,000	$146,270,980,000	$3,239,000	0.0022%

Source: California Health Benefits Review Program, 2017.

Notes: (a) This population includes persons with privately funded (including Covered California) and publicly funded (e.g., CalPERS HMOs, Medi-Cal Managed Care Plans) health insurance products regulated by DMHC or CDI. Population includes enrollees aged 0 to 64 years and enrollees 65 years or older covered by employer-sponsored health insurance.

(b) The baseline coverage of 52.9% is a weighted average of enrollees aged 0 to 17 years covered by privately funded (10%) and publicly funded (100%) health insurance products regulated by DMHC and CDI.

(c) Excludes screening as part initial assessment, as it is currently delivered through newborn screening and school-aged screening. The average cost per user of hearing aids and/or services reported here includes all types of users, including those who receive hearing aids and those may only receive hearing services (e.g., diagnostic tests) but do not receive hearing aids in the claim year, 2014 and 2015 in MarketScan® Commercial Claims and Encounters Database.

(d) 100% of people aged 0 to 17 years have coverage for hearing aids and related services under CalPERS and Medi-Cal managed care. Does not include enrollees in COHS; 100% of people aged 0 to 17 years have coverage for hearing aids and related services under Medi-Cal.

(e) As of June 1, 2016, 58.82% of CalPERS members were state retirees, state employees, or their dependents. CHBRP assumes the same ratio for 2018. It should be noted, however, that should CalPERS choose to make similar adjustments for consistency to the benefit coverage of enrollees associated with CalPERS' self-insured products, the fiscal impact on CalPERS could be greater.

(f) Enrollee premium expenditures include contributions to employer-sponsored health insurance, health insurance purchased through Covered California, and contributions to Medi-Cal Managed Care.

(g) Includes only those expenses that are paid directly by enrollees to providers for services related to the mandated benefit that are not currently covered by insurance. In addition this only includes those expenses that would be newly covered, postmandate. Other components of expenditures in this table include all health care services covered by insurance.

Key: CalPERS HMOs = California Public Employees' Retirement System Health Maintenance Organizations; CDI = California Department of Insurance; COHS = County Organized Health System; DMHC = Department of Managed Health Care.

POLICY CONTEXT

The California Assembly Health Committee has requested that the California Health Benefits Review Program (CHBRP)[4] conduct an evidence-based assessment of the medical, financial, and public health impacts of California Assembly Bill (AB) 1601.

If enacted AB 1601, would affect the health insurance of approximately 24.0 million enrollees (61.6% of all Californians). This represents 100% of the 24.0 million Californians who will have health insurance regulated by the state in 2017 that may be subject to any state health benefit mandate law — health insurance regulated by the California Department of Managed Health Care (DMHC) or the California Department of Insurance (CDI). The bill excludes Medicare supplement, dental-only, and vision-only plans from the Health and Safety code provisions and excludes accident-only, specified disease, hospital indemnity, Medicare supplement, dental-only, and vision-only policies from the Insurance Code provisions.

Because analysis of a similar introduced bill was completed in 2016 for AB 2004 (Bloom) Hearing Aids, CHBRP has drawn from the AB 2004 report to inform this analysis. CHBRP expects that many of the impacts projected in its analysis of AB 2004 to be similar, as the language and intent of both bills are very similar. For the purpose of CHBRP's cost analyses, the bill language is identical and any differences in the bill language have no implications on CHBRP's cost analysis approach. To project the impact of AB 1601, the updated cost analysis uses more recent claims data and an updated model reflecting the estimated 2018 population in state-regulated plans and policies. CHBRP also provides an updated public health analysis. CHBRP did not expect any major changes to the medical effectiveness literature, and has included the AB 2004 medical effectiveness analysis for reference.

Bill-Specific Analysis of AB 1601 Hearing Aids: Minors

Bill Language

AB 1601 would require DMHC-regulated plans and CDI-regulated policies issued, amended, or renewed on or after January 1, 2018, to include coverage for hearing aids for all enrollees younger than 18 years when medically necessary. Coverage includes initial assessment, new hearing aids at least every 5 years, new ear molds, new hearing aid(s) if they no longer meet the child's needs or if existing hearing aid(s) are not working fittings, adjustments, auditory training, and maintenance for hearing aid(s). Hearing aids are defined in the bill as "an electronic device usually worn in or behind the ear of a deaf and hard of hearing person for the purpose of amplifying sound." The bill requires coverage, but does not specify the level of coverage required or a dollar amount cap on coverage (e.g., $2,000 in coverage over 5 years). The bill would add a new section to the Health and Safety Code (1367.72) and to the Insurance Code (10123.72). AB 1601 excludes Medicare supplement, dental-only, and vision-only plans from the Health and Safety code provisions. The bill excludes accident-only, specified disease, hospital indemnity, Medicare supplement, dental-only, and vision-only policies from the Insurance Code provision. The full text of AB 1601 can be found in Appendix A .

Analytic Approach and Key Assumptions

The following are key assumptions used in the analysis of AB 1601:

[4] CHBRP's authorizing statute is available at www.chbrp.org/docs/authorizing_statute.pdf.

The bill language defines hearing aids as "an electronic device usually worn in or behind the ear of a deaf and hard of hearing person for the purpose of amplifying sound." Based on this definition, the analysis includes conventional air conduction hearing aids as these are most commonly used by children with hearing loss (Gabbard and Schryer, 2003; Palmer and Ortmann, 2005). The CHBRP analysis also includes the nonsurgical bone conduction hearing aid (BCHA).[5] The wearable BCHA is a vibratory transducer (device that transmits vibrations) attached to a removable headband; the device presses against the skull bone to transmit sound waves via bone to the inner ear.

The analysis does not include surgically implanted BCHAs or cochlear implants because they are not "worn," but surgically implanted.

Although adjuvant therapy, such as speech therapy, is often coupled with hearing aid usage for children with hearing loss, this analysis does not incorporate the costs of adjuvant therapy, as that is outside the scope of the costs for this bill.

General Caveat for All CHBRP Analyses

It is important to note that CHBRP's analysis of proposal benefit mandate bills addresses the incremental effects — how the proposed legislation would impact benefit coverage, utilization, costs, and public health. CHBRP's estimates of these incremental effects are presented in this report.

Interaction With Existing Requirements

AB 1601 may interact and align with the following state and federal mandates or provisions.

California law and regulations

California law requires screening for hearing loss among children, first at birth in the Newborn Hearing Screening Program and subsequently at school age (for students in the public school system) (NCSL, 2011).[6,7,8] For more information about these programs, please see the *Background on Pediatric Hearing Loss and Hearing Aids* section.

There is no existing law mandating any kind of coverage for hearing aids for private insurance. However, for children age 21 years and under in Medi-Cal and children who meet certain qualifications including a qualifying hearing loss, hearing aids are covered through California Children's Services (CCS). CCS is a state program that provides coverage for children under age 21 with certain eligible medical conditions, including hearing loss. Children may also qualify for CCS by meeting certain age, residence, medical, and financial requirements.[9,10]

The eligibility criteria are:

[5] Based on input from content expert, Margaret Winter. Personal communication with Margaret Winter, March 11, 2016.
[6] Cal. Health and Safety Code § 123975.
[7] Cal. Health and Safety Code § 124115 et seq.
[8] California Code of Regulations, Title 17, Section 2952 (c)(1).
[9] Medi-Cal Provider Manual. Part 2 – Audiology and Hearing Aids (AUD), California Children's Services (CCS) Program.
[10] http://www.dhcs.ca.gov/services/ccs/Pages/qualify.aspx.

- **Age:** Child must be under 21;
- **Residence:** Child must be California resident;
- **Medical condition:** Child has a medical condition that is covered by CCS, as determined by the California Code of Regulations;[11]
- **Financial and other:** Child and family meets one of the following criteria:
    - Family income of $40,000 or less;
    - Out-of-pocket medical expenses expected to be more than 20% of family's adjusted gross income;
    - A need for an evaluation to find out whether there is a health problem covered by CCS;
    - Child was adopted with a known health problem that is covered by CCS;
    - Child has a need for the Medical Therapy Program (a state program that provides services for children who have handicapping conditions, generally due to neurological or musculoskeletal disorders); or
    - Medi-Cal, with full benefits.

For children who meet the stated criteria, CCS covers qualifying hearing loss as defined by the California Code of Regulations.[12]

Medi-Cal recipients under age 21 must be referred to CCS for hearing loss services, including hearing aids,[13] both for fee-for-service and managed care. For Medi-Cal beneficiaries in county organized health system (COHS) plans, the COHS plans, rather than CCS, provide hearing services.[14,15,16]

Having private insurance does not preclude a child from receiving services through CCS. If they meet one or more of the previously mentioned requirements, children with private insurance may receive coverage through CCS for certain conditions (e.g., hearing loss) that their insurance does not cover or for services that meet the out-of-pocket medical expense eligibility above.[17]

Similar requirements in other states

Fifteen states (CO, DE, KY, LA, MN, MD, MA, MN, MS, NJ, NM, NC, OK, OR, TN) require that health benefit plans cover hearing aids for children, but not adults (ASHA, 2016b). Four states — Arkansas, Connecticut, New Hampshire, and Rhode Island — require that plans cover hearing aids for adults and children. Wisconsin requires coverage for both hearing aids and cochlear implants for children.

Of the 20 states that mandate coverage of hearing aids for children, California's proposed legislation is most similar to Colorado's law, which requires plans to cover hearing aids for children younger than 18

[11] California Code of Regulations, Title 22, Article 1, Sections 41811 through 41876.
[12] 22 CCR § 41518 § 41518. Diseases of the Ear and Mastoid Process.
[13] Medi-Cal Provider Manual. Part 2 – Audiology and Hearing Aids (AUD).
[14] Email correspondence with DHCS, March 24, 2016.
[15] These COHS counties are Marin, Napa, San Mateo, Solano, Santa Barbara, and Yolo.
[16] CHBRP analyses exclude COHS plans.
[17] Personal communication with Margaret Winter, March 15, 2016.

years when medically necessary. Under Colorado's law, coverage includes new hearing aid(s) every 5 years, a new hearing aid when alterations to the existing hearing aid(s) cannot meet the needs of the child, and services and supplies such as the initial assessment, fitting, adjustments, and auditory training.[18]

Affordable Care Act

A number of Affordable Care Act (ACA) provisions have the potential to or do interact with state benefit mandates. Below is an analysis of how AB 1601 may interact with requirements of the ACA as presently exists in federal law, including the requirement for certain health insurance to cover essential health benefits (EHBs).[19]

Any changes at the federal level may impact the analysis or implementation of this bill, were it to pass into law. However, CHBRP analyzes bills in the current environment given current law.

Essential Health Benefits

State health insurance marketplaces, such as Covered California, are responsible for certifying and selling qualified health plans (QHPs) in the small-group and individual markets. QHPs are required to meet a minimum standard of benefits as defined by the ACA as essential health benefits (EHBs). In California, EHBs are related to the benefit coverage available in the Kaiser Foundation Health Plan Small Group Health Maintenance Organization (HMO) 30 plan, the state's benchmark plan for federal EHBs.[20,21]

States may require QHPs to offer benefits that exceed EHBs.[22] However, a state that chooses to do so must make payments to defray the cost of those additionally mandated benefits, either by paying the purchaser directly or by paying the QHP.[23,24] State rules related to provider types, cost-sharing, or reimbursement methods would *not meet* the definition of state benefit mandates that could exceed EHBs.[25]

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[18] Colorado Rev. Stat. §10-16-104.

[19] The ACA requires nongrandfathered small-group and individual market health insurance — including but not limited to QHPs sold in Covered California — to cover 10 specified categories of EHBs. Resources on EHBs and other ACA impacts are available on the CHBRP website: http://www.chbrp.org/other_publications/index.php.

[20] The U.S. Department of Health and Human Services (HHS) has allowed each state to define its own EHBs for 2014 and 2015 by selecting one of a set of specified benchmark plan options. CCIIO, Essential Health Benefits Bulletin. Available at: cciio.cms.gov/resources/files/Files2/12162011/essential_health_benefits_bulletin.pdf.

[21] H&SC Section 1367.005; IC Section 10112.27.

[22] ACA Section 1311(d)(3).

[23] State benefit mandates enacted on or before December 31, 2011, may be included in a state's EHBs, according to the U.S. Department of Health and Human Services (HHS). Patient Protection and Affordable Care Act: Standards Related to Essential Health Benefits, Actuarial Value, and Accreditation. Final Rule. Federal Register, Vol. 78, No. 37. February 25, 2013. Available at: www.gpo.gov\fdsys\pkg\FR-2013-02-25\pdf\2013-04084.pdf.

[24] However, as laid out in the Final Rule on EHBs HHS released in February 2013, state benefit mandates enacted on or before December 31, 2011, would be included in the state's EHBs and there would be no requirement that the state defray the costs of those state mandated benefits. For state benefit mandates enacted after December 31, 2011, that are identified as exceeding EHBs, the state would be required to defray the cost.

[25] Essential Health Benefits. Final Rule. A state's health insurance marketplace would be responsible for determining when a state benefit mandate exceeds EHBs, and QHP issuers would be responsible for calculating the cost that must be defrayed.

AB 1601 and EHBs

AB 1601 could be interpreted to exceed the EHBs for the following reasons:

- AB 1601 would apply to QHPs in Covered California.
- The state's benchmark plan (Kaiser Foundation Health Plan Small Group HMO 30) does cover hearing screenings and exams as a preventive care service. However, the benchmark plan does not cover hearing aids for children or adults. Thus, this service would not appear to be considered an essential health benefit for the state of California.
- The federal definition of a state benefit mandate that can exceed EHBs is "specific to the care, treatment, and services that a state requires issuers to offer to its enrollees."[26] AB 1601 would appear to meet this federal definition.
- Pediatric hearing aids and related services are not covered under basic health care services, as required by the Knox-Keene Health Care Service Plan Act of 1975.

Thus, coverage of hearing aids for children younger than 18 years and associated services, as mandated by AB 1601, would require coverage for a new benefit that appears to exceed EHBs in California. This would appear to trigger the ACA requirement that the state defray the cost of additional benefit coverage for enrollees in QHPs in Covered California. For an estimate of the cost of exceeding EHBs, see the *Benefit Coverage, Utilization, and Cost Impacts* section of this report.

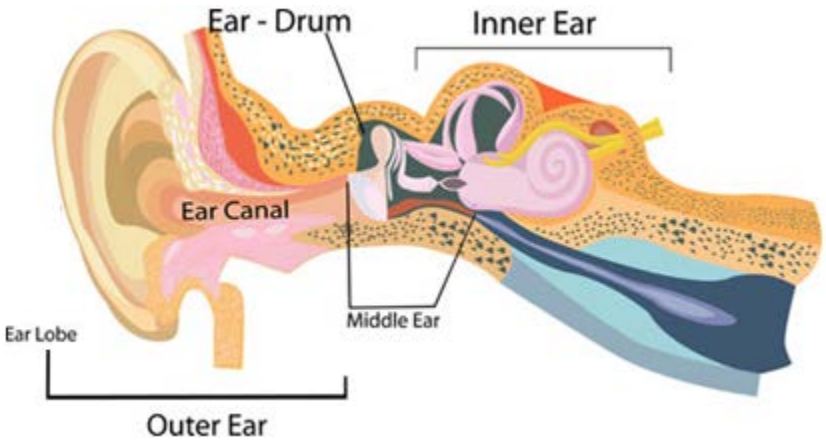
[26] Essential Health Benefits Final Rule. Federal Register, Vol. 87, No. 27. February 25, 2013. Available at: www.gpo.gov/fdsys/pkg/FR-2013-02-25/pdf/2013-04084.pdf.

