PUBLIC HEALTH IMPACT ANALYSIS AND RESEARCH APPROACH

Overview

The California Health Benefits Review Program (CHBRP) is charged by the California Legislature with analyzing introduced health benefit mandates (or repeals) and health insurance-related legislation. Traditional (or "full") CHBRP analyses present three types of information about proposed health insurance benefit mandates or repeals: (1) the medical effectiveness of screening, diagnostic, treatment, and other health services addressed in the legislation; (2) the financial impacts of the legislation; and (3) the impact on public health.[1]

Information related to the public health impact of a proposed insurance benefit mandate or repeal is presented within three sections of a CHBRP report: (1) background, (2) public health impacts (short-term), and (3) long-term impacts. Each section has a unique and distinct purpose. The background section consists of contextual and baseline information to help the California Legislature better understand the disease or condition of focus. The public health impacts section estimates the short-term public health impacts (within 12 months of implementation) of the proposed benefit mandate. And the long-term impacts section includes estimates of the long-term public health impacts (beyond 12 months of implementation), such as impacts on social determinants of health (SDOH), premature death, and economic loss.

This document describes the research approach used to analyze public health impact and can be found on CHBRP's website.[2]

Background Section

This *Background Section* consists of the following three subsections described below: 1) Background on Test/Treatment/Service/Condition/Disease, 2) Baseline Incidence and Prevalence and Related Health Outcomes, and 3) Baseline Disparities and Social Determinants of Health.

[1] CHBRP's initial approach to analyzing bills was described in a special edition of *Health Services Research* (Philip et al., 2006).
[2] Available at: https://chbrp.com/analysis_methodology/public_health_impact_analysis.php.

Background on Test/Treatment/Service/Condition/Disease

The background section of a CHBRP analysis presents broad, contextual information about the test/treatment/service/condition/disease. Descriptions may include the history of the disease/condition, a basic clinical description or characteristics, and cause(s) of the disease/condition, among other summaries to help the California Legislature understand the bill subject.

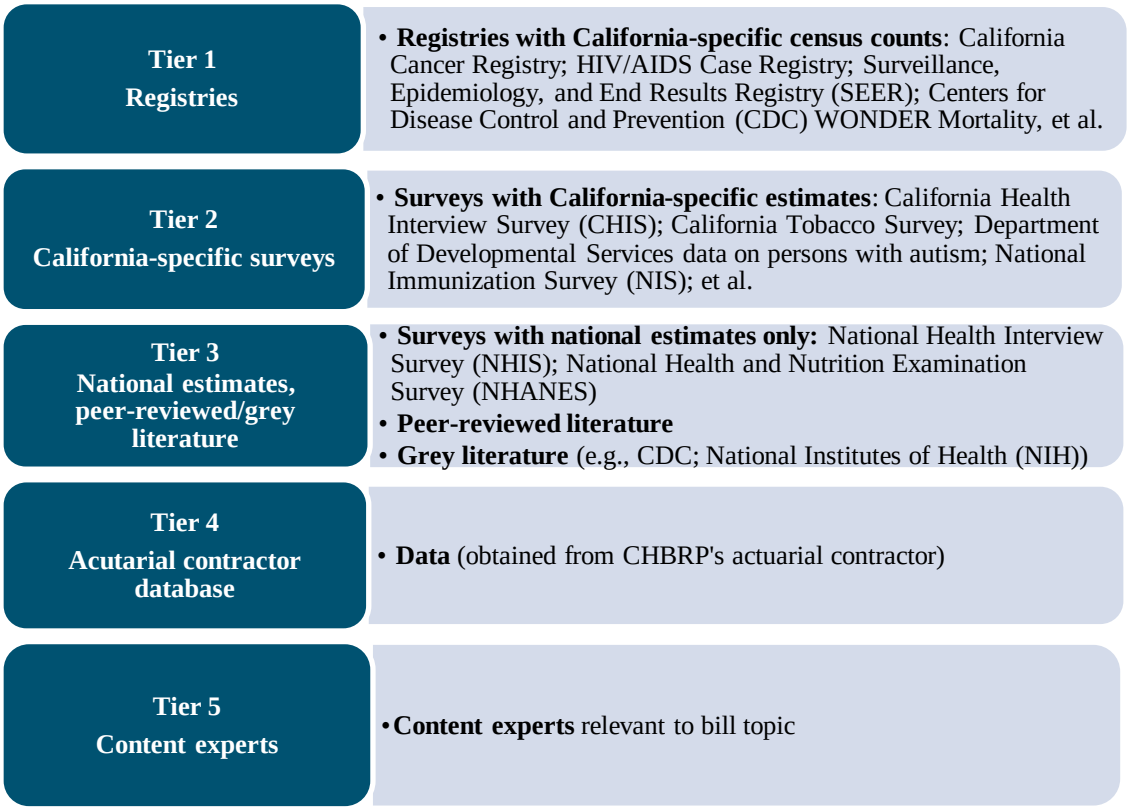
Baseline Incidence and Prevalence and Related Health Outcomes

Information on the baseline prevalence and incidence of the disease or condition, as well as the health outcomes (e.g., morbidity or mortality), provides an overview of the portion of the California population potentially affected by the mandate. Additionally, it provides the overall context for the medical effectiveness, cost and utilization, and public health impacts sections of CHBRP analytic reports.

Identifying baseline incidence and prevalence

CHBRP's public health team uses a five-tiered hierarchy to prioritize sources of incidence and prevalence data. Using the following sources (Figure 1), the public health team conducts primary and secondary research depending on the availability of the data and ability to meet the 60-day analytic deadline imposed by CHBRP's authorizing statute.