BACKGROUND ON PEDIATRIC HEARING LOSS AND HEARING AIDS

Types of Hearing Loss

There are three types of hearing loss: conductive, sensorineural, and mixed. Sensorineural hearing loss occurs when there is damage to the inner ear hair cells or a damaged hearing nerve. Conductive hearing loss, affecting the outer ear and middle ear, is usually transient, unlike sensorineural loss, which is generally permanent (CDC, 2015a).

Most permanent hearing loss is sensorineural and is attributed to congenital causes (present at birth) or acquired during childhood. About 50% of congenital hearing loss cases are due to genetic causes, 25% of cases are due to maternal illness during pregnancy, premature birth, or complications after birth. The causes are unknown for the remaining 25% of cases (CDC, 2015b). Reasons for acquired hearing loss include excessive noise, injury, certain medications, tumors, jaundice, meningitis, or problems with blood circulation (Boyle et al., 2011; Shargorodsky et al., 2010).



Source: CDC, 2015a, modified by California Health Benefits Review Program, 2017.

Hearing loss can range from “mild” to “profound” and can be unilateral or bilateral (one or both ears). The following table (

Table 2) describes the degrees of hearing loss and examples of audible words at different levels of loss. In the United States, hearing aids can be used by children with unilateral or bilateral mild-to-profound hearing loss.[27]

[27] Based on input from content expert, Margaret Winter. Personal communication with Margaret Winter, April 7, 2016.

Table 2. Degrees and Descriptions of Hearing Loss

Degree of Hearing Loss Decibel Level (dB)	Description of Loss (Words Heard According to Degree of Loss)
Normal-slight: -10–25 dB	Normal hearing range not requiring a hearing aid
Example of Loss:	*Freddie thought he should find a whistle.*
Mild: 26–40 dB	Cannot hear a whispered conversation in a quiet atmosphere at close range.
Example of Loss:	*Freddie though- -e ‘”ould -ind a whi”’le.*
Moderate: 41–55 dB	Cannot hear normal conversation in a quiet atmosphere at close range.
Example of Loss:	*-reddie ”ough- -e ‘”ould -i” a ”i”’le.*
Severe: 56–90 dB	Cannot hear speech; can only hear loud noises such as a vacuum cleaner or lawn mower at close range.
Example of Loss:	*‘”e‘”ie ‘”ou‘” -e ‘”ou‘” -i‘” a ‘”i”’le.*
Profound: 91+ dB	Cannot hear speech; may only hear extremely loud noises such as a chain saw at close range or the vibrating component of loud sound.
Example of loss:	*LOUDsoft LOUD soft soft LOUD soft LOUDsoft*

Source: California Health Benefits Review Program, 2016. Adapted from American Academy of Otolaryngology—Head and Neck Surgery Foundation, 2006; and the American Speech-Language-Hearing Association, 2016a; and the Wyoming Early Hearing Detection and Intervention program.

California Hearing Screening Programs

California Newborn Hearing Screening Program

Landmark research in the 1990s found that early identification and treatment of hearing loss in children prevented delays in speech, language, and cognitive development, which led to the implementation of the universal newborn hearing screening programs (NHSP) in the United States. (Yoshinaga-Itano, 2003). The California Newborn Hearing Screening Program requires California hospitals to screen newborns for hearing loss before discharge (DHCS, 2016). The most recent data (2013) showed that 97% of live births in California were screened, and of those, 0.2% (909 infants) were diagnosed with hearing loss by age 6 months (CDPH, 2015).

The program’s goal is to identify infants with hearing loss before 3 months of age and subsequently link those infants to intervention services by 6 months of age (DHCS, 2016). Infants who fail the initial screening in the hospital setting are referred for up to two more rescreenings prior to 3 months of age. Those who do not pass the final screening are referred to California Children’s Services for a diagnostic hearing evaluation. In addition to screening and diagnosis for hearing loss, the NHSP connects families of newly diagnosed infants with community support services (including services provided based on the requirements of the Individuals with Disabilities Education Act), assists with assessing the family’s insurance coverage or, if eligible, facilitates enrollment in the California Children Services and Early Start Programs (DHCS, 2016).

Public School Hearing Screening Programs

Public screening programs for hearing loss in school-aged children also identify those with previously undiagnosed loss and acquired hearing loss. Specifically, California requires school-aged children to be

screened in kindergarten or first grade, second, fifth, eighth, and tenth or eleventh grade. School audiometrists, public health nurses, or credentialed school nurses conduct the screenings. If a child fails the hearing test, the school must provide to the parents or guardians a written notice of the results and provide a recommendation for medical and audiological follow-up evaluations.

Prevalence and Incidence of Hearing Loss in California

National

According to the Centers for Disease Control and Prevention, estimating the total number of children with hearing loss is dependent on the age groups studied and the definition of hearing loss (CDC, 2015c). Various national surveys[28] and programs track the incidence[29] and prevalence[30] of children with hearing loss using different age groups (e.g., cohorts of newborns, aged 8 years, aged 3 to 17 years); different definitions (e.g., moderate-to-profound loss, affected by hearing loss), and different methods (e.g., self-report, administrative records, audiometric evaluations) (Mehra et al., 2009). These differences make it difficult to calculate an overall prevalence rate for children under age 19 years. The literature frequently notes that the *incidence* of moderate-to-profound pediatric hearing loss ranges between 1 and 5 per 1,000 children (0.1% to 0.5%) (Boyle et al., 2011; HLAC, 2016; NIDCD, 2016). Other sources report *prevalence* rates between 3.1% to 5.3% and up to 15% of children (aged 6 to 19 years and 12 to 19 years, respectively) with a hearing loss of at least 16 dB (slight loss) in one or both ears (Niskar et al., 1998; Shargorodsky et al., 2010) (Table 1).

California

CHBRP found no registry or recent survey data that estimated overall hearing loss in California's pediatric population, but the CDC Early Hearing and Detection Intervention program showed an incidence rate of 1.9 per 1,000 California newborns screened in 2013 with hearing loss (reported via California NHSP). Additionally, there are several state agencies that provide services to support many of California's children with hearing loss including the California Department of Developmental Services (serving about 3,512 children with "hearing problems") and the California Department of Education (serving about 16,150[31] "hard of hearing/deaf" children) (CDE, 2016; DDS, 2016).

Children may experience hearing loss in one or both ears, and so will require either one or two hearing aids. CHBRP finds the following prevalence estimate most relevant to the analysis of AB 1601: Nationwide, hearing loss in one ear (unilateral) occurs in about 2.7% of adolescents aged 12 to 19 while hearing loss in both ears (bilateral) is less common at 0.8% of adolescents (Shargorodsky et al., 2010). This overall prevalence rate of 3.5% includes children with unilateral and bilateral loss of at least 16 dB that is congenital or acquired.

[28] National Health and Nutrition Examination Survey (NHANES III), Metropolitan Atlanta Developmental Disabilities Surveillance Program, National Health Information Survey, Early Hearing Detection and Intervention Program, etc.
[29] Incidence is the number of new cases identified in a specified timeframe (e.g., number of new cases of flu in August).
[30] Prevalence is the number of all active cases identified in a specific timeframe (e.g., all cases of flu in August).
[31] Personal communication, N. Sager, March 2016.

Types and Costs of Hearing Aids

Costs and Ability to Pay

Hearing aids generally cost between $1,500 and $4,000 per ear depending on the technology and enhancements selected by the patient. Patients also incur costs for hearing aid-related services such as fittings, repairs, and related audiometry testing. Families of children with hearing loss experience additional costs associated with more frequent fittings of new ear molds necessary to accommodate the child's growth (up to 4 times per year for infants/toddlers[32]). Muñoz et al. (2013) reported that the most important challenges to parents in obtaining pediatric hearing aids was the ability to pay, accepting the need for hearing aids, and wait time for a pediatric audiologist. Their 2007 to 2010 survey results indicated that, despite the cost challenge, only a minority of parents were unable to obtain hearing aids for their child (4 of 333 respondents or 1.2%). Thirty-seven percent reported having insurance coverage for hearing aids and about one-half of children were fitted with loaner hearing aids prior to purchasing their own (California does not have a hearing aid loaner program unlike Colorado, Idaho, or Kansas; however, some hearing aid manufacturers provide the loaner service) (Muñoz et al., 2013). Other sources of hearing aid assistance, for those who meet eligibility criteria, include charities and California Children's Services[33] (Muñoz et al., 2013).

In summary, cost may pose a final barrier wherein a minority of children who need hearing aids go without hearing aids because they cannot afford them. In other cases, families may shoulder a financial burden to acquire medically necessary hearing aids for children.

Types of Hearing Aids

There are five basic categories of hearing aids (Table 3), all of which are customized for each user by the manufacturer and audiologist. Due to improved technology, the electronics used in hearing aids are usually digital rather than analog;[34] however, either can be used in any type of hearing aid. In general, hearing aids include a microphone, amplifier, receiver, and battery (volume controls are optional, and can be activated or de-activated in the programming software (American Hearing Research Foundation, 2015). *Digital aids* convert sound waves into numerical codes (i.e., binary code) before amplifying them. The coding allows the audiologist to program the aid to accommodate a variety of types, degrees, and configurations of hearing and to help the user hear and understand in a variety of settings (i.e., classrooms, noisy restaurants, etc.). Digital aids also have the ability to focus on sounds coming from a specific direction (NIDCD, 2015).

Hearing aid fittings

Children who are prescribed hearing aids visit an audiologist who works with the child's parents or guardians to select an appropriate hearing aid. The type of insurance coverage for hearing aids, if any, may impact the type of hearing aid they select. The audiologist takes impressions of the child's ears to make custom ear molds for the child's hearing aid. After the hearing aid is selected and ordered, the child returns for a fitting. This requires taking measurements of the child's ear canal volume, programming the hearing aids using manufacturer software, and adjusting the hearing aid to the child's ear canal volume, verifying the amplification to appropriate target values and validation of the fitting through observation,

[32] Personal communication, M. Winter, March 2016.
[33] http://www.dhcs.ca.gov/services/ccs/Pages/qualify.aspx.
[34] Personal communication, M. Winter, March 2016.

questionnaires, assessment of sound detection and speech comprehension. For young children, hearing aid checks and assessments are needed frequently with ear molds being recast three to four times per year). When children are well established with a stable hearing and amplification, they are likely to need checks and assessments about twice annually, and adolescents are likely to need annual checks.

Table 3. Description of Categories of Hearing Aids

Type of Aid	Description		$ Range*
BTE: Behind-the-ear	Hard plastic cases that fit behind the ear and connect by tubing to a plastic customized ear mold that fits into the outer ear. Least expensive, easiest to adjust, less feedback, fewest problems with wax or infections. Suitable for mild-to-profound hearing loss. *BTE are considered the most appropriate hearing aid for young children since they accommodate the widest range of loss, and, since as the child grows, ear molds can be replaced frequently without having to re-case an in-the-ear instrument.*		$1,580–$2,769
RIC/RITE: Receiver in canal/Receiver-in-the ear	Similar in appearance to BTE, but the speaker is placed inside the canal via thin wires instead of acoustic tubes. Suitable for mild to severe loss. Controls are easy to manipulate. Wax and moisture build up may occur, and users may feel "plugged" while wearing. May be appropriate for children since ear molds can be recast as the child grows.		$1,694–$2,993
ITE: In-the-ear	The aid, contained in a custom shell, fits in outer ear bowl and part of the ear canal. They are suitable for mild-to-severe hearing loss. Low-profile hearing aids are described as half-shell shapes that fit in the lower half of the outer ear and are large enough to accommodate volume wheels and program push buttons. Requires dexterity to adjust and remove; not recommended for young children who would require new custom shells to assure proper fit as they grow.		$1,600–$2,757
ITC/CIC: In-the-canal/ Completely-in-canal	Fits entirely inside the canal. The least visible aids are completely-in-the-canal (CIC). These are very small and can be hard for some people to adjust and remove. Both can be used for mild-to-moderately severe hearing loss and are generally not recommended for young children or people with severe-to-profound hearing loss due to limited power and volume and because the smallest aids can be a choking hazard for infants and toddlers.		$1,695–$2,958
BCHA: Bone conduction hearing aid	Vibratory transducer is attached to a removable headband and presses through the scalp against the skull bone to transmit vibrations (sound waves) via bone to the inner ear. *Ideal candidates are children with aural atresia (structural deficits to middle ear), absent external ears, chronic middle ear drainage, or unilateral profound sensorineural hearing loss where conventional hearing aids are contraindicated and who are too young for surgical application of bone conduction implants.*		$4,000

Sources: California Health Benefits Review Program, 2016. Photos from American Speech-Language-Hearing Association. Descriptions from the American Hearing Research Foundation, NIDCD, and personal communication with M. Winter.
Note: Extended Wear Hearing Aids are another newer option for adults. They are placed nonsurgically in the ear canal by an audiologist and worn continuously for several months until replaced with a new aid.
* Estimated range in costs obtained from AARP Hearing Aid Styles: Pros and Cons (Gandel, 2014), and personal communication with M. Winter, April 5, 2016 (for BCHA estimate).

Social Determinants of Health[35] and Disparities[36] in Hearing Loss

Per statute, CHBRP includes discussion of disparities under the broader umbrella of social determinants of health (SDoH). SDoH include factors outside of the traditional medical care system that influence health status and health outcomes. CHBRP considers the full range of SDoH and related disparities (e.g., income, education, and social construct around age, race/ethnicity, gender, and gender identity/sexual orientation) that are relevant to this bill and where evidence is available. In the case of AB 1601, evidence shows that disparities exist in prevalence of pediatric hearing loss by gender and race/ethnicity in addition to disparities in the prevalence of obtaining screening for hearing loss by geographic location and educational attainment. No data were found regarding the utilization of hearing aids in the pediatric population by race/ethnicity or gender.

Disparities in Pediatric Hearing Loss

CHBRP reviewed several sources to identify potential disparities in the prevalence of pediatric hearing loss. The 2005–2006 National Health and Nutrition Examination Survey (NHANES) used interviews and performed audiometric evaluations on children aged 12 to 19 years to determine level of hearing loss (moderate to profound) in the pediatric cohort. The National Health Interview Survey (NHIS) included a nationally representative cohort of children aged 3 to 17 years to estimate the prevalence of moderate-to-profound hearing loss. The NHIS data presented here are aggregated between 1991 and 2008 (Boyle et al., 2011). The 2010 Metropolitan Atlanta Developmental Disabilities Surveillance Program (MADDSP) monitored only children aged 8 years using administrative data from multiple education and health records and reported on those with moderate-to-profound hearing loss (Van Naarden Braun et al., 2015).

Gender

Most studies found that pediatric hearing loss is more prevalent among males than females (Mehra et al,, 2009). For example, a study using NHIS data found that the prevalence of self-reported moderate-to-profound pediatric hearing loss in males was 0.42% compared with 0.35% in females (Boyle et al., 2011). A study using MADDSP data on 8-year-olds in the Atlanta region reported a mean hearing loss prevalence rate of 1.5% for males compared with 1.2% for females between 1991 and 2010. And Shargorodsky et al. (using NHANES data) reported that among 12- to 19-year-olds, hearing loss among

[35] CHBRP defines social determinants of health as conditions in which people are born, grow, live, work, learn, and age. These social determinants of health (economic factors, social factors, education, physical environment) are shaped by the distribution of money, power, and resources and impacted by policy (adapted from CDC, 2014; Healthy People 2020 [ODPHP, 2015). See SDoH white paper for further information. Available at: http://www.chbrp.org/analysis_methodology/docs/Incorporating%20Relevant%20Social%20%20Determinants%20of%20Health%20in%20CHBRP%20Analyses%20Final%2003252016.pdf.
[36] Several competing definitions of "health disparities" exist. CHBRP relies on the following definition: "Health disparities are potentially avoidable differences in health (or health risks that policy can influence) between groups of people who are more or less advantaged socially; these differences systematically place socially disadvantaged groups" at risk for worse health outcomes (Braveman, 2006).

males was 21.8% compared to females at 17.1%. The NHANES study included those with a slight hearing loss (16 dB or greater) rather than moderate or greater loss, and focused on older children who would have higher rates of acquired loss; thus, the discrepancy between studies.

Income

Boyle et al. (2011) found that a higher proportion of children who were poor and who were covered by public insurance suffered from hearing loss, but that the differences were not statistically significant. For instance, the prevalence of moderate-to-profound hearing loss in children living below 200% FPL[37] was 0.47% compared with 0.32% for those at or above 200% FPL. Additionally, hard of hearing children with private insurance had the lowest prevalence rate of hearing loss (0.34%), followed by those who were uninsured (0.44%). Those who had Medicaid/Children's Health Insurance Program (CHIP) insurance had the highest rate of hearing loss (0.77%) (Boyle et al., 2011). These findings are from the National Health Interview Survey using parent reports of their child's moderate-to-profound hearing loss. While there is no explanation of why rates may be higher in poor children, the same pattern was found in the distribution of ADHD (attention-deficit/hyperactivity disorder), learning disabilities, intellectual disabilities, seizures, and other developmental delays included in the study.

Race/ethnicity

CHBRP found ambiguous evidence about racial/ethnic disparities in the prevalence of pediatric hearing loss. Two studies reported that prevalence rates of moderate-to-profound hearing loss was lowest among Hispanics (Boyle et al., 2011; Shargorodsky et al., 2010). One study showed non-Hispanic whites with a higher prevalence of pediatric hearing loss than non-Hispanic blacks (0.44% and 0.35%, respectively) (Boyle et al., 2011), whereas two other studies found no significant difference between the two groups (Shargorodsky et al., 2010; Van Naarden Braun et al., 2015).

Disparities in Obtaining Medical Services for Hearing Loss

CHBRP considers both disparities in health conditions, such as hearing loss, as well as disparities in obtaining medical services to treat identified health conditions. In this case, those with hearing loss would need to be screened and diagnosed in order to receive a hearing aid. Thus, CHBRP conducted a literature review to examine the extent to which there are disparities in receipt of hearing screenings or receipt of hearing aids. CHBRP found limited evidence regarding the types of barriers facing families in obtaining screening for hearing loss followed by the management of hearing loss and acquisition of hearing aids for children in need. Bush et al. (2014) found that there are regional socioeconomic and educational disparities in the timely diagnosis of congenital hearing loss in rural children and concluded that there may be a number of rural socioeconomic variables contributing to noncompliance with treatment and diagnostic factors, including limited availability of infant diagnostic audiological services, longer average commute times to seek health care services (1 to 3 hours), lack of public transit, and geographic isolation. In a systematic review conducted by Ravi et al. (2016), 25 of 53 studies reported disparities in education and lack of adequate knowledge as a leading contributor of familial non-compliance and loss to follow-up for hearing loss management. To date, there have been no studies conducted that review and evaluate disparities in obtaining hearing aids. However, it stands to reason that disparities in obtaining screening for hearing loss would transfer to disparities in obtaining hearing aids. Although it is important to note that coverage of hearing aids through the Medi-Cal program in

[37] FPL = Federal Poverty Level.

California may reduce disparities by eliminating financial barriers for low-income children, Medi-Cal coverage would not address other barriers such as lack of education or geographic location listed above.

MEDICAL EFFECTIVENESS

Because CHBRP completed a literature review in 2016 for a very similar bill, AB 2004 (Bloom) Hearing Aids: Minors, CHBRP did not compete a new literature review in 2017 for AB 1601. CHBRP assumed that the literature in this field is unlikely to have changed significantly in the past year. Outcomes addressed in 2016's AB 2004 literature review include:

- Speech Outcomes;
- Language Development;
- Nonverbal Outcomes;
- Personal/Social Development Outcomes;
- Effectiveness of Using a Hearing Aid With Cochlear Implant Summary; and
- Effectiveness of Using a Wearable BCHA.

In this section, CHBRP presents a summary of the 2016 literature review results. For the full Medical Effectiveness section and literature review results, please see the AB 2004 CHBRP report (CHBRP Completed Analyses).

Interventions to treat hearing loss in children involve fitting children with hearing aids, and providing educational interventions for children and their caregivers. Hearing aids help children with hearing loss by amplifying sounds. In the United States, the federal Individuals with Disabilities Education Act (IDEA) requires local school districts to provide educational interventions to children with hearing loss. These interventions include training in the use of hearing aids and auditory, speech, and language development. Families of children with hearing loss are often given counseling and training in stimulation of speech and communication.

Interventions may also include sign language training. Most intervention programs for hearing loss among young children provide a combination of home- and school-based services (Carney and Moeller, 1998).

Research Approach and Methods

CHBRP's medical effectiveness review for AB 1601 builds upon the review conducted by CHBRP for AB 368 (2007) and includes studies published from 2006 to 2016. The search was limited to studies of children with hearing loss because AB 1601 would require health plans to cover hearings aids for children only and because characteristics of hearing loss in children and adults differ (CHBRP, 2007). The CHBRP medical effectiveness review for AB 1601 focuses on traditional air conduction hearing aids because they are the type of hearing aids most frequently used by children with hearing loss (Gabbard and Schryer, 2003; Palmer and Ortmann, 2005).[38] AB 1601 may also apply to bone conduction hearing aids and vibrotactile aids, wearable devices that are used by persons who are not helped by air conduction hearing aids.[39] The review does not assess the effects of surgically implanted bone-

[38] In the 2016 literature review, CHBRP searched for more current data on the types of hearing aids used by children but did not identify any more recent studies.
[39] Gabbard and Schryer (2003), Gatehouse (2002), and Palmer and Ortmann (2005) provide further information about bone conduction hearing aids, bone-anchored hearing aids, and cochlear implants.

conduction hearing aids (BCHAs) or cochlear implants because AB 1601 only addresses wearable devices designed for the ear. Surgically implanted BCHAs and cochlear implants combine a surgical implant with an external microphone and sound processor. A more thorough description of the methods used to conduct the medical effectiveness review and the process used to grade the evidence for each outcome measure may be found in Appendix B of the AB 2004 Report (CHBRP Completed Analyses).

Methodological Considerations

It is generally accepted that the use of hearing aids improves the hearing of children with hearing loss. As a result, there have been few recent studies on the impact of hearing aids on hearing in children. As noted, the current review builds upon the review conducted by CHBRP for AB 368 (2007); key findings of studies noted previously are summarized, and more current literature is included where available. The review examines three major categories of recent studies on children with hearing loss: (1) studies of the relationship between age at initial diagnosis and treatment of hearing loss, and children's speech, language, and social development; (2) studies of the effect of wearing a hearing aid in the opposite ear from a cochlear implant, and (3) studies of wearable BCHAs.

The literature review did not discover any randomized controlled trials (RCTs) of children with hearing loss that assess the effects of early diagnosis and treatment of hearing loss, or the effectiveness of using a hearing aid in the opposite ear from a cochlear implant, or wearable BCHA. The barriers to conducting RCTs of hearing loss treatments for children are formidable, resulting in a research base that is not as rigorous and thereby limiting the certainty of conclusions drawn from the literature. All of the studies of the effectiveness of early diagnosis and treatment were observational studies that did not include control groups of children with hearing loss who did not receive hearing aids or other interventions.

Study Findings

CHBRP's review of the literature on the effects of hearing aids on children with hearing loss suggests that early treatment of hearing loss is associated with improvement in language, verbal, nonverbal, and social development outcomes. These findings relate to AB 1601, because if health plans cover hearing aids for children, more children may have access to hearing aids at a younger age.

Findings for Quality of Life in Children

Speech outcomes

The 2007 CHBRP review found a preponderance of evidence suggesting that early diagnosis and treatment of hearing loss decreases the age at which children begin to form syllables and improves the intelligibility of their speech.

CHBRP found no recent studies examining the effect of hearing aids on speech outcomes in children.

The preponderance of evidence from moderate research designs suggests that early treatment of hearing loss by hearing aids is effective in improving speech outcomes in children.

Language development outcomes

The 2007 CHBRP report on hearing aids in children described several studies that assessed the impact of early treatment of hearing loss via hearing aids on language development outcomes. CHBRP found a preponderance of evidence that children treated for hearing loss at a younger age had statistically significant improvement in receptive vocabulary and verbal reasoning compared to children at later stages that did not have statistically significant language development outcomes. The report also cites studies demonstrating that children fitted with hearing aids at younger ages had significantly larger vocabularies, asked a significantly higher proportion of questions in conversation, and spoke significantly more words per minute as measured by one of two instruments.

CHBRP identified two more recent studies (Tomblin et al., 2014, 2015) that found mild-to-severe hearing loss places children at risk for delays in language development, but those risks are moderated by the provision of early and consistent access to well-fit hearing aids that provide optimized audibility.

Overall, the preponderance of evidence suggests that early diagnosis and treatment of hearing loss improves language development.

Nonverbal interaction outcomes

Three studies identified by CHBRP in 2007 demonstrated an association between early diagnosis of hearing loss and treatment and more advanced nonverbal interactions (such as observation, imitation, discrimination among objects, and motor behavior) for children with hearing aids, although two out of three of these studies' observations were not statistically significant.

CHBRP found no recent studies examining the effect of hearing aids on nonverbal interaction in children.

Thus, there is a preponderance of evidence suggests that early diagnosis and treatment are associated with small, nonsignificant gains in nonverbal understanding and interaction.

Personal/social development outcomes

In 2007, CHBRP identified several studies with a lack of significant and consistent findings investigating the effects of age at intervention to treat hearing loss on children's personal and social development.

CHBRP found no recent studies examining the effect of hearing aids on personal and social development in children.

The lack of significant and consistent findings indicates that the evidence of effect of early diagnosis and treatment of hearing loss on personal/social development is conflicting. Please note that the absence of evidence is not "evidence of no effect" — positive or negative impacts could result, but current evidence is insufficient to ascertain outcomes.

Findings for Hearing Aid use with Cochlear Implants and Wearable BCHA

Studies of the effects of using a hearing aid in the opposite ear from a cochlear implant

Cochlear implants are used by children with severe-to-profound hearing loss that have one or more ears in which hearing is too poor to derive benefit from a hearing aid. Whereas a hearing aid amplifies sounds to improve the ear's ability to hear them, a cochlear implant bypasses the damaged portions of the ear and directly stimulates the auditory nerve. Cochlear implants consist of an implanted electrode array that is attached to an external device that amplifies sound, processes speech, stimulates the auditory nerve, and transmits signals to the implanted electrode array. Children who receive cochlear implants must undergo extensive speech therapy because the process of hearing with a cochlear implant differs from normal hearing or using a hearing aid (NIDCD, 2006).

The 2007 CHBRP report found several studies that assessed the impact of using a hearing aid in the opposite ear from a cochlear implant.[40] These studies are pertinent to AB 1601 because having health insurance coverage for hearing aids may increase the likelihood that children with cochlear implants would be fitted with a hearing aid in the opposite ear. Several previous studies found that using a hearing aid with a cochlear implant was associated with a statistically significant improvement in speech recognition (Ching et al., 2001, 2005; Holt et al., 2005). By contrast, one study reported that using a hearing aid with a cochlear implant had no effect on speech recognition, but instead found that bilateral cochlear implants were associated with better speech recognition than were unilateral cochlear implants (Litovsky et al., 2006).

Overall, the preponderance of the evidence suggests that using a hearing aid with a cochlear implant improves speech recognition, but may not be as effective as bilateral cochlear implants for children who are candidates for bilateral cochlear implants. CHBRP found no recent studies examining the effect of using a hearing aid in the opposite ear from a cochlear implant on speech recognition.

Studies of the effects of using wearable BCHA

The wearable bone conduction hearing aid (BCHA) is an alternative to the surgically implanted bone BCHA for children that are too young for an implant because the thickness of the temporal bone is too small and because of problems with osseo-integration of the titanium implant in the immature bone (Verhagen et al., 2008). CHBRP interprets AB 1601 to require health plans to cover wearable BCHAs because they are external, wearable devices.

CHBRP found two cohort studies conducted outside of the United States that evaluated the effects of wearable BCHAs for children with bilateral aural atresia (failure of the development of the external auditory canal in both ears, such that it cannot accommodate a standard hearing aid). The studies found that the wearable BCHA is as effective for hearing rehabilitation and auditory development (Fan et al., 2014; Verhagen et al., 2008). One study found the wearable BCHA to be as effective as the conventional bone conductor with a spring clamping steel headband (Verhagen et al., 2008). Neither study assessed adverse effects associated with use of the wearable BCHA. Further limitations of these studies include

[40] The 2007 report for AB 368 also summarizes studies related to the effect of using a hearing aid in conjunction with a cochlear implant on the localization of sound, and impact of using a hearing aid in conjunction with a cochlear implant on children's functional performance during activities of daily living. Though evidence for improvement in localization was ambiguous, CHBRP found that use of a hearing aid in conjunction with a cochlear implant is effective at improving functional performance during activities of daily living.

low statistical power due to small sample sizes, and limited data assessing language development outcomes (Verhagen et al., 2008).