Figure 1. Five-Tiered Hierarchy of Data Sources for Public Health Impact Analyses



Registries reporting California-specific data (Tier 1) are the preferred source for prevalence and incidence data as they represent the entire population of persons with a disease or condition in the state. These sources may be located within a California agency (e.g., California's Cancer Registry, newborn and prenatal screening program registry, HIV/AIDS Case Registry) or at the federal level (e.g., Centers for Disease Control and Prevention [CDC] WONDER Mortality Database, SEER Registry).

CHBRP's second choice for data (Tier 2) is population-based surveys with California-specific estimates. The main source of estimates of health conditions and illnesses is derived from California Health Interview Survey (CHIS), a statewide survey of over 22,000 Californians. The CHIS is conducted on a continuous basis by the UCLA Center for Health Policy Research and includes questions addressing the health status, health-related behaviors, insurance coverage, access to health care, and use of health care services of California children, adolescents, and adults.[3] Data from CHIS can be stratified by gender, age, race/ethnicity, and by insurance status. For example, CHBRP's analysis of Senate Bill 473 (CHBRP, 2021) used the CHIS to determine the number of privately insured Californians diagnosed with Type 1 or Type 2 diabetes in 2019. When data on a specific condition or disease are unavailable in the CHIS dataset, CHBRP searches for other relevant population- or telephone-based surveys (e.g., National Health and

[3] CHIS data available at: https://healthpolicy.ucla.edu/chis/data/Pages/GetCHISData.aspx.

Nutrition Examination Survey [NHANES], National Immunization Survey [NIS]) that capture the California population.

CHBRP's third choice for data (Tier 3) includes national estimates from population- or telephone-based surveys, which are used for conditions or illnesses where no California-specific data exist. Summary data maintained by the National Center for Health Statistics such as the National Health Interview Survey (NHIS) and the NHANES are examples of sources that may be reviewed. In addition, the CDC and National Institutes of Health (NIH) websites may be searched for potential sources of data, as are websites of national associations affiliated with the disease or condition of interest. Also, literature searches may be conducted to find studies of California-specific or national incidence and prevalence rates published in peer-reviewed journals or in the grey literature. For example, in its analysis of Senate Bill 428 (CHBRP, 2021), to estimate the prevalence of adverse childhood experiences (ACEs) in the California Medi-Cal population, CHBRP used *ACEs Aware* programmatic data published by the California Office of the Surgeon General and the Department of Health Care Services.

Tier 4 includes data obtained from the actuarial contractor. For example, in its analysis of Assembly Bill 767 (CHBRP, 2019), CHBRP examined the 2016 MarketScan® database and Milliman's proprietary 2016 Consolidated Health Cost Guidelines™ Sources Database (CHSD) for infertility services among enrollees with an infertility diagnosis in California, as well as in New Jersey, a state where an infertility mandate is already in place.

CHBRP strives to provide the legislature with the best evidence-based estimates possible, but in rare instances where no data can be found — perhaps because it has never been studied formally — CHBRP relies on content experts (Tier 5) to advise staff on plausible assumptions. In the case of Assembly Bill 2643 (CHBRP, 2018), CHBRP consulted with experts regarding the supply of dentists providing dental general anesthesia (DGA), as well as the approximate incidence of DGA cases among pediatric and special needs populations.

Identifying Related Health Outcomes

The report also includes data on health outcomes associated with the disease such as morbidity and mortality. In consultation with the medical effectiveness team and a content expert, a list of relevant health outcomes for each disease is developed. Morbidity data are searched using the same procedure outlined above for incidence and prevalence data. Cancer-specific mortality rates are available from the California Cancer Registry. Data on other mortality rates can be found through CDC's WONDER database query system, which contains mortality data from all death certificates filed in the United States starting in 1968. Annual data on the number of deaths and death rates are available by underlying cause of death and can be stratified by state, age, race, and gender. CDC WONDER also offers links to multiple public health reports and data systems sponsored by government and nongovernment organizations.

Baseline Disparities and Social Determinants of Health

CHBRP's authorizing statute requests consideration of "the impact on the health of the community, including diseases and conditions where disparities in outcomes associated with the social determinants of health as well as gender, race, sexual orientation, or gender identity are

established in peer-reviewed scientific and medical literature." As such, the background section of each CHBRP analysis includes contextual information related to the prevalence of any existing disparities (e.g., by race/ethnicity, sex/gender, sexual orientation, gender identity, etc.) and/or any other bill-relevant SDOH (e.g., income, transportation, education, discrimination, employment, etc.) that may make the impacts of proposed health insurance legislation vary among groups of Californians.

As defined by the Healthy People initiative, CHBRP relies on the following definitions:

1. **Health Disparity**: "A particular type of health difference that is closely linked with social, economic, and/or environmental disadvantage. Health disparities adversely affect groups of people who have systematically experienced greater obstacles to health based on their racial or ethnic group; religion; socioeconomic status; gender; age; mental health; cognitive, sensory, or physical disability; sexual orientation or gender identity; geographic location; or other characteristics historically linked to discrimination or exclusion (HP2020, 2014)."

2. **SDOH**: "the conditions in the environment in which people are born, live, learn, work, play, worship and age that affect a wide range of health outcomes and risks." Composed of five domains: (1) economic stability, (2) education access and quality, (3) health care access and quality, (4) neighborhood and built environment, and (5) social and community context, SDOH play a pivotal role in shaping one's health, well-being, and quality of life. Examples of SDOH include: safe housing, transportation, racism, discrimination, education, income, language, among a number of other determinants." (HP2030, 2021).