Summary of Findings

The charts in this section summarize CHBRP's findings regarding the strength of the evidence for the effects of specific tests, treatments, and services addressed by AB 1601. Separate charts are presented for each test, treatment, or service for which the bill would mandate coverage and for each outcome for which evidence of the effectiveness of a treatment is available. The title of the chart indicates the test, treatment or service for which evidence is summarized. The statement under the heading "Conclusion" presents CHBRP's conclusion regarding the strength of evidence about the effect of a particular test, treatment, or service on a specific relevant outcome and the number of studies on which CHBRP's conclusion is based. For test, treatments, and services for which CHBRP concludes that there is clear and convincing, preponderance, limited, or conflicting evidence, the placement of the vertical bar indicates the strength of the evidence. If CHBRP concludes that evidence is insufficient, a graph that states "Insufficient Evidence" will be presented.

Figure 3. Speech Outcomes Summary

Conclusion

CHBRP concludes that there is a preponderance of evidence from studies with moderately strong research designs that suggests that earlier age of fitting with hearing aid is associated with greater gains in speech outcomes. The reason for a rating of moderate is due to a lack of studies with strong research designs (e.g., RCTs).

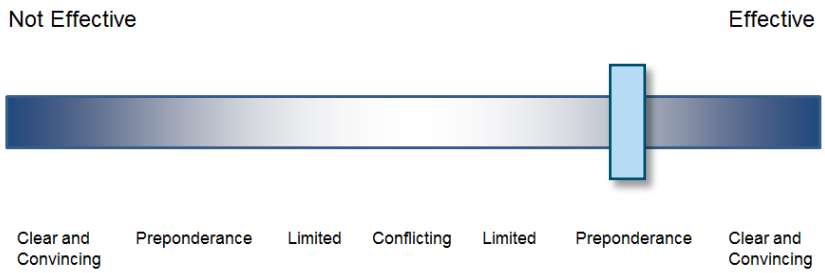


Figure 4. Language Development Outcomes Summary

Conclusion

CHBRP concludes that there is a preponderance of evidence from studies with moderately strong research designs that hearing aids is are effective in improving language development outcomes in children. In particular, risk for language delays in children with hearing loss may be mitigated from early age of fitting and consistent use of hearing aids. The reason for a rating of moderate is due to a lack of studies with strong research designs (e.g., RCTs).

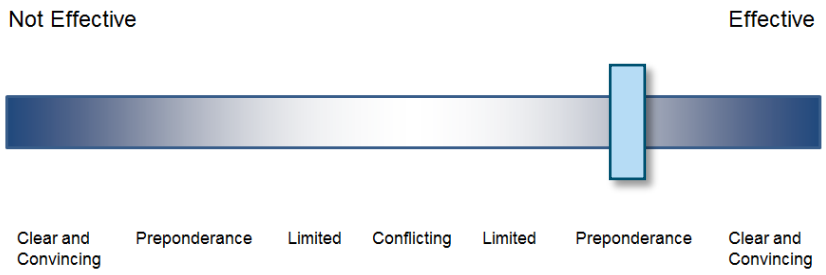


Figure 5. Nonverbal Outcomes Summary

Conclusion

CHBRP concludes that there is a preponderance of evidence that suggest hearing aids are effective in improving nonverbal outcomes in children.

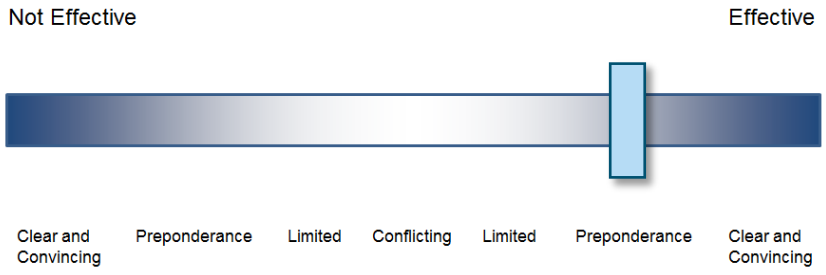


Figure 6. Personal/Social Development Outcomes Summary

Conclusion

CHBRP concludes that there is conflicting evidence that hearing aids are effective in improving personal and social development outcomes in children. CHBRP notes that the absence of conclusive evidence does not mean there is no effect; it means the effect is unknown.

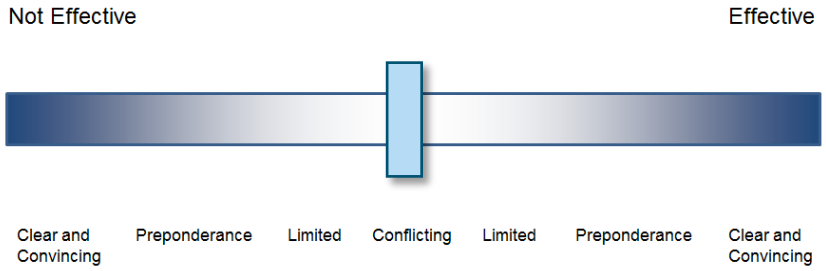


Figure 7. Effectiveness of Using a Hearing Aid With Cochlear Implant Summary

Conclusion

CHBRP concludes that there is a preponderance of evidence that hearing aid use with a cochlear implant improves outcomes for children but may not be as effective as bilateral cochlear implants for children who are candidates for bilateral cochlear implants.

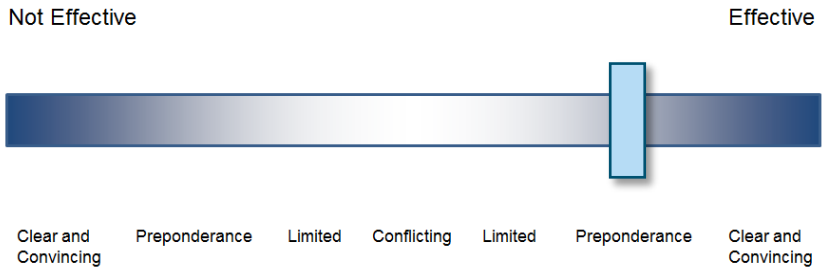
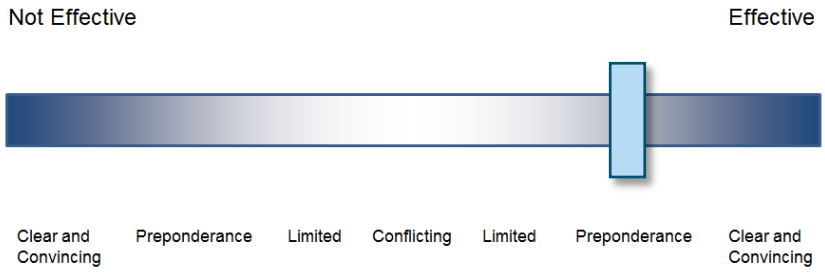


Figure 8. Effectiveness of Using a Wearable BCHA

Conclusion

CHBRP concludes that there is a preponderance of evidence from studies with moderate designs that suggest the wearable BCHA is effective for hearing rehabilitation and auditory development.



BENEFIT COVERAGE, UTILIZATION, AND COST IMPACTS

CHBRP estimates AB 1601's impact on hearing aid coverage, utilization, and cost for enrollees aged 0 to 17 years in both the DMHC- and CDI-regulated markets, as well as publicly funded plans (including CalPERS and Medi-Cal Managed Care Plans that are subject to the Knox-Keene Health Care Service Plan Act). CHBRP determined current coverage of hearing aids for children aged 0 to 17 by surveying the seven largest providers of health insurance in California.

All hearing aid service product codes were identified with the assistance of a content expert. The following were excluded as they identify services not covered by AB 1601: implants (including cochlear), battery and cord replacements, and hearing screening. Hearing aid product codes (HCPCs) were used to extract data from Truven's MarketScan® Commercial Claims and Encounters Database. For this analysis, CHBRP includes the following types of hearing aids:

- Behind-the-ear (BTE);
- Receiver in canal/receiver-in-the ear (RIC/RITE);
- In-the-ear (ITE);
- In-the-canal/completely-in-canal (ITC/CIC); and
- Wearable (non-surgically implanted) bone conduction hearing aid (BCHA).

Because all children already qualify for initial assessment hearing screening under the California Newborn Screening Hearing Program and school-age screening, costs associated with screening were excluded from the bill analysis (ASHA, 2016b). The 2014 and 2015 MarketScan® data were used to develop baseline cost and utilization information for hearing aids for 0- to 17-year-olds. CHBRP identified four categories of hearing aid services within the claims data:

- Hearing aids;
- Maintenance and repairs (excludes ear molds);
- Replacements;
- Diagnostic tests, hearing aid checks, fittings and adjustments (excludes screening as part initial assessment, covered under EHB); and
- Ear molds.

From this claims database, utilization and unit cost information were identified for each service category. Where coverage is not offered by the health plan, the enrollee is responsible for the cost of hearing aids, which is a likely barrier to utilization. This removal of financial responsibility for the full cost of hearing aids when pediatric hearing aids coverage is introduced might thus result in utilization uptake. There are, however, no data sources that show by how much hearing aid utilization increases when coverage for hearing aids is mandated; in other words, there have not been longitudinal studies examining changes in utilization before and after legislation has been implemented in other states. CHBRP thus used content expert input and information in the peer-reviewed literature to estimate likely utilization change that the demand for hearing aids among children is largely price inelastic (see Postmandate Utilization below and Appendix B for more detail), which means families are not likely to forgo obtaining hearing aids for their children due to cost and there are programs, such as CCS and charities, available to families meeting financial requirements. With the body of evidence available, CHBRP estimates that the removal of a cost

barrier when coverage is introduced for hearing aids would thus result in a modest increase in utilization of 2.4% among enrollees who do not have coverage for hearing aids and related services premandate. Separate from utilization change due to cost, and not to be overlooked, is that cost of hearing aids and services has been shown to pose a financial burden to families obtaining hearing aids (Limb et al., 2010; Muñoz et al., 2013). The financial load that is lifted off of families when coverage for hearing aids is offered by carriers is seen in the estimates of out-of-pocket expenditures for hearing aids and services presented in this section and discussed in greater detail in the *Public Health Impacts* section. Enrollees, including those eligible for CCS, may shift to more costly hearing aids in the absence of financial burden. However, existing insurer practices such as coverage caps and cost-sharing levels are likely to prevent a higher level of utilization of more costly units postmandate.

This section reports the potential incremental impact of AB 1601 on estimated baseline benefit coverage, utilization, and overall cost. For further details on the underlying data sources and methods, please see Appendix B .

Benefit Coverage

Premandate (Baseline) Benefit Coverage

In 2017, CHBRP estimates there will be 24,048,000 total enrollees with health insurance subject to AB 1601; of these, 6,668,000 are enrollees aged 0 to 17 years old.

Current law does not require coverage for hearing aids as part of a basic contract or offered as an optional benefit to groups or individuals. Current coverage of hearing aids for children aged 0 to 17 was determined by a survey of the seven largest providers of health insurance in California. Responses to this survey represent 85% of enrollees in the privately funded market subject to state mandates. This survey was conducted in 2016 for AB 2004, which had the same provisions as AB 1601. CHBRP considered these data to remain applicable to all plans in California in 2017 because there were no notable changes in market structure, plan availability, or health benefits from 2016.

Based on the responses, approximately 52.9% of enrollees aged 0 to 17 years in California with health insurance have coverage that is compliant with AB 1601. This estimate includes children in both privately funded and publicly funded (e.g., CalPERS HMO, Medi-Cal Managed care) health insurance products regulated by DMHC or CDI. Coverage of hearing aids for privately funded and publicly funded health insurance products varies widely:

- Per CHBRP's carrier survey, approximately 10% of enrollees aged 0 to 17 in privately funded products have coverage for hearing aids and services.
- 100% of CalPERS enrollees and Medi-Cal beneficiaries aged 0 to 17 have hearing aids coverage for hearing aids and services.

Although children covered by Medi-Cal are included in the mandate, these enrollees currently receive coverage for hearing aids through the California Children's Services (CCS) program.[41] An unknown number of enrollees who are privately insured, but who meet certain financial qualifications, can also

[41] Necessary hearing services provided through California Children's Services to child enrollees in Medi-Cal are billed to Medi-Cal, based on personal communication with M. Winter, March 30, 2017.

receive coverage for hearing aids through CCS or charitable organizations (see the *Policy Context* section for more information).

Postmandate Benefit Coverage

Postmandate, 100% of enrollees aged 0 to 17 with health insurance would have mandate-compliant coverage of hearing aids and services; premandate this figure was 52.9%, reflecting an 89.1% change postmandate (see Table 1).

Utilization

Premandate (Baseline) Utilization

Using 2014 MarketScan® Commercial Claims and Encounters Database, CHBRP estimated premandate utilization. CHBRP applied the utilization rates estimated from MarketScan® data to all enrollees that currently have coverage and thus assumed enrollees in public and private insurance have the same utilization rates.

There are 17,839 users aged 0 to 17 of hearing aids and/or services currently, including about 9,544 who have coverage for these services and 8,295 who do not have coverage. Given that some use more than one type of service, there are approximately 9,213 enrollees using hearing aids and/or services, 1,455 enrollees using hearing aid maintenance and repair, 5,130 enrollees who receive follow-up ear molds, 9,392 enrollees using diagnostic tests, hearing aid checks, fittings and adjustments (screening that is not initial assessment), and approximately 102 enrollees who replace hearing aids during this 1-year period.

Postmandate Utilization

CHBRP found enrollees aged 0 to 17 years outside of Medi-Cal and CalPERS largely currently lack coverage for hearing aids (approximately 10% of enrollees in privately funded insurance, per CHBRP's carrier survey, have coverage premandate versus 100% for Medi-Cal and CalPERS). Where coverage is not offered by the health plan (either as part of a basic plan or as an optional rider), the enrollee is responsible for the cost of hearing aids and thus pays for the hearing aid devices and related services out-of-pocket. Studies suggest hearing aids are largely price inelastic (Amlani, 2010; Amlani and De Silva, 2005), and the use of pediatric services are largely unaffected by price. Goldman and Grossman (1978) find the price elasticity of demand for pediatric visits is between −0.03 and −0.06 (i.e., inelastic). Similarly, Wolfson et al. (1982) found no relationship between user fees/cost sharing and the use of services for disabled children, suggesting the presence of a disability makes it less likely to reduce the use of medical services, and parents are likely less inclined to risk their child's health by foregoing medical services. Yet, it is still quite possible that the introduction of coverage for a previously uncovered service would result in an increase in demand (Eichner, 1998). The removal of cost as a barrier when coverage is introduced for hearing aids would thus result in utilization uptake. Applying a price elasticity of −0.03 to an assumed 80% reduction in cost to the enrollee when coverage is offered to those who did not have coverage before, CHBRP estimates an increase in utilization of 2.4% (–0.03 × 80%) among enrollees who did not have coverage for hearing aids and services premandate and have coverage postmandate (see Appendix B for more detail).

Translated into utilization change in the first 12 months of enactment of the mandate for all enrollees aged 0 to 17 subject to AB 1601 using hearing aids, CHBRP estimates that postmandate, there would be an increase of 1.1% in utilization overall. This reflects the utilization increase that occurs for enrollees who

were not covered premandate and would have coverage postmandate. Noncovered enrollees premandate shift into covered enrollees postmandate (see Table 1). Postmandate, it is estimated that this shift would result in increases of 195 newly covered enrollees that will receive a hearing aid or a service due to the mandate. Some of these enrollees will receive more than one type of service. Postmandate, CHBRP estimates 101 newly covered enrollees will use hearing aid and/or services, 16 newly covered enrollees will use hearing aid maintenance and repair, 56 newly covered enrollees will receive ear molds, 103 newly covered enrollees will use diagnostic tests, hearing aid checks, fittings, and adjustments (screening that is not initial assessment), and 1 newly covered enrollees will replace hearing aids over a 1-year period (for further detail, please see Appendix B).

Impact on access and health treatment/service availability

AB 1601 would increase coverage for hearing aids to those who currently do not have coverage for hearing aids and services, but estimates that utilization would increase only moderately. Per CHBRP's content expert and the literature, it appears families generally will acquire hearing aids for their children despite the costs, per the price elasticity of demand studies on hearing aids and services for children, even if there exists a financial burden on them (Amlani, 2010; Amlani and De Silva, 2005; Eichner, 1998; Goldman and Grossman, 1978; Wolfson et al., 1982). CHBRP estimates the current supply of hearing aids would be able to meet the demand. CHBRP estimates there would be no change postmandate in the service availability of obtaining hearing aids and thus there would be no shortage of these products caused by AB 1601.

Per-Unit Cost

Premandate (Baseline) and Postmandate Per-Unit Cost

Based on MarketScan® Commercial Claims and Encounters Database, CHBRP estimates hearing aids and/or services cost on average $2,178 per enrollee. Because this cost is the average per user, where children might use two hearing aids, the average cost per enrollee reflects the cost of both units. Also, this average cost per user of hearing aids and/or services includes all types of users, including those who receive hearing aids and those may only receive hearing services (e.g., diagnostic tests), but do not receive hearing aids, in the 2014 and 2015 MarketScan® Commercial Claims and Encounters Database. Postmandate, CHBRP estimates there would be no change in the average per enrollee cost of hearing aids and services.

Premiums and Expenditures

Premandate (Baseline) Premiums and Expenditures

Table 4 presents per member per month (PMPM) premandate estimates for premiums and expenditures by market segment for DMHC-regulated plans and CDI-regulated policies.

PMPM by market segment is as follows for DMHC-regulated plans and CDI-regulated policies, respectively:

- Large group: $616.22 and $808.88;
- Small group: $577.61 and $757.64; and

- Individual market: $595.70 and $498.91.

Total current annual expenditures for all DMHC-regulated plans and CDI-regulated policies is $146,267,740,000.

Postmandate Expenditures

Changes in total expenditures

AB 1601 would increase total net annual expenditures from $146,267,741,000 to $146,270,980,000, or a $3,239,000 increase. This is due to a modest increase in expected utilization of 2.4% for those obtaining insurance coverage for hearing aids and services, and from costs that would shift from out-of-pocket expenditures to premiums postmandate. Prior to the mandate, enrollees without coverage for hearing aids incurred an estimated $18,081,000 in out-of-pocket expenses for hearing aids and services. Postmandate, these costs plus additional administrative costs associated with providing coverage by health plans will be shifted to premiums. Post mandate out-of-pocket expenditures are estimated to increase by $2,534,000 in copayments for the newly covered benefits, resulting in $15,547,000 net reduction in enrollee out-of-pocket costs.

Postmandate premium expenditures and PMPM amounts per category of payer

Increases in insurance premiums as a result of AB 1601 would vary by market segment. Note that the total population in Table 5 reflects all the enrollees in health plans subject to AB 1601.

Overall, across plan types, CHBRP estimates a 0.0142% increase in premium expenditures, which translates into an increase of 0.0022% in total expenditures. For commercial plans regulated by DMHC, large-group premiums are estimated to increase by 0.0187%, for small group by 0.0247%, and for individual by 0.0127%. Expenditures for large group increase by 0.0025%, for small group by 0.0044%, and for individual by 0.0023%. Among publicly funded DMHC-regulated health plans, total expenditures for CalPERS HMOs, Medi-Cal Managed Care (under 65 years), and Medi-Cal Managed Care (over 65 years) does not change postmandate. For commercial plans regulated by CDI, large-group premiums are estimated to increase by 0.0169%, for small group by 0.0185%, and for individual by 0.0283%. Expenditures for large group increase by 0.0025%, for small group by 0.0032%, and for individual by 0.0053%.

Potential cost offsets or savings in the first 12 months after enactment

CHBRP estimates there would be no cost offsets or savings in the first 12 months after enactment.

Postmandate administrative expenses and other expenses

CHBRP estimates that the increase in administrative costs of DMHC-regulated plans and/or CDI-regulated policies would remain proportional to the increase in premiums. CHBRP assumes that if health care costs increase as a result of increased utilization or changes in unit costs, there is a corresponding proportional increase in administrative costs. CHBRP assumes that the administrative cost portion of premiums would be unchanged. All health plans and insurers include a component for administration and profit in their premiums.

Related Considerations for Policymakers

Cost of Exceeding Essential Health Benefits

As explained in the *Policy Context* section, hearing aids are not included in California's EHB package. As also explained in the *Policy Context* section, a state enacting a benefit mandate that exceeds essential health benefits (EHBs) would be required to defray the cost incurred by enrollees in qualified health plans (QHPs). Coverage for hearing aids, as would be required if AB 1601 were to become law, would appear to exceed EHBs and so the state may be required to defray associated costs.

Final rules released by the U.S. Department of Health and Human Services (HHS) clarify that QHP issuers are responsible for calculating the cost that must be defrayed but left state flexibility in terms of the calculation; it could be based on "either a statewide average or each issuer's actual cost."[42] CHBRP is unaware whether California has yet identified which option it will use. However, CHBRP is able to estimate, the same way it estimates the mandate's marginal cost, the PMPM premium associated with a mandate exceeding EHBs. Should the value of exceeding EHBs be calculated in this way, CHBRP estimates that the state would be required to defray the following amounts due to AB 1601:

- $0.12 PMPM for each QHP enrollee in a small-group DMHC-regulated plan;
- $0.06 PMPM for each QHP enrollee in an individual market DMHC-regulated plan;
- $0.11 PMPM for each QHP enrollee in a small-group CDI-regulated policy; and
- $0.09 PMPM for each QHP enrollee in an individual market CDI-regulated policy.

In Table 6, CHBRP estimates that these payments will amount to a state- responsibility of $5,593,000 in total payments to the insurers that issue following plans and policies:

- $3,840,000 in payments to DMHC-regulated small group plans;
- $1,508,000 in payments to DMHC-regulated individual plans;
- $190,000 in payments to CDI-regulated small group policies; and
- $55,000 in payments to CDI-regulated individual policies.

[42] Essential Health Benefits. Final Rule. 12843.

Postmandate Changes in Uninsured and Public Program Enrollment

Changes in the number of uninsured persons[43]

CHBRP estimates premium increases of less than 0.03% for each market segment; this premium increase would not have a measurable impact on the number of persons who are uninsured. CHBRP does not anticipate loss of health insurance, changes in availability of the benefit beyond those subject to the mandate, changes in offer rates of health insurance, changes in employer contribution rates, changes in take-up of health insurance by employees, or purchase of individual market policies, due to the small size of the increase in premiums after the mandate.

Changes in public program enrollment

Due to the lack of available data on enrollment in CCS, CHBRP is unable to estimate the impact that the mandate would have on enrollment and utilization of covered benefits in the publicly funded insurance market. As described earlier in this report, CCS covers hearing aids and services for children who meet certain age, residence, medical, and financial requirements, whether he or she has public or private insurance as long as other qualifications are met. Thus, there is likely a group of privately insured enrollees who qualify and use CCS for hearing aids who would no longer use CCS postmandate.

How Lack of Benefit Coverage Results in Cost Shifts to Other Payers

Because enrollees in public programs already have hearing aid coverage, there is no expected cost shifting to occur from the public programs into the privately insured market nor would these public programs incur a cost as a result of the mandated offering. However, there may be cost shifting from the public programs to the private insurers where privately insured enrollees who qualify and use CCS for hearing aids who would no longer use CCS postmandate and thus reduce CCS expenditures. Due to the lack of data on the group of privately insured children who use CCS, CHBRP is unable to assess this quantitatively.

[43] See also CHBRP's *Criteria and Methods for Estimating the Impact of Mandates on the Number of Uninsured*, available at http://www.chbrp.org/analysis_methodology/cost_impact_analysis.php.

Table 4. Baseline (Premandate) Per Member Per Month Premiums and Total Expenditures by Market Segment, California, 2018

	DMHC-Regulated						CDI-Regulated			
	Privately Funded Plans (by Market) (a)			Publicly Funded Plans			Privately Funded Plans (by Market) (a)			
	Large Group	*Small Group*	*Individual*	*CalPERS HMOs (b)*	*MCMC (Under 65) (c)*	*MCMC (65+) (c)*	*Large Group*	*Small Group*	*Individual*	**Total**
Enrollee counts										
Total enrollees in plans/policies subject to state mandates (d)	9,128,000	3,163,000	2,379,000	884,000	7,192,000	644,000	276,000	145,000	237,000	24,048,000
Total enrollees aged 0–17 with health insurance subject to AB 1601	2,242,000	776,000	317,000	217,000	2,978,000	0	68,000	35,000	55,000	6,688,000
Premium costs										
Average portion of premium paid by employer	$456.42	$324.76	$0.00	$460.43	$257.00	$751.00	$527.06	$433.40	$0.00	$97,688,732,000
Average portion of premium paid by employee	$115.59	$149.62	$469.56	$115.11	$0.00	$0.00	$166.32	$157.88	$423.05	$34,995,304,000
Total premium	**$572.01**	**$474.38**	**$469.56**	**$575.54**	**$257.00**	**$751.00**	**$693.38**	**$591.28**	**$423.05**	**$132,684,037,000**
Enrollee expenses										
Enrollee expenses for covered benefits (deductibles, copays, etc.)	$44.11	$103.11	$126.07	$31.49	$0.00	$0.00	$115.39	$166.25	$75.74	$13,565,623,000
Enrollee expenses for benefits not covered (e)	$0.10	$0.12	$0.06	$0.00	$0.00	$0.00	$0.12	$0.12	$0.11	$18,081,000
Total expenditures	**$616.22**	**$577.61**	**$595.70**	**$607.03**	**$257.00**	**$751.00**	**$808.88**	**$757.64**	**$498.91**	**$146,267,740,000**

Source: California Health Benefits Review Program, 2017.

Notes: (a) Includes enrollees with grandfathered and nongrandfathered health insurance, both on Covered California and outside the health insurance marketplace.

(b) As of June 1, 2016, 58.82% of CalPERS members were state retirees, state employees, or their dependents. CHBRP assumes the same ratio for 2018.

(c) Medi-Cal Managed Care Plan expenditures for members over 65 include those who are also Medicare beneficiaries. This population does not include enrollees in COHS..

(d) This population includes both persons who obtain health insurance using private funds (group and individual) and through public funds (e.g., CalPERS HMOs, Medi-Cal Managed Care Plans). Only those enrolled in health plans or policies regulated by the DMHC or CDI are included. Population includes all enrollees in state-regulated plans or policies aged 0 to 64 years, and enrollees 65 years or older covered by employer-sponsored health insurance.

(e) Includes only those expenses that are paid directly by enrollees or other sources to providers for services related to the mandated benefit that are not currently covered by insurance. This only includes those expenses that would be newly covered, postmandate. Other components of expenditures in this table include all health care services covered by insurance.

Key: CalPERS HMOs = California Public Employees' Retirement System Health Maintenance Organizations; CDI = California Department of Insurance; COHS = County Organized Health Systems; DMHC = Department of Managed Health Care; MCMC = Medi-Cal Managed Care.

Table 5. Impacts of the Mandate on Per Member Per Month Premiums and Total Expenditures by Market Segment, California, 2018

	DMHC-Regulated						CDI-Regulated			
	Privately Funded Plans (by Market) (a)			Publicly Funded Plans			Privately Funded Plans (by Market) (a)			
	Large Group	*Small Group*	*Individual*	*CalPERS HMOs (b)*	*MCMC (Under 65) (c)*	*MCMC (65+) (c)*	*Large Group*	*Small Group*	*Individual*	**Total**
Enrollee counts										
Total enrollees in plans/policies subject to state mandates (d)	9,128,000	3,163,000	2,379,000	884,000	7,192,000	644,000	276,000	145,000	237,000	24,048,000
Total enrollees in plans/policies subject to AB 1601	2,242,000	776,000	317,000	217,000	2,978,000	0	68,000	35,000	55,000	6,688,000
Premiums										
Average portion of premium paid by employer	$0.0853	$0.0803	$0.0000	$0.0000	$0.0000	$0.0000	$0.0893	$0.0800	$0.0000	$12,828,000
Average portion of premium paid by employee	$0.0216	$0.0370	$0.0597	$0.0000	$0.0000	$0.0000	$0.0282	$0.0291	$0.1196	$5,958,000
Total premium	$0.1069	$0.1172	$0.0597	$0.0000	$0.0000	$0.0000	$0.1175	$0.1091	$0.1196	**$18,786,000**
Enrollee expenses										
for covered benefits (deductibles, copays, etc.)	$0.0083	$0.0253	$0.0175	$0.0000	$0.0000	$0.0000	$0.0197	$0.0308	$0.0179	$2,534,000
for noncovered benefits (e)	−$0.0996	−$0.1173	-$0.0637	$0.0000	$0.0000	$0.0000	−$0.1168	−$0.1154	−$0.1109	−$18,081,000
Total expenditures	$0.0156	$0.0252	$0.0134	$0.0000	$0.0000	$0.0000	$0.0204	$0.0245	$0.0265	**$3,239,000**
Percent change										
Premiums	0.0187%	0.0247%	0.0127%	0.0000%	0.0000%	0.0000%	0.0169%	0.0185%	0.0283%	0.0142%
Total expenditures	0.0025%	0.0044%	0.0023%	0.0000%	0.0000%	0.0000%	0.0025%	0.0032%	0.0053%	0.0022%

Source: California Health Benefits Review Program, 2017.

Notes: (a) Includes enrollees with grandfathered and nongrandfathered health insurance, inside and outside the exchange.

(b) As of June 1, 2016, 58.82% of CalPERS members were state retirees, state employees, or their dependents. CHBRP assumes the same ratio for 2018.

(c) Medi-Cal Managed Care Plan expenditures for members over 65 include those who are also Medicare beneficiaries. This population does not include enrollees in COHS.

(d) This population includes both persons who obtain health insurance using private funds (group and individual) and through public funds (e.g., CalPERS HMOs, Medi-Cal Managed Care Plans). Only those enrolled in health plans or policies regulated by the DMHC or CDI are included. Population includes all enrollees in state-regulated plans or policies aged 0 to 64 years, and enrollees 65 years or older covered by employer-sponsored health insurance.

(e) Includes only those expenses that are paid directly by enrollees or other sources to providers for services related to the mandated benefit that are not currently covered by insurance. This only includes those expenses that would be newly covered, postmandate. Other components of expenditures in this table include all health care services covered by insurance.