Evidence (see Appendix A) shows that five SDOH domains per Healthy People 2030 strongly influence health outcomes (HP2030, 2021). SDOH are more frequently influenced by systemic social policy and less commonly by specific health insurance legislation. However, health insurance legislation may impact health outcomes for disparities associated with SDOH. Health insurance improves access to medical care and, therefore, can be considered a factor that mediates the outcomes of disease and injury. Less commonly, health insurance and medical care may also influence SDOH. Although benefit mandate laws are unlikely to address SDOH, they may create, ameliorate, or exacerbate disparities linked to SDOH. Therefore, proposed legislation, such as a health insurance benefit bill, might be expected to create, ameliorate, or exacerbate such disparities. When relevant to the bill subject and where evidence is available, CHBRP indicates how proposed health insurance legislation may interact with health outcome disparities associated with SDOH.

Public Health Impacts Section

The following relevant components of the Public Health Impacts analysis are described below: 1) Criteria and Guidelines for the Analysis of Short-Term Public Health Impacts; 2) Estimating the Public Health Impacts of a Mandate; and 3) Estimating Impacts on Disparities and Social Determinants of Health (e.g., Gender and Racial/Ethnic Disparities).

Criteria and Guidelines for the Analysis of Short-Term Public Health Impacts

CHBRP reports on the impacts of a proposed health benefit mandate. CHBRP's authorizing statute specifies the initial calendar year following implementation as the key period of interest. When estimating the public health impacts of a mandate, the public health team focuses on the short-term timeframe (within 12 months of implementation) in parallel with the cost team estimates.

CHBRP focuses its postmandate cost and public health impacts analysis on the initial 1-year time horizon for several reasons:

1. The CHBRP cost impact model for premium and total expenditure estimates mimics the internal processes used by most plans and insurers to determine premium changes in a given year and provides the legislature with the "real world" perspective on how decisions are made by health insurers.
2. The 60-day analytic timeframe limits CHBRP's capacity for modeling the long-term cost and health consequences of proposed benefit mandates — an effort that would require sophisticated, disease-specific simulation models.
3. Given the specific nature of most proposed benefit mandates analyzed by CHBRP, the long-term cost impacts or public health impacts attributable to the mandate are not necessarily addressed in the literature.
4. The longer the time horizon, the greater the uncertainty due to compounding factors other than any change in benefits that the proposed mandate would cause. Such compounding factors include changes in the practice, organization, and delivery of medical care, as well as changes in technology, demographics, and the economy. Because of such compounding factors, estimates beyond the 12-month timeframe for the impacts of a proposed benefit mandate may be unstable.

Estimating the Public Health Impacts of a Mandate

Per CHBRP's authorizing statute, the public health impact analysis includes an estimate on "the impact on the health of the community, including the reduction of communicable disease and the benefits of prevention such as those provided by childhood immunizations and prenatal care."[4] The data elements needed to estimate the public health impact on the overall health of the community are the medical effectiveness of the mandated health benefit, the impact on coverage and utilization due to the mandate, and baseline incidence and health outcomes of the relevant condition(s).

The medical effectiveness team bases its conclusions regarding the medical impact of the health benefit mandate on thorough literature reviews conducted with medical librarians and in consultation with content experts. The methods used to conduct the literature search are available on CHBRP's website in the *Medical Effectiveness Analysis and Research Approach* summary.[5]

[4] CHBRP's authorizing statute is available at: www.chbrp.org/about_chbrp/faqs/index.php.
[5] See *Medical Effectiveness Analysis and Research Approach* available at: https://chbrp.com/analysis_methodology/medical_effectiveness_analysis.php.

The cost and utilization team estimates changes in the insured population that would be directly affected by the mandate, including those who currently have coverage for the health benefit mandate and the number of Californians who would be newly covered as a result of the mandate. Additionally, the cost team estimates the utilization impacts for insured Californians who have coverage for the proposed health insurance benefit at baseline and for those who will be newly covered for the benefit in the first year postmandate. Details on the methodology used to make these adjustments can be found in the *Cost Impact Analysis and Research Approach* summary.[6] These estimates are critical to the public health impact analysis.

If all these data elements are available, the overall change in health outcomes in the affected population can be estimated. The public health impact calculations combine the estimated change in coverage and/or utilization of the health benefit mandate for the relevant population and the measure of effectiveness derived from the medical effectiveness literature review. The results for each health outcome are compiled to produce an overall mean estimate that can be used to calculate the health effects of the benefit mandate. For each specific health outcome reviewed in the literature for which there are baseline data available and a mean effect calculated, the estimated impact on each health outcome is applied to the population of new users to determine the overall change in outcomes resulting from the mandate.

Summary data and estimates are presented in the *Public Health Impacts* section of a CHBRP analysis, and detailed calculations are included in an appendix when impacts can be quantified. Figure 2 below explains the logic supporting the calculations.

[6] See *Cost Impact Analysis and Research Approach* available at: https://chbrp.org/document_center/Analysis%20Methodology/Cost%20Impact%20Analysis%20and%20Research%20Approach.pdf.

Figure 2. Calculations of Estimated Public Health Impacts (Short-Term) and Data Sources

Baseline

Step 1. *Calculate baseline population of interest*:

- Total population of enrollees in plans or policies that would be subject to the bill already covered for tests/treatments/services in proposed health benefit mandate (CHBRP/actuarial data)[7]
    - Of the total covered population, the number with relevant disease/condition (registries, state or national surveys, medical or public health literature)

Step 2. *Calculate baseline expected outcome estimates without mandate for a 1-year period*:

- Use of services/treatment by this population (CHBRP/actuarial data/literature)
    - Medical effectiveness of the service/treatment (literature)
        - Total number of persons with averted (or improved) health outcomes

Postmandate

Step 3. *Calculate estimate of newly covered population in the first year postmandate:*

- Total population of enrollees in plans or policies that would be subject to the bill, with no or partial coverage, who would be newly covered for service/treatment by the proposed health benefit mandate (CHBRP/actuarial data/literature).
    - Of the total newly covered population, the number with relevant disease/condition (registries, state or national surveys, medical or public health literature)

Step 4. *Calculate baseline expected outcome estimates with mandate for a 1-year period*:

- Use of services/treatment by this population (CHBRP/actuarial data/literature)
    - Medical effectiveness of the service/treatment (literature)
        - Total number of persons with averted (or improved) health outcomes

Step 5. *Calculate expected difference(s) in outcome(s) between baseline and postmandate in the first postmandate year:*

- Report the difference between the total number of persons with averted (or improved) health outcomes baseline (Step 2) and the total number of persons with averted (or improved) health outcomes postmandate (Step 4).

Conclusions about the short-term public health impacts (i.e., within 12 months of implementation) of a mandate are categorized as follows:

- *Quantitative or qualitative short-term public health impacts are estimated* when the following conditions are met:

[7] CHBRP's *Estimates of Sources of Health Insurance in California* is available at: https://chbrp.com/other_publications/index.php#revize_document_center_rz44.

    - The medical effectiveness team finds "clear and convincing," "preponderance of," or "limited[8]" evidence that the service or treatment is effective, AND
    - The cost team estimates a change in number of enrollees with compliant benefit coverage and/or a change in utilization of the relevant service or treatment.
- *"No measurable public health impacts"* are estimated for the first year postmandate when the evidence suggests that no improvement in health outcomes at the population level are likely to occur due to the service or treatment or when insurance coverage or utilization is not expected to measurably change at the population level.
- *"Unknown public health impacts"* are estimated for the first year postmandate if medical effectiveness evidence is inconclusive or insufficient; if the cost team cannot estimate a change in utilization; or if no sufficient prevalence or incidence data are available.
- When estimates of changes in coverage or utilization are considered too uncertain for a single point estimate, public health impacts may be estimated with an upper and/or lower bound (quantitative) or directionally (qualitative).

Harms

Public health impacts of a service or a treatment includes benefits as well as any potential harms. These potential adverse outcomes from a public health perspective are weighed against the overall potential desirable health outcomes and include both long-term and short-term harms to physical and psychological health, as well as adverse financial effects. Harms reported in the *Medical Effectiveness* section focus primarily on short-term adverse health effects of a service or treatment.

Estimating the Impacts on Disparities (e.g., Gender and Racial/Ethnic Disparities) and Social Determinants of Health

CHBRP's authorizing statute requires that analyses assess the extent to which a mandated benefit will have an "impact on the health of the community, including diseases and conditions where gender and racial/ethnic disparities in outcomes are established in peer-reviewed and scientific literature." CHBRP's analyses focus on enrollees in health plans and policies that are subject to state regulation as per its authorizing statute.[9] Although insurance status (insured vs. uninsured) has been found to be an important factor in health disparities, particularly in explaining racial/ethnic health disparities (Sohn, 2017), there is less research addressing disparities within the insured population. CHIS data provide one indication that disparities among the insured population persist. Among the insured population of Californians aged 18 to 64, Blacks, Latinos, and American Indian/Alaska Natives reported worse overall health status compared with Whites (CHIS, 2020). This finding is consistent with much of the academic literature and policy reports that document racial and ethnic disparities in overall health status and disparities within specific health conditions (e.g., NASEM, 2017; NCHS, 2016).

[8] The short-term public health impacts may be estimated if the medical effectiveness team finds "limited" evidence and discussion is warranted based on the mandate topic.
[9] See CHBRP's resource, *Estimates of Sources of Health Insurance in California for 2022*, available at https://chbrp.com/other_publications/index.php#revize_document_center_rz44.

When data are available, CHBRP analyses detail differences in disease prevalence, health services utilization, and health outcomes by gender and race/ethnicity, specific to the insured population. Four steps are used to assess whether disparities exist and whether the proposed mandate will have an impact on gender and/or racial/ethnic disparities:

1. *Conduct literature review*: Using keywords, the public health team searches the academic literature for gender and racial/ethnic differences by: (a) prevalence of relevant health conditions or diseases; (b) utilization of relevant health services; and (c) relevant health outcomes. The medical effectiveness literature is also reviewed for any relevant gender or racial/ethnic disparity information.
2. *Review data sources*: The team also identifies sources that contain relevant prevalence/incidence, health care utilization, and outcomes data by gender and race/ethnicity, preferably in California's insured population. The public health team applies the same hierarchy of evidence for disparities as that used to search for general incidence and prevalence data.
3. *Determine whether a mandate will impact disparities*: There are five main conclusions regarding the potential for mandates to impact gender or racial/ethnic disparities:

    1) Evidence suggests that no disparities exist for the disease/condition/health outcome;
    2) Impact is unknown due to a lack of evidence of disparities;
    3) The mandate may increase disparities;
    4) The mandate may decrease disparities; or
    5) The mandate is not expected to alter existing disparities.

4. *Determine whether a change in disparities can be quantified*: Ideally, when a change in disparities is a possible outcome, CHBRP attempts to quantify the marginal effect of the proposed mandate on gender and racial/ethnic disparities in the insured population. In order to accomplish this, the following information is needed:

    - Baseline incidence or prevalence of a condition by gender and/or race/ethnicity within the insured population;
    - Coverage impacts by gender and/or race/ethnicity (the gender and/or racial/ethnic breakdown of the population affected by the specific mandate);
    - Utilization impacts by gender and/or race/ethnicity (the gender and/or racial/ethnic breakdown of increased use of the benefit due to the mandate); and
    - Medical impacts by gender and/or race/ethnicity (gender- and/or race/ethnicity-specific calculations of the medical effectiveness of the mandate in improving health outcomes).