Key: CalPERS HMOs = California Public Employees' Retirement System Health Maintenance Organizations; CDI = California Department of Insurance; COHS = County Organized Health Systems; DMHC = Department of Managed Health Care; MCMC = Medi-Cal Managed Care.

Table 6. Estimated State Responsibility for Portion of Mandate That Is in Excess of EHB, California, 2018

	DMHC-Regulated		CDI-Regulated		
	Small Group	**Individual**	**Small Group**	**Individual**	**TOTAL**
Enrollee counts					
Total enrollees in plans/policies subject to state Mandates	3,163,000	2,379,000	145,000	237,000	5,924,000
Number of Enrollees in QHPs (a)	2,779,000	2,241,000	144,000	51,000	5,215,000
Premium cost of mandated benefit					
Estimated premium cost of mandated benefit (b)	$0.12	$0.06	$0.11	$0.09	$0.09
Estimated annual state responsibility for portion of mandate that is in excess of EHB					
Full estimated cost (e) = (a) x (b) x 12	$3,840,000	$1,508,000	$190,000	$55,000	$5,593,000

Source: California Health Benefits Review Program, 2017.
Notes:
(a) States are required to defray the costs of state-mandated benefits that are in excess of the EHB for QHPs. QHPs are a subset of the plans offered in the individual and small group markets.
(b) Estimated full cost of the mandated benefit without offsets for reduction in costs for related benefits that are EHBs.
(c) Estimated marginal premium impact considering some of the increase in costs associated with a given benefit mandate may be offset by reductions in costs for related benefits that are EHBs.
(d) Estimated marginal premium impact of the proposed mandated benefit considering some QHPs may already cover the mandated benefit. It is yet to be determined whether the State is responsible for defraying the full cost of the mandated benefit in this circumstance.

Key: CDI = California Department of Insurance; DMHC = Department of Managed Health Care; EHB = essential health benefits; QHP = qualified health plan.

PUBLIC HEALTH IMPACTS

The public health impact analysis includes estimated impacts in the short term (within 12 months of implementation) and in the long term (beyond the first 12 months postmandate). This section estimates the short-term impact[44] of AB 1601 on mandate-relevant health outcomes, potential side effects, impact on disparities, financial burden, and economic loss. See the *Long-Term Impacts* section for discussion of economic loss, educational attainment, and employment opportunities.

Estimated Public Health Outcomes

Early diagnosis and treatment for hearing loss in children is an important step to producing better speech and language outcomes (Yoshinaga-Itano and Apuzzo, 1998). Close to 100% of newborns in California are screened at birth for hearing loss through the Newborn Hearing Screening Program; for those infants diagnosed with hearing loss, early treatment with hearing aids and/or therapy are available. For children who acquire hearing loss later in childhood, hearing screening tests are obtained through a clinician's office or through the public education system; referrals are made to audiologists for those requiring diagnostic testing.

Once a child is determined to have hearing loss, delays in obtaining hearing aids can occur. In a survey of 352 U.S. parents with young children diagnosed with hearing loss, Muñoz et al. (2013) found three primary challenges to parents in obtaining timely hearing aid fittings for their children. The top three reasons included problems paying for hearing aids (30%), problems paying for ear molds (17%), and problems accepting the need for hearing aids (21%). Thirty-five percent reported no problems at all. Sixty-four percent of those surveyed reported incomes of greater than $60,000, and 37% reported purchasing hearing aids through private insurance (Muñoz et al., 2013).

As presented in the *Medical Effectiveness* section, there is a preponderance of evidence that early diagnosis and treatment of hearing loss with hearing aids significantly improves the intelligibility of children's speech, and language development. Evidence also showed that gains in nonverbal understanding and interactions and improvements in personal/social development in children with hearing aids did not reach statistical significance. It is noted that, for many hard of hearing children, there is a synergistic relationship between hearing aids and adjuvant speech and language therapy or other educational interventions; each component is necessary to achieve the improved outcomes sought by the patients and their families (CHBRP, 2007).

As presented in the *Benefit Coverage, Utilization, and Cost Impacts* section, an additional 195 children needing hearing aids or services would be newly covered under AB 1601 postmandate (17,839 children using hearing aids and services premandate to 18,034 children postmandate). For some, this permits first-time use of hearing aids, and for all newly covered hearing aid users, it permits more repairs, replacements, testing, and recasted ear molds, which improve the effectiveness of the hearing aids. All of these newly covered children would be in privately funded health insurance plans or policies because Medi-Cal and CalPERS currently cover hearing aids and services.

[44] CHBRP defines short-term impacts as changes occurring within 12 months of bill implementation.

In the first year postmandate, CHBRP estimates that a total of 195 children will become first-time users (all in the privately funded insurance market). There is a preponderance of evidence that early diagnosis and treatment of hearing loss with hearing aids and services is medically effective. Thus, assuming new coverage terms are similar to premandate cost-sharing terms, hearing and speech and language skills would be expected to improve for this subset of newly covered children with hearing loss who were unable to afford hearing aids or timely repairs/replacements premandate. (See the Estimated Impact on Financial Burden section for further discussion.)

Common Difficulties Associated With Hearing Aids

When data are available, CHBRP estimates the marginal change in relevant harms associated with interventions affected by the proposed mandate. In the case of AB 1601, hearing aids do not produce harms, but there are several common problems associated with the use of hearing aids. These include discomfort from the user's voice sounding too loud (occlusion effect), feedback from the hearing aid, background noise, a buzzing sound with cellphone use, and feeling physically uncomfortable. Many of these problems can be attenuated through adjustments performed by an audiologist. Additionally, perceived social stigma associated with hearing aids may inhibit consistent use by children (Kent and Smith, 2006). Despite these issues with hearing aids, there is a preponderance of evidence that early diagnosis and treatment of hearing loss with hearing aids significantly improves the intelligibility of children's speech, and language development which clearly outweigh these identified problems.

Impact on Disparities[45]

Insurance benefit mandates that bring all state-regulated plans and policies to parity may change an existing disparity.[35] As described in the *Background on Pediatric Hearing Loss and Hearing Aids* section, disparities in pediatric hearing loss exist by gender and race/ethnicity in addition to disparities in obtaining screening and hearing aids for hearing loss. Within the first 12 months postmandate, CHBRP estimates AB 1601 could reduce disparities in gender and race/ethnicity. (For a discussion of potential impacts beyond the first 12 months of implementation, see the *Long-Term Impacts* section.) As noted in the *Background on Pediatric Hearing Loss and Hearing Aids* section, coverage of hearing aids through the Medi-Cal program in California may reduce disparities by eliminating financial barriers for low-income children, but Medi-Cal coverage would not address other barriers such as lack of education or geographic location listed above. It is unknown the extent to which AB 1601 would address these disparities.

No literature was found that discussed the receipt of hearing aids and its effect on ameliorating existing disparities in hearing loss by gender, income, and maternal education in addition to disparities in obtaining screening and hearing aids for hearing loss (as described in the *Background on Pediatric Hearing Loss and Hearing Aids* section).

Estimated Impact on Financial Burden

When possible, CHBRP estimates the marginal impact of mandates on financial burden, defined as uncovered medical expenses paid by the enrollee as well as out-of-pocket expenses (e.g., deductibles, copayments, and coinsurance). AB 1601 would decrease the financial burden for families of those

[45]. For details about CHBRP's methodological approach to analyzing disparities, see http://www.chbrp.org/analysis_methodology/docs/Estimating Impacts on Racial and Ethnic Disparities FINAL.pdf.

enrollees who are newly covered and use hearing aids in several ways. CHBRP estimates that the additional 18,034 newly covered children using hearing aids, the families of 195 children would be able to purchase otherwise unaffordable hearing aids due to new coverage. CHBRP estimates that the annual out-of-pocket costs for families of the newly 18,034 children would decrease by $18.1 million postmandate, which would be offset by an increase in $2.5 million in cost sharing, for an overall $15.5 million reduction in out-of-pocket expenses associated with the use of hearing aids and services (Table 1). CHBRP estimates are based on claims data and may underestimate the cost savings for enrollees due to carriers' ability to negotiate discounted rates that are unavailable to patients and their families. A study by Gallaudet Research Institute found that, of hard of hearing students in California, 17% have a sibling who is also hard of hearing or deaf (Gallaudet Research Institute, 2011). For those families with more than one child who uses hearing aid(s), AB 1601 would bring them additional savings. (These estimates hold true postmandate, assuming that new coverage meets or exceeds current levels of coverage, usually around $1,000 cap every 3 to 5 years; AB 1601 does not require a specific level of cost-sharing.)

CHBRP estimates that AB 1601 would modify coverage and reduce the net financial burden by approximately $15.5 million in the first year postmandate for the families of 18,034 children using hearing aids and services.

LONG-TERM IMPACTS

Long-Term Utilization and Cost Impacts

Utilization Impacts

CHBRP estimated an increase of 1.1% overall for children aged 0 to 17 years in the first year postmandate due to AB 1601. CHBRP estimates the same level of increase for the future years and in the long term.

Cost Impact

The technology of hearing aids may change, thus it is possible that unit costs of these devices may change as well. In the absence of data on likely changes to unit cost of hearing aids, the long-term cost impact is expected to remain the same increase as indicated in the first year postmandate.

Also, the legislation does not preclude the imposition of a coverage cap on devices and services or delineate the parameters around reimbursement for providers. Per CHBRP's content expert, currently there is variation in how insurance carriers pay providers: for example, providers might be reimbursed a flat rate per interval (e.g., $1,000 every 3 years per ear) or, in other cases, paid a percentage of the cost the carrier considers usual and customary charges. Also, whereas most health plans currently do not offer coverage for hearing aids, it is common for many to have relationships with vendors to provide a discount to their members or subscribers (and thus affect cost), and these relationships are likely to change postmandate. Due to the uncertainty in how the mandate would affect the way carriers choose and impose coverage limits, and how it would shift provider- vendor relationships and thus costs, CHBRP is unable to estimate the impacts of these changes.

Long-Term Public Health Impacts

Some interventions in proposed mandates provide immediate measurable impacts (e.g., maternity service coverage or acute care treatments), whereas other interventions may take years to make a measurable impact (e.g., coverage for tobacco cessation or vaccinations). When possible, CHBRP estimates the long-term effects (beyond 12 months postmandate) to the public's health that would be attributable to the mandate, including impacts on social determinants of health, premature death, and economic loss.

CHBRP estimates the change in coverage (and reduction in out-of-pocket costs) could improve the quality and effectiveness of the hearing aids used by children over the course of their development into adulthood.

Impacts on the Social Determinants of Health[46] and Disparities

Periodically, health insurance mandates can influence SDoH, which can mediate health inequities. Evidence presented in the *Background on Pediatric Hearing Loss and Hearing Aids* section indicates that

[46] For more information about SDoH, see CHBRP's publication *Incorporating Relevant Social Determinants of Health into CHBRP Benefit Mandate Analyses* at http://www.chbrp.org/analysis_methodology/docs/Incorporating Relevant Social_Determinants of Health in CHBRP Analyses Final to WEBSITE 033016.pdf.

educational attainment and employment status are correlated with the timely acquisition of hearing aids and services for children diagnosed with hearing loss.

Educational Attainment and Employment Status

The provision of hearing aids through AB 1601 may contribute to success in school and employment, thereby influencing two powerful social determinants of health. The *Medical Effectiveness* section established that the preponderance of evidence suggests that early diagnosis and treatment of hearing loss improves language development. Several studies have established that communication skills, especially spoken language, are moderately or strongly associated with college readiness and success in college or vocational training programs.

For instance, a study of hard of hearing high school students (who used a validated survey to rate their communication ability, including spoken language) found that those who had higher communication scores also had higher ACT scores, although the association was weak (Convertino et al., 2009). The evidence was stronger in Cuculick and Kelly's study of graduation from technical school among 905 deaf students (Cuculick and Kelly, 2003). They found that students with stronger language skills had the highest overall graduation rates compared to students with weaker language skills. Furthermore, students with higher language skills performed well across degree categories, regardless of curriculum requirements and difficulty.

Other societal risk factors associated with pediatric hearing loss, such as low birth weight, blood lead levels above 10 µg/dL, nutritional (thiamine and iodine) deficiencies, and low income would not be affected by AB 1601 (Vasconcellos et al., 2014).

It is unknown the degree to which the passage of AB 1601 would improve the future educational attainment and employment status of children who obtain hearing aids through the new coverage. However, it stands to reason, that for those who use hearing aids at a young age and maintain their communication skills into adulthood would experience improved outcomes as compared with not using hearing aids.

Impacts on Economic Loss

Economic loss associated with disease is generally presented in the literature as an estimation of the value of the years per life lost in dollar amounts (i.e., valuation of a population's lost years of work over a lifetime). In addition, morbidity associated with the disease or condition of interest can also result in lost productivity by causing a worker to miss days of work due to illness or acting as a caregiver for someone else who is ill.

Estimates of the lifetime costs associated with hearing loss typically focus on those with severe or profound hearing loss, and costs vary from one estimate at $297,000 per person (Mohr et al., 2000) to another at $417,000 per person (CDC, 2004). These cost estimates include both direct and indirect costs. The direct costs can be broken down into medical and nonmedical costs. The medical costs associated with AB 1601 are specified in the *Benefit Coverage, Utilization, and Cost Impacts* section of this report. Nonmedical direct costs for children with hearing loss primarily consist of special education costs. One estimate from the Centers for Disease Control and Prevention (CDC) indicates that indirect costs, including lower wages due to limits in the type or amount of work a person can do, make up 63% of total lifetime costs associated with hearing loss for those younger than 18 years (Honeycutt et al., 2004).

It is unknown the degree to which the passage of AB 1601 might impact economic loss associated with pediatric hearing loss.

APPENDIX A TEXT OF BILL ANALYZED

On February 22, 2017, the California Assembly Committee on Health requested that CHBRP analyze AB 1601.

CALIFORNIA LEGISLATURE— 2017–2018 REGULAR SESSION

ASSEMBLY BILL **No. 1601**

Introduced by Assembly Member Bloom

February 17, 2017

An act to add and repeal Section 1367.72 of the Health and Safety Code, and to add and repeal Section 10123.72 of the Insurance Code, relating to health care coverage.

LEGISLATIVE COUNSEL'S DIGEST

AB 1601, as introduced, Bloom. Hearing aids: minors.

Existing law, the Knox-Keene Health Care Service Plan Act of 1975, provides for the licensure and regulation of health care service plans by the Department of Managed Health Care and makes a willful violation of the act a crime. Existing law also provides for the regulation of health insurers by the Department of Insurance. Existing law requires health care service plan contracts and health insurance policies to provide coverage for specified benefits.

This bill, until January 1, 2020, would require a health care service plan contract or a health insurance policy issued, amended, or renewed on or after January 1, 2018, to include coverage for hearing aids for an enrollee or insured under 18 years of age, as specified. These provisions would become inoperative if the Department of Managed Health Care and the Department of Insurance receive a notification from the federal Centers for Medicare and Medicaid Services or any other applicable federal agency that these provisions constitute a discriminatory age limitation under federal law and the state is required to defray the costs of requiring a plan contract or policy to include coverage for hearing aids on behalf of enrollees or insureds who are 18 years of age or older pursuant to a specified federal law. Because a willful violation of these requirements by a health care service plan would be a crime, this bill would impose a state-mandated local program.