Historically, the CHBRP analytic model has been constrained by the lack of baseline data describing the racial/ethnic composition among enrollees in plans and policies subject to health insurance mandates and the lack of utilization data by gender or race/ethnicity. In order to identify the racial/ethnic composition of enrollees with health insurance potentially subject to state-level benefit mandates, CHBRP uses CHIS data and CHBRP's estimates of sources of health insurance (i.e., commercial enrollees and Medi-Cal enrollees).[10] Due to the varied

[10] See CHBRP's document on *Benefit Mandate Structure and Unequal Racial/Ethnic Health Impacts* available at: https://chbrp.com/analysis_methodology/public_health_impact_analysis.php.

distribution of racial/ethnic groups between and varied representation within the two markets (i.e., commercial enrollees and Medi-Cal enrollees), a mandate that exempts one or the other may generate unequal impacts on related health outcomes.

CHBRP analyses will make directional statements regarding unequal impacts expected due to the structure of a proposed benefit mandate when the following conditions are true:

1. There is sufficient medical effectiveness evidence to suggest that utilization of the relevant test, treatment, or service will result in desired health outcomes among enrollees with compliant benefit coverage;
2. The proposed benefit mandate is written to exempt either the health insurance of Medi-Cal beneficiaries enrolled in Department of Managed Health Care (DMHC)-regulated plans or the health insurance of commercial enrollees (all other enrollees in DMHC regulated plans or California Department of Insurance-regulated policies);
3. In the exempt market, a significant portion of health insurance does not comply with the proposed mandate;
4. In the nonexempt market:
    a. Benefit coverage compliant with the proposed mandate is projected to increase; and
    b. Utilization of the relevant tests, treatments, or services is expected to increase.

In addition to detailing differences in disease prevalence, health services utilization, and health outcomes via gender and race/ethnicity, when data are available, CHBRP projects impacts of the proposed mandate related to any or all of the following disparities:

- *Sex and age*: Using the approach outlined for the analysis of racial/ethnic disparities (described above), CHBRP analyses will be able to estimate, broadly, the potential impacts by sex and/or age for bills that exempt either Medi-Cal or commercial insurance. For bills that address conditions or treatments focused on women or children (e.g., mammography screening or vaccinations), exempting one type of insurance from a mandate could create, exacerbate, or reduce disparities within these populations due to the disproportionate presence of women and children in Medi-Cal.

- *Gender identity/sexual orientation*: Using the approach outlined for the analysis of racial/ethnic disparities (described above), when evidence is available, CHBRP discusses the interaction between the proposed benefit mandate and gender identity or sexual orientation. CHBRP defines gender identity as one's internal sense of one's own gender, or the gender in which a person identifies, whether it be male, female, or nonbinary. Gender identity and sexual orientation are different facets of one's identity; an individual's gender does not determine a person's sexual orientation (i.e., a person's emotional, romantic, or sexual attraction to other people) (ACOG, 2020; CDC 2021).

- *Income*: CHBRP analyses separately address Medi-Cal beneficiaries and broadly estimate the potential impacts for those above and below 138% of the federal poverty line for bills that exempt Medi-Cal, in addition to considering impacts on lost productivity and out-of-pocket costs.

Other bill-relevant determinants: For bills in which data on nontraditional health outcomes are cited (e.g., work days lost, school absence, increased appointments, specific denials of care),

CHBRP seeks to identify evidence about the possible impacts on corresponding determinants such as employment, education, transportation, or discrimination.

Long-Term Impacts Section

The following aspects of the *Long-Term Impacts Section* are described below: 1) Criteria and Guidelines for Estimating Long-Term Impacts, 2) Estimating Long-Term Impacts on Disparities and Social Determinants of Health, and 3) Estimating Impacts on Premature Death and Economic Loss Associated With Disease.[11]

Criteria and Guidelines for Estimating the Long-Term Impacts

For those outcomes likely to manifest beyond 12 months of implementation (e.g., preventive services such as screenings or vaccinations), CHBRP estimates long-term public health impacts based on literature reviews and actuarial data. This section includes both the expected public health, and cost and utilization long-term impacts.[12] Examples of long-term impacts related to public health in CHBRP analyses are provided in Appendix B. The methodology for preparing the public health subsection of the *Long-Term Impacts Section* is presented below:

1. During the initial assessment of a proposed benefit mandate, the CHBRP analytic team determines whether there are likely to be long-term health impacts on consultation with content experts.
2. The public health team for the analysis works with the medical librarian, to determine search terms and parameters that identify key literature on the possible long-term public health impacts of the proposed mandate. This includes economic loss associated with the disease and cost-effectiveness studies (which typically analyze lifetime health benefits and costs, as well as longitudinal epidemiological cohort studies).
3. The cost team reviews relevant literature, including cost-effectiveness studies that may have modeled long-term costs. The literature on cost-effectiveness analysis is summarized by the public health team to inform the reader as to what are the costs associated with a life saved (or a "quality-adjusted life-year" saved).

The public health team quantifies the effect of a proposed benefit mandate on lifetime morbidity and mortality, if data are available. As mentioned, if sufficient information is not available to quantify impacts, the public health team may indicate a direction of effect based on qualitative information.

Estimating Long-Term Impacts on Disparities and Social Determinants of Health

When relevant, CHBRP's public health team may also analyze the extent to which the proposed mandate has long-term impacts on disparities (e.g., gender, racial/ethnic, among other

[11] For an example of long-term public health analyses in CHBRP reports, see CHBRP's analysis of Senate Bill 1245 (Figueroa) Cervical Cancer Screening, available at https://www.chbrp.org/completed_analyses/index.php.
[12] The methodology for preparing long-term utilization and cost impacts is described in CHBRP's *Cost Impact Analysis and Research Approach*, available at https://chbrp.org/analysis_methodology/cost_impact_analysis.php.

demographic factors) and/or SDOH. There are several conclusions regarding the potential for mandates to impact long-term disparities and/or SDOH:

6) Due to the lack of evidence/literature and/or breadth of the mandate subject, CHBRP is unable to estimate the long-term impacts on disparities/SDOH.
7) Although disparities may exist and likely contribute to the prevalence of disease/health outcome, CHBRP projects no changes in disparities/SDOH that would be attributable to the mandate.
8) Based on the available evidence/literature, CHBRP projects that there may be an impact on select disparities/SDOH.*
   *__Note__: If it's determined that there would be an impact on select disparities/SDOH (e.g., age, race/ethnicity, etc.), CHBRP's public health team would proceed to expound upon the related impacts (e.g., increase/decrease in disparities/SDOH).

Periodically, health insurance mandates can influence SDOH, which can mediate health inequities. Based on the evidence presented in the background section, CHBRP may conclude that the mandate could modify the effects of SDOH on health status/outcomes. Or CHBRP may conclude that changes in health status/outcomes due to the mandate could mediate SDOH by some factor.

Estimating Impacts on Premature Death and Economic Loss Associated With Disease

CHBRP's public health team is also tasked with analyzing "the extent to which the proposed service reduces premature death and the economic loss associated with disease." Economists and public health experts use the following measures, which expand beyond direct medical care costs, to assess societal costs and quality of life impacts (indirect costs) of a health care service or treatment on the community.

Premature death

Premature death is often defined as death before age 75 years (NCI, 2019). The overall impact of premature death due to a particular disease can be measured in years of potential life lost (YPLL) (Gardner and Sanborn, 1990). This is a common measure used by public health researchers that essentially weights deaths occurring at younger ages more heavily than deaths in the older population. This measure complements crude and age-adjusted mortality rates, which are usually dominated by the underlying disease process in the elderly (CDC, 1986). To measure the impact of premature death across the population impacted by a proposed mandate, CHBRP first collects baseline mortality rates, usually from state or national vital statistics data sets. Medical effectiveness literature is also examined to determine whether the tests, treatments, or services relevant to the proposed benefit mandate are likely to reduce mortality. If so, the public health team conducts a literature review to determine whether the YPLL has been established for that condition. The analysis may conclude one of the following:

- Premature death is not relevant — because the condition or disease relevant to the proposed benefit mandate does not result in death;

- The impact of the proposed benefit mandate on premature death is unknown due to insufficient/inconclusive evidence or because CHBRP estimates no measurable change in utilization of relevant tests, treatments, or services;
- The proposed benefit mandate would have no impact (per evidence); or
- The proposed benefit mandate would likely impact premature death (per evidence).

In order to calculate an expected impact on premature death, the following criteria must be met:

- Mortality must be a relevant health outcome (per peer-reviewed literature) for the relevant tests, treatments, or services;
- The relevant tests, treatments, or services must be medically effective at reducing mortality (per peer-reviewed literature); and
- The mandate would increase benefit coverage or utilization of the relevant tests, treatments, or services (estimates from the CHBRP cost team).

Economic loss

Economic loss associated with disease is commonly presented in the literature as an estimation of the value of the YPLL in a dollar amount (e.g., valuation of years of work life lost). In addition, morbidity associated with the disease can be quantified as lost productivity, absenteeism, and quality of life (e.g., lost days of work due to illness for patient or caregiver). Similar to the process used to estimate the premature death impact, the public health team conducts a literature review to determine whether societal costs of illness (indirect costs) have been established and uses the evidence to support one of four conclusions:

- Disease/condition most relevant to the proposed benefit mandate is not relevant to economic loss.
- Impact of the benefit mandate on economic loss is unknown due to insufficient/ambiguous evidence of medical effectiveness or because CHBRP estimates no measurable change in utilization of the relevant tests, treatments, or services.
- The benefit mandate would have no impact on economic loss (per evidence).
- The benefit mandate would decrease/increase economic loss (per evidence).

CHBRP presents the indirect cost of illness when available, but also notes where data on the economic loss associated with a disease are not published. This economic loss analysis is separate from the cost analysis, which calculates the direct, incremental cost of a mandate that would expand or rescind coverage of a health benefit, or alter the terms of existing benefit coverage.

In order to carry out a calculation of a benefit mandate's likely effect on economic loss associated with a relevant disease or condition, the following must be true:

- The benefit mandate would increase coverage or utilization of the relevant tests, treatments, or services; and

- The economic loss associated with a disease or condition can be calculated with either California or national data.

Conclusion

Understanding the scope of the public health impacts of health insurance benefit mandates (and related health-insurance legislation) through evidence-based analysis is critical to public policymaking; inclusion of the public health perspective in these reports helps capture the potential value of a mandate (i.e., What may be achieved and at what cost?). The public health team continually works with its CHBRP colleagues to refine the research methods and apply relevant, evidence-based data sources to support the California Legislature with the most timely, accurate, nonpartisan estimates of the impacts of proposed benefit mandates.