The California Constitution requires the state to reimburse local agencies and school districts for certain costs mandated by the state. Statutory provisions establish procedures for making that reimbursement.

This bill would provide that no reimbursement is required by this act for a specified reason.

DIGEST KEY

Vote: majority Appropriation: no Fiscal Committee: yes Local Program: yes

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BILL TEXT
THE PEOPLE OF THE STATE OF CALIFORNIA DO ENACT AS FOLLOWS:

SECTION 1.
It is the intent of the Legislature to explore alternate approaches to ensure the continuation of broad coverage of pediatric hearing benefits upon expiration of this mandate, including exploring ways to add pediatric hearing as an essential health benefit, without incurring ongoing state costs.

SEC. 2.
Section 1367.72 is added to the Health and Safety Code, to read:

1367.72.
(a) (1) A health care service plan contract issued, amended, or renewed on or after January 1, 2018, shall include coverage for hearing aids for all enrollees under 18 years of age when medically necessary.
(2) Coverage for hearing aids includes an initial assessment, new hearing aids at least every five years, new ear molds, new hearing aids if alterations to existing hearing aids cannot meet the needs of the child, a new hearing aid if the existing one is no longer working, fittings, adjustments, auditory training, and maintenance of the hearing aids.
(b) For purposes of this section, "hearing aid" means an electronic device usually worn in or behind the ear of a deaf and hard of hearing person for the purpose of amplifying sound.
(c) This section shall not apply to Medicare supplement, dental-only, or vision-only health care service plan contracts.
(d) (1) This section shall become inoperative if the department receives a notification from the federal Centers for Medicare and Medicaid Services or any other applicable federal agency that this section constitutes a discriminatory age limitation under federal law and the state is required to defray the costs of requiring a plan contract to include coverage for hearing aids on behalf of enrollees who are 18 years of age or older pursuant to Section 1311 of the Patient Protection and Affordable Care Act (42 U.S.C. Sec. 18031(d)(3)).
(2) This section shall become inoperative 30 days after the director executes a declaration, which shall be retained by the director, stating that the department received the notification described in paragraph (1). The director shall post the declaration on the department's Internet Web site, and the director shall send the declaration to the appropriate policy committees of the Legislature and to the Legislative Counsel.
(e) This section shall remain in effect only until January 1, 2020, and as of that date is repealed.

SEC. 3.
Section 10123.72 is added to the Insurance Code, to read:

10123.72.
(a) (1) A health insurance policy issued, amended, or renewed on or after January 1, 2018, shall include coverage for hearing aids for all insureds under 18 years of age when medically necessary.
(2) Coverage for hearing aids includes an initial assessment, new hearing aids at least every five years, new ear molds, new hearing aids if alterations to existing hearing aids cannot meet the

needs of the child, a new hearing aid if the existing one is no longer working, fittings, adjustments, auditory training, and maintenance of the hearing aids.
(b) For purposes of this section, "hearing aid" means an electronic device usually worn in or behind the ear of a deaf and hard of hearing person for the purpose of amplifying sound.
(c) This section shall not apply to accident-only, specified disease, hospital indemnity, Medicare supplement, dental-only, or vision-only health insurance policies.
(d) (1) This section shall become inoperative if the department receives a notification from the federal Centers for Medicare and Medicaid Services or any other applicable federal agency that this section constitutes a discriminatory age limitation under federal law and the state is required to defray the costs of requiring a health insurance policy to include coverage for hearing aids on behalf of insureds who are 18 years of age or older pursuant to Section 1311 of the Patient Protection and Affordable Care Act (42 U.S.C. Sec. 18031(d)(3)).
(2) This section shall become inoperative 30 days after the commissioner executes a declaration, which shall be retained by the commissioner, stating that the department received the notification described in paragraph (1). The commissioner shall post the declaration on the department's Internet Web site, and the commissioner shall send the declaration to the appropriate policy committees of the Legislature and to the Legislative Counsel.
(e) This section shall remain in effect only until January 1, 2020, and as of that date is repealed.
SEC. 4.
No reimbursement is required by this act pursuant to Section 6 of Article XIII B of the California Constitution because the only costs that may be incurred by a local agency or school district will be incurred because this act creates a new crime or infraction, eliminates a crime or infraction, or changes the penalty for a crime or infraction, within the meaning of Section 17556 of the Government Code, or changes the definition of a crime within the meaning of Section 6 of Article XIII B of the California Constitution.

APPENDIX B COST IMPACT ANALYSIS: DATA SOURCES, CAVEATS, AND ASSUMPTIONS

This subsection discusses the caveats and assumptions relevant to specifically to an analysis of AB 1601.

- The population subject to the mandated offering includes children covered by DMHC-regulated commercial insurance plans and CDI-regulated policies and publicly funded plans (including CalPERS and Medi-Cal) subject to the requirements of the Knox-Keene Health Care Service Plan Act. Health plans and insurers could currently comply with this mandate in one of two ways: (1) as a written agreement, or rider, that attaches to a policy to modify insurance coverage; or (2) as part of their basic benefit package. CHBRP assumes that carriers would provide coverage to comply with AB 1601 post-mandate in the base plan to avoid adverse selection (attracting members who anticipated using this benefit). CalPERS and Medi-Cal currently offer coverage for hearing aids and are thus already compliant with AB 1601.
- AB 1601 exceeds Essential Health Benefits (EHBs) because hearing aids for children are not a part of California's EHBs/benchmark plan.
- Healthcare Common Procedure Coding System (HCPCS) and Current Procedural Terminology (CPT) codes related to hearing aids, including codes related to screening and diagnostics, hearing aid fittings, ear molds, maintenance and repairs, and replacements, were identified with CHBRP's content expert. Below is the list of HCPCS and CPT codes categorized under each group:
    - Hearing Aid: 69799, L8690, V5030, V5050, V5060, V5080, V5110, V5130, V5140, V5160, V5180, V5220, V5241, V5246, V5253, V5254, V5255, V5256, V5257, V5258, V5259, V5260, V5261, V5267, V5272, V5274, V5282, V5283, V5287, V5288, V5289, V5298, L8692
    - Maintenance and Repair: 69711, L7510, L7520, V5014, V5299
    - Ear Molds: V5264, V5265, V5275
    - Screening: V5010, V5011, 92590, 92591, 92592, 92593, 92594, 92595
    - Replacement: L8691
- The following hearing aid codes were excluded as they identify services not covered by AB 1601: Codes relating to implants (including cochlear), Codes relating to battery and cord replacements, Under consultation with CHBRP's content expert, codes associated with screening and thus covered under California's EHB's were also excluded from the analysis.
- As AB 1601 applies only to minors, the final claims database used was limited to 0- to 17-year-olds. CHBRP summarized five categories of hearing aid services within the claims data and thus reports utilization by these categories in Table 1: Hearing aids; Hearing aid maintenance and repair; Replacement; Ear mold; and Diagnostic tests, hearing aid checks, fittings, and adjustments.
- The identified HCPCS and CPT codes were used to extract data from the 2014 and 2015 MarketScan® Commercial Claims and Encounters Database. These data from MarketScan® were used to develop baseline cost and utilization information for hearing aids. Baseline cost and utilization rates per 1,000 members were calculated and used to estimate enrollee counts for each service type and cost per user.

- Cost of hearing aids and services does not include any additional costs from warranties or other add-on costs to protect hearing aids that might be purchased by families obtaining hearing aids for children.
- Baseline cost was trended at a 3.1% annual rate of increase from 2015 to 2018 based on 2016 medical consumer price index (CPI) rate, for a total increase in cost of 9.6% over the time period.
- Carrier surveys were administered to estimate the percentage of enrollees who have hearing aid coverage pre-mandate along with typical cost-sharing for those who do have coverage.
    - To estimate the total number of services provided, CHBRP estimated the percentage of children with coverage for hearing aids in the 2014 and 2015 MarketScan® database, based on responses to the carrier surveys.
    - The surveys revealed that 10% of commercially insured enrollees have this coverage. CHBRP then calculated the utilization rate as a percentage of enrollees; the analysis showed that 0.26% of children received at least one of the relevant hearing aid services. For each of the service types, CHBRP calculated a similar value. CHBRP then applied the utilization rates to each of the population cohorts that currently have coverage. All Medi-Cal children, who do have coverage for hearing aids and services were assumed to have utilization rates at the same levels as commercially insured children.
- Because there are no data sources that show by how much hearing aid utilization increases when coverage for hearing aids is mandated (i.e., there are no longitudinal studies examining changes utilization before and after legislation has been implemented in other states), CHBRP used content expert input and information in the peer-reviewed literature to estimate the most likely utilization change that would occur if AB 1601 were to be enacted. The following describes the sources of information that were gathered to make an assessment of utilization change:
    - Cost has been cited as a barrier to the acquisition of hearing aids in a study of 352 U.S. parents with young children diagnosed with hearing loss (Muñoz et al., 2013). This study found approximately 1% of the study population did not get hearing aids due to cost (4 out of 352) and is consistent with the price elasticity of demand literature described below that points to hearing aids and pediatric services being largely inelastic.
    - Price elasticity of demand —- the measure of the relationship between a change in the quantity demanded of a good (in this case, hearing aids for children) and a change in its price — is a key input to estimating utilization change when cost to the consumer changes when coverage is given. There are estimates of the price elasticity of demand for hearing aids, suggesting hearing aids are largely inelastic, which means the demand or use of the good is largely unaffected by price change (price elasticity of demand ranges between −0.31 and −0.54 [Amlani, 2010; Amlani and De Silva, 2005]). These price elasticity of demand estimates for hearing aids, however, are not specific to pediatric hearing aids. Thus, going to the broader body of literature on pediatric services, there is evidence that the price elasticity of demand for pediatric clinical visits is also low: Goldman and Grossman (1978) find the price elasticity of demand for pediatric visits to be −0.03 to −0.06. Similarly, Wolfson et al. (1982) found no relationship between user fees/cost sharing and the use of services among disabled children, suggesting the presence of a disability makes it less likely to reduce the use of medical services and parents are likely less inclined to risk the child's health by foregoing medical services. Despite the evidence pointing to the price inelasticity of demand for child hearing aids, CHBRP recognizes it is still possible that the introduction of coverage for a previously uncovered service would result in some increase in demand (Eichner, 1998). The removal of cost as a barrier when coverage is introduced for hearing aids thus is assumed to

result in utilization uptake. Assuming a family has no coverage for hearing aids, the family pays 100% of the cost. If their insurance plan were to cover hearing aids such that the enrollee pays 20% out of pocket, the family experiences an 80% reduction in cost. Applying a price elasticity of −0.03 (low point estimate from Goldman and Grossman [1978] of price elasticity of demand for pediatric visits; the low point is chosen to better reflect the more inelastic nature of a medical service for a disability in children per Wolfson and colleagues [1982]) to the assumed 80% reduction in cost, there would be a 2.4% (−0.03 × 80%) increase in demand/utilization of hearing aids. CHBRP thus assumed pre-mandate baseline utilization is lower among noncovered enrollees compared to covered enrollees such that postmandate, AB 1601 would result in an increase in utilization of 2.4% among noncovered enrollees, bringing utilization among noncovered enrollees up to par with utilization among covered enrollees. This assumption is consistent with the assumption applied in the cost analysis of hearing aids bill AB 368 by CHBRP in 2007 in which CHBRP estimated a baseline premandate utilization rate 2% less for those who lack coverage, which was based on a survey conducted in 2003 by the Listen Up organization that found approximately 1% of respondents cited cost as a barrier to obtaining a hearing aid for their child with hearing loss (CHBRP, 2007).

    - CHBRP's content expert pointed out that there exist a number of ways families might receive help for obtaining hearing aids if cost poses a barrier. For currently noncovered enrollees who meet certain financial qualifications, they can receive financial aid and full coverage for hearing aids. California Children's Services (CCS) is available for hearing aid services for children who are commercially insured but do not have a hearing aid benefit or have high out-of-pocket costs for hearing aids depending on their financial status. There are other charitable organizations that provide hearing aids for free or at a drastic discount, based on specified financial qualifications. For example, the Miracle-Ear Children's Foundation provides hearing aids to children 18 years or younger whose families are low income but do not qualify for public support (Miracle-Ear Children's Foundation, 2016). Utilization rates and cost data for enrollees obtaining hearing aids through CCS, charitable organizations, or for those purchasing units fully out of pocket, are not available and thus not included in this analysis.

- Health plans and insurers often provide discounts to members or subscribers. Even if health plans and insurers do not cover hearing aids, it is common for many to have relationships with vendors to provide a discount to their members or subscribers. These relationships may change postmandate; however, due to the uncertainty in how the mandate would shift provider-vendor relationships, CHBRP is unable to estimate impacts of these changes.

REFERENCES

American Hearing Research Foundation. Hearing and Balance Disorders. Hearing Aids. 2015. Available at: http://american-hearing.org/disorders/hearing-aids/. Accessed March 4, 2016.

American Speech-Language-Hearing Association (ASHA). Degree of Hearing Loss. Available at: http://www.asha.org/public/hearing/Degree-of-Hearing-Loss/. Accessed March 1, 2016a.

American Speech-Language-Hearing Association (ASHA). State Information. California Hearing Screening Requirements for Newborns and School-Aged Children Available at: http://www.asha.org/Advocacy/state/info/CA/California-Hearing-Screening-Requirements.htm. Accessed March 1, 2016b.

American Speech-Language-Hearing Association (ASHA). Information for the Public, Hearing and Balance, Different Styles of Hearing Aids. Available at: http://www.asha.org/public/hearing/Different-Styles-of-Hearing-Aids/. Accessed March 2, 2016c.

American Speech-Language-Hearing Association (ASHA). State Insurance Mandates for Hearing Aids. Available at: http://www.asha.org/advocacy/state/issues/ha_reimbursement/. Accessed March 1, 2016d.

Amlani AM, De Silva DG. Effects of business cycles and FDA intervention on the hearing aid industry. *American Journal of Audiology*. 2005;14:71-79.

Amlani AM. Will government subsidies increase the US hearing aid market penetration rate? *Audiology Today*. 2010;22(2):40-46.

Boyle CA, Boulet S, Schieve LA, et al. Trends in the prevalence of developmental disabilities in US children, 1997-2008. *Pediatrics*. 2011;127:1034-1042.

Braveman P. Health disparities and health equity: concepts and measurement. *Annual Review of Public Health*. 2006;27:167-194.

Bush ML, Bianchi K, Lester C, et al. Delays in diagnosis of congenital hearing loss in rural children. *The Journal of Pediatrics.* 2014;164:393-397.

California Department of Developmental Services (DDS). Quarterly Client Characteristics Report. December 2016. Available at: http://www.dds.ca.gov/FactsStats/docs/QR/Dec2016_Quarterly.pdf. Accessed March 6, 2017.

California Department of Education (CDE). DataQuest. Special Education Enrollment by Age and Disability Statewide Report. Reporting Cycle December 1, 2014. Available at: http://data1.cde.ca.gov/dataquest/SpecEd/SpecEd1.asp?cChoice=SpecEd1&cYear=2014-15&cLevel=State&cTopic=SpecEd&myTimeFrame=S&submit1=Submit&ReptCycle=December . Accessed February 24, 2016.

California Department of Health Care Services (DHCS). Frequently Asked Questions. Available at: http://www.dhcs.ca.gov/services/nhsp/Pages/FreqAskedQ.aspx. Accessed March 2, 2016.

California Department of Public Health (CDPH). California Newborn Hearing Screening Program. Calendar Year 2013 Data. Updated March 3, 2015. Available at: http://www.dhcs.ca.gov/services/nhsp/Documents/NHSPData2013.pdf. Accessed March 2, 2016.

California Health Benefits Review Program (CHBRP). Analysis of Assembly Bill 368: Mandate to Offer Coverage of Hearing Aids for Children. A report to the 2007-2008 California State Legislature. Oakland, CA: CHBRP; 2007.

Carney AE, Moeller MP. Treatment efficacy: hearing loss in children. *Journal of Speech, Language, and Hearing Research*. 1998;41:S61-S84.

Centers for Disease Control and Prevention (CDC). Economic Costs Associated with Mental Retardation, Cerebral Palsy, Hearing Loss, and Vision Impairment --- United States, 2003. January 30, 2004. Available at: https://www.cdc.gov/mmwr/preview/mmwrhtml/mm5303a4.htm. Accessed March 2, 2016.

Centers for Disease Control and Prevention (CDC). National Center on Birth Defects and Developmental Disabilties: Hearing Loss in Children: Types of Hearing Loss. Page last reviewed: February 18, 2015a. Available at: http://www.cdc.gov/ncbddd/hearingloss/types.html. Accessed March 2, 2016.

Centers for Disease Control and Prevention (CDC). National Center on Birth Defects and Developmental Disabilties: Hearing Loss in Children: Facts. Page last reviewed October 23, 2015b. Available at: http://www.cdc.gov/ncbddd/hearingloss/facts.html. Accessed March 2, 2016.

Centers for Disease Control and Prevention (CDC). Hearing Loss in Children: Research and Tracking. Page last reviewed August 2015c. Available at: http://www.cdc.gov/ncbddd/hearingloss/research.html. Accessed March 6, 2016.

Centers for Disease Control and Prevention (CDC). NCHHSTP Social Determinants of Health. Frequently Asked Questions. Page last reviewed: March 10, 2014. Available at: http://www.cdc.gov/nchhstp/socialdeterminants/faq.html. Accessed August 27, 2015.

Ching TY, Hill M, Brew J, et al., The effect of auditory experience on speech perception, localization, and functional performance of children who use a cochlear implant and a hearing aid in opposite ears. *International Journal of Audiology.* 2005;44:677-690.

Ching TY, Psarros C, Hill M, Dillon H, Incerti P. Should children who use cochlear implants wear hearing aids in the opposite ear? *Ear and Hearing*. 2001;22:365-380.

Convertino CM, Marschark M, Sapere P, Sarchet T, Zupan M. Predicting academic success among deaf college students. *Journal of Deaf Studies and Deaf Education*. 2009;14:324-343.

Cuculick JA, Kelly RR. Relating deaf students' reading and language scores at college entry to their degree completion rates. *American Annals of the Deaf.* 2003;148:279-286.

Eichner MJ. The demand for medical care: what people pay does matter. *American Economic Review.* 1998;88:117-121.

Fan Y, Zhang Y, Wang P, et al. The efficacy of unilateral bone-anchored hearing devices in Chinese mandarin-speaking patients with bilateral aural atresia*. JAMA Otolaryngology—Head & Neck Surgery*. 2014;140:357-362.

Gabbard SA, Schryer J. Early amplification options. *Mental Retardation and Developmental Disabilities Research Review*. 2003;9:236-242.

Gallaudet Research Institute. *State Summary Report of Data from the 2009-10 Annual Survey of Deaf and Hard of Hearing Children and Youth.* April 2011. Washington, DC: GRI, Gallaudet University.

Gandel C. Hearing Aid Styles: Pros and Cons. *AARP Bulletin*. October 2014. Available at: http://www.aarp.org/health/conditions-treatments/info-05-2011/hearing-aid-styles.html. Accessed March 15, 2016.

Gatehouse S. Electronic aids to hearing. *British Medical Bulletin*. 2002;63:147-156.

Goldman F, Grossman, M. The demand for pediatric care: an hedonic approach. *Journal of Political Economy.* 1978;86:259- 80.

Hearing Loss Association of America (HLAC). Basic Facts About Hearing Loss, 2016. Available at: http://www.hearingloss.org/content/basic-facts-about-hearing-loss. Accessed March 4, 2016.

Holt RF, Kirk KI, Eisenberg LS, Martinez AS, Campbell W. Spoken word recognition development in children with residual hearing using cochlear implants and hearing aids in opposite ears. *Ear and Hearing.* 2005;26:82S-91S.

Honeycutt AA, Grosse SD, Dunlap LJ, et al. Economic costs of mental retardation, cerebral palsy, hearing loss, and vision impairment--United States, 2003. *MMWR. Morbidity and Mortality Weekly Report*. 2004;53:57-59.

Kent B, Smith S. They only see it when the sun shines in my ears: exploring perceptions of adolescent hearing aid users. *Journal of Deaf Studies and Deaf Education*. 2006;11:461-476.

Limb SJ, McManus MA, Fox HB, White KR, Forsman I. Ensuring financial access to hearing AIDS for infants and young children. *Pediatrics*. 2010;126 Suppl 1:S43-S51.

Litovsky RY, Johnstone PM, Godar SP, et al. Bilateral cochlear implants in children: Localization acuity measured with minimum audible angle. *Ear and Hearing*. 2006;27:43-59.

Mehra S, Eavey RD, Keamy DG Jr. The epidemiology of hearing impairment in the United States: newborns, children, and adolescents. *Archives of Otolaryngology—Head & Neck Surgery.* 2009;140:461-472.

Miracle-Ear Foundation. Miracle Ear Foundation Eligibility Criteria. 2016. Available at: https://www.miracle-ear.com/foundation-eligibility. Accessed March 3, 2016.

Mohr PE, Feldman JJ, Dunbar JL, et al. The societal costs of severe to profound hearing loss in the United States. *International Journal of Technology Assessments in Health Care*. 2000;16:1120-1135.

Muñoz K, Blaiser K, Barwick K. Parent hearing aid experiences in the United States. *Journal of the American Academy of Audiologists*. 2013;24:5-16.

National Conference of State Legislatures (NCSL). Newborn Hearing Screening Laws. May 2011. Available at: http://www.ncsl.org/research/health/newborn-hearing-screening-state-laws.aspx#c. Accessed March 20, 2016.

National Institute on Deafness and Other Communication Disorders (NIDCD). Cochlear Implants. 2006. Available at: http://www.nidcd.nih.gov/health/hearing/coch.htm. Accessed March 13, 2007.

National Institute on Deafness and Other Communication Disorders (NIDCD*).* Hearing Aids. Last Updated December 14, 2015. Available at: http://www.nidcd.nih.gov/health/hearing/pages/hearingaid.aspx. Accessed March 8, 2016.

National Institute on Deafness and Other Communication Disorders (NIDCD). Health Info, Hearing, Ear Infections and Deafness: Hearing Aids. Last Updated March 22, 2016. Available at: https://www.nidcd.nih.gov/health/hearing-aids#hearingaid_05. Accessed March 22, 2016.

Niskar AS, Kieszak SM, Holmes A, Esteban E, Rubin C, Brody DJ. Prevalence of hearing loss among children 6 to 19 years of age: the Third National Health and Nutrition Examination Survey. *JAMA*. 1998;279:1071-1075.

Office of Disease Prevention and Health Promotion (ODPHP). Healthy People 2020: Social Determinants of Health. Available at: www.healthypeople.gov/2020/topics-objectives/topic/socialdeterminantshealth/addressing-determinants. Accessed February 16, 2016.

Palmer CV, Ortmann A. Hearing loss and hearing aids*. Neurologic Clinics*. 2005;23:901-918.

Ravi R, Gunjawate DR, Yerraguntla K, Lewis LE, Driscoll C, Rajashekhar B. Follow-up in newborn hearing screening: a systematic review. *International Journal of Pediatric Otorhinolaryngology.* 2016;90:29-36.

Shargorodsky J, Curhan S, Curhan G, Eavey R. Change in prevalence of hearing loss in US adolescents. *JAMA*. 2010:304;772-778.

Tomblin JB, Oleson JJ, Ambrose SE, Walker E, Moeller MP. The Influence of Hearing Aids on the Speech and Language Development of Children With Hearing Loss. *JAMA Otolaryngology—Head & Neck Surgery*. 2014;140:403-409.

Tomblin JB, Harrison M, Ambrose SE, Walker EA, Oleson JJ, Moeller MP. Language Outcomes in Young Children with Mild to Severe Hearing Loss*. Ear and Hearing*. 2015;36 Suppl 1:76s-91s.

U.S. Department of Health and Human Services. Office of Disease Prevention and Health Promotion. Healthy People 2020: Social Determinants of Health. Available at: www.healthypeople.gov/2020/topics-objectives/topic/social-determinantshealth/addressing-determinants. Accessed February 16, 2016.

Van Naarden Braun K, Christensen D, Doernberg N, et al. Trends in the prevalence of autism spectrum disorder, cerebral palsy, hearing loss, intellectual disability, and vision impairment, Metropolitan Atlanta, 1991–2010. *PLoS One.* 2015;10:e0124120.

Vasconcellos AP, Colello S, Kyle ME, Shin JJ. Societal-level risk factors associated with pediatric hearing loss: a systematic review. *JAMA Otolaryngology—Head & Neck Surgery*. 2014;151:29-41.

Verhagen CV, Hol MK, Coppens-Schellekens W, Snik AF, Cremers CW. The Baha Softband. A new treatment for young children with bilateral congenital aural atresia*. International Journal of Pediatric Otorhinolaryngology.* 2008;72:1455-1459.

Wolfson J, Kapadia AS, Decker M, Sear AM, Roht LH, Effects of cost-sharing on users of a state's health service program. *Medical Care*. 1982;20:1178-1187.

Wyoming Early Hearing Detection and Intervention Program. Types of Hearing Loss. Available at: http://www.wyomingehdi.org/types-of-hearing-loss/. Accessed March 3, 2016.

Yoshinaga-Itano C, Apuzzo ML. The development of deaf and hard of hearing children identified early through the high-risk registry. *American Annals of the Deaf*. 1998;143:416-424.

Yoshinaga-Itano C. From screening to early identification and intervention: discovering predictors to successful outcomes for children with significant hearing loss. *Journal of Deaf Studies and Deaf Education*. 2003;8:11-30.

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A group of faculty, researchers, and staff complete the analysis that informs California Health Benefits Review Program (CHBRP) reports. The CHBRP **Faculty Task Force** comprises rotating senior faculty from University of California (UC) campuses. In addition to these representatives, there are other ongoing contributors to CHBRP from UC that conduct much of the analysis. The **CHBRP staff** coordinates the efforts of the Faculty Task Force, works with Task Force members in preparing parts of the analysis, and manages all external communications, including those with the California Legislature. As required by CHBRP's authorizing legislation, UC contracts with a certified actuary, PricewaterhouseCoopers, to assist in assessing the financial impact of each legislative proposal mandating or repealing a health insurance benefit.

The **National Advisory Council** provides expert reviews of draft analyses and offers general guidance on the program to CHBRP staff and the Faculty Task Force. CHBRP is grateful for the valuable assistance of its National Advisory Council. CHBRP assumes full responsibility for the report and the accuracy of its contents.

Faculty Task Force

Janet Coffman, MA, MPP, PhD, *Vice Chair for Medical Effectiveness*, University of California, San Francisco
Sara McMenamin, PhD, *Vice Chair for Medical Effectiveness and Public Health*, University of California, San Diego
Joy Melnikow, MD, MPH, *Vice Chair for Public Health*, University of California, Davis
Ninez Ponce, PhD, Co-*Vice Chair for Cost*, University of California, Los Angeles
Nadereh Pourat, PhD, Co-*Vice Chair for Cost*, University of California, Los Angeles
Susan L. Ettner, PhD, University of California, Los Angeles
Sylvia Guendelman, PhD, LCSW, University of California, Berkeley
Marilyn Stebbins, PharmD, University of California, San Francisco

Task Force Contributors

Diana Cassady, DrPH, University of California, Davis
Shana Charles, PhD, MPP, University of California, Los Angeles, and California State University, Fullerton
Shauna Durbin, MPH, University of California, Davis
Margaret Fix, MPH, University of California, San Francisco
Ronald Fong, MD, MPH, University of California, Davis
Brent Fulton, PhD, University of California, Berkeley
Barry Hill, MPH, University of California, Davis
Sarah Hiller, MA, University of California, San Diego
Jeffrey Hoch, PhD, University of California, Davis
Michelle Ko, MD, PhD, University of California, Davis
Gerald Kominski, PhD, University of California, Los Angeles
Elizabeth Magnan, MD, PhD, University of California, Davis
Ying-Ying Meng, PhD, University of California, Los Angeles
Jack Needleman, PhD, University of California, Los Angeles
Matthew J. Niedzwiecki, PhD, University of California, San Francisco

National Advisory Council

CHBRP Staff

Garen Corbett, MS, Director
John Lewis, MPA, Associate Director
Erin Shigekawa, MPH, Principal Policy Analyst
Adara Citron, MPH, Principal Policy Analyst
Karla Wood, Program Specialist

**A small percentage of AJ Scheitler's time is available to serve as a backup CHBRP staff resource.*

California Health Benefits Review Program
University of California
Office of the President
1111 Broadway, Suite 1400
Oakland, CA 94607
Tel: 510-287-3876 Fax: 510-763-4253
chbrpinfo@chbrp.org www.chbrp.org

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Please direct any questions concerning this document to:

California Health Benefits Review Program
University of California, Office of the President
UC Health
1111 Broadway, Suite 1400
Oakland, CA 94607
Tel: 510-287-3876
Fax: 510-763-4253
www.chbrp.org

A group of faculty and staff undertakes most of the analysis that informs reports by the California Health Benefits Review Program (CHBRP). The CHBRP Faculty Task Force comprises rotating representatives from multiple University of California (UC) campuses. In addition to these representatives, there are other ongoing contributors to CHBRP from UC. This larger group provides advice to the CHBRP staff on the overall administration of the program and conducts much of the analysis.

CHBRP staff coordinates the efforts of the Faculty Task Force, works with Task Force members in preparing parts of the analysis, and coordinates all external communications, including those with the California Legislature.

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CHBRP assumes full responsibility for the report and the accuracy of its contents. All CHBRP bill analyses and other publications are available at www.chbrp.org.

Garen Corbett, MS
Director