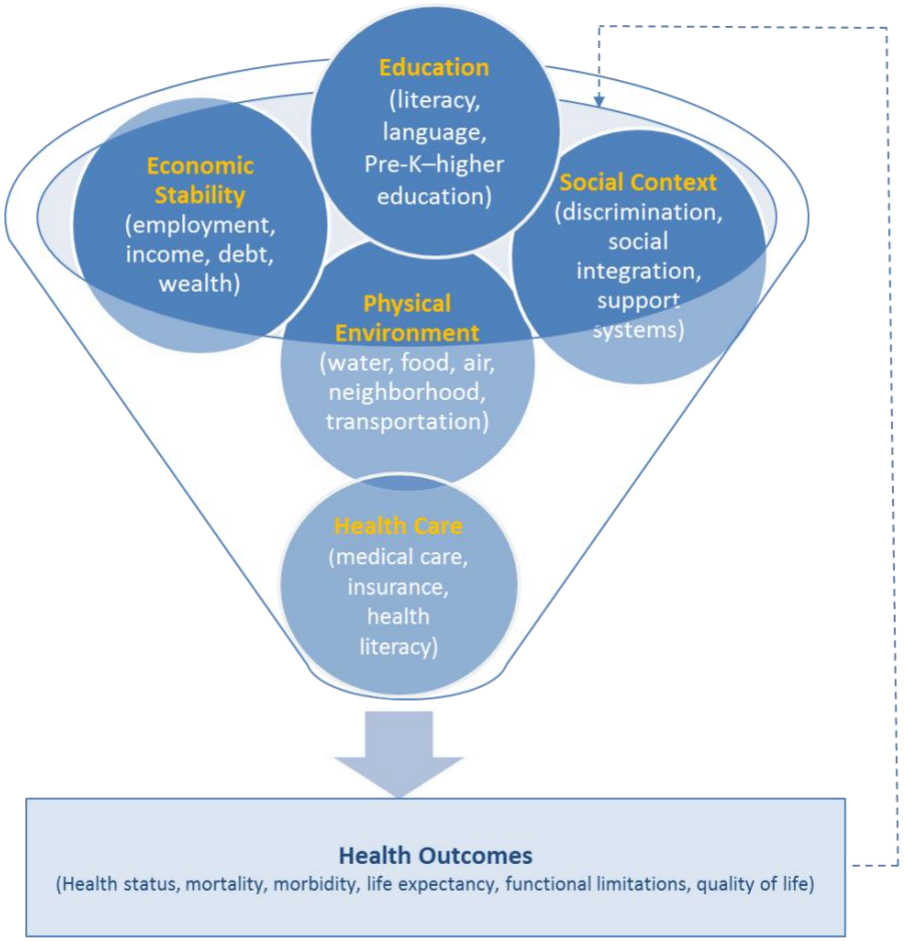
Appendix A: Social Determinants of Health

The basic concept underlying social determinants of health (SDOH) is that many factors outside of genetics and the delivery of medical care have a substantial influence on health and mortality (see Figure 3 and Figure 4, below). A large body of evidence from the past 2 decades suggests that SDOH such as education access and quality, economic stability (e.g., income stability, employment, wealth), social and community context (e.g., race/ethnicity, discrimination), neighborhood and built environment (e.g., quality of air, water, and food, housing, transportation, etc.), and health care access and quality exert a significant influence on health conditions and health outcomes (Braveman and Gottlieb, 2014; HP2030, 2021), and contribute to health disparities among various populations.[13]

SDOH interact with each other in complex, nonlinear relationships. The example of a bidirectional relationship between health and education (see CHBRP Case Study AB 264, below) demonstrates that chronically ill children have lower educational attainment due to chronic school absence. Furthermore, their poor health status may have the potential to influence their future earning potential.

[13] CHBRP reviewed national and global health-related organization websites to find the SDOH definition most relevant to CHBRP's task of estimating impacts of proposed health insurance benefit mandates. The majority of organizations have adopted variations of SDOH definitions in line with either the World Health Organization (WHO) or Healthy People 2030 (HP2030). CHBRP reviewed definition from well-respected bodies such as WHO, U.S. Office of Disease Prevention and Health Promotion (Healthy People 2030), Centers for Disease Control and Prevention, National Academy of Medicine (formerly known as the Institute of Medicine), Kaiser Family Foundation, American Public Health Association, American Medical Association, and the Robert Wood Johnson Foundation—these definitions overlap considerably.

Figure 3. Simplified Framework of Health Outcomes Affected by Social Determinants of Health



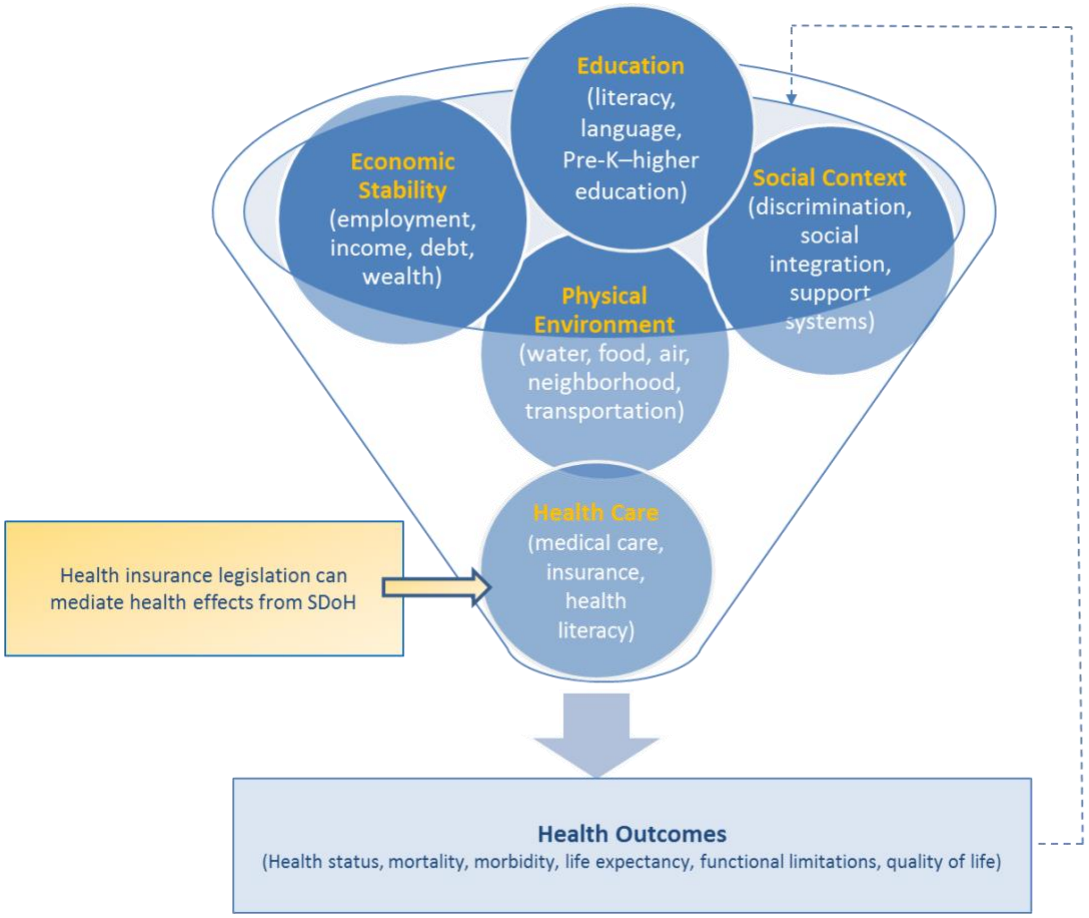
Note: Factors listed are not all-inclusive, and can interact bidirectionally.
Source: California Health Benefits Review Program, 2021.

A Case Study in SDOH: Flint, Michigan

We can apply this theoretical construct to a recent scenario in Flint, Michigan (Goodnough et al., 2016). In 2014, a policy decision was made to change the water source of the city. This decision, driven by budgetary considerations in a largely poor and minority community, resulted in significant lead contamination to the city water supply and a subsequent doubling of documented cases of lead poisoning among young children in Flint. Childhood lead poisoning can severely inhibit brain development and intellectual attainment in children; hence, the negative impact on these children and on the community will continue for years. The problems in Flint children were first brought to public attention by a pediatrician working in Flint who, after treating symptomatic children, compared lead screening results of young patients before and after the change in water supply. This example illustrates how a utility department's policy change — unrelated to health or health care — affected the physical environment (water pipes and water quality), and produced major negative health impacts in a community. It also demonstrates the important inter-relationships between the health care system and the identification of important harms resulting from public policies.

Interaction Between SDOH and Health Insurance

Figure 4. How Health Insurance Interacts With Social Determinants of Health



Source: California Health Benefits Review Program, 2021.
Note: Factors listed are not all-inclusive and can interact bidirectionally.

CHBRP Case Study: AB 264: Pediatric Asthma Self-Management Education

In 2006, CHBRP analyzed AB 264, a proposed insurance mandate for asthma management education for children.[14] CHBRP estimated that the bill would reduce school absences for California children with asthma by 40,500 days per school year (across 10,000 schools). Evidence suggests that attendance is closely linked with educational success, not only for those with the chronic condition, but for their peers who experience curriculum delay due to too many classmates missing class (Balfanz and Byrnes, 2012). Additionally, a reduction in school day absences could improve school budgets through recovery of payments through increases in average daily attendance. Furthermore, although environmental causes of asthma may not be eliminated through this health benefit mandate, it appears that this mandate could mediate the negative environmental determinants by helping children manage their disease.

[14] See CHBRP's report on pediatric asthma education, *Analysis of Assembly Bill 264: Pediatric Asthma Self-Management Training and Education Services.* Available at: https://chbrp.org/completed_analyses/index.php.

References

American College of Obstetricians and Gynecologists (ACOG). LGBTQ Teens. 2020. Available at: https://www.acog.org/womens-health/faqs/lgbtq-teens. Accessed September 2020.

Balfanz R, Byrnes V. Chronic Absenteeism: Summarizing What We Know From Nationally Available Data. 2012. Baltimore, MD: Johns Hopkins University Center for Social Organization of School. Available at: https://ccrscenter.org/products-resources/resource-database/chronic-absenteeism-summarizing-what-we-know-nationally. Accessed January 2022.

Braveman P. Defining health disparities and health equity. *Public Health Reports.* 2014:129 Suppl 2;5-8.

Braveman P, Gottlieb L. The social determinants of health: it's time to consider the causes of the causes. *Public Health Reports.* 2014;129 Suppl 2:19-31.

California Health Benefits Review Program (CHBRP). *Analysis of Assembly Bill 767: Infertility.* Report to California State Legislature. Berkeley, CA: CHBRP: 2019.

California Health Benefits Review Program (CHBRP). *Analysis of Senate Bill 1245: Health Care Coverage: Cervical Cancer Screening Test.* Report to California State Legislature. Oakland, CA: CHBRP; 2006.

California Health Benefits Review Program (CHBRP). *Analysis of Assembly Bill 1429: Human Papillomavirus Vaccination.* Report to California State Legislature. Oakland, CA: CHBRP; 2007.

California Health Benefits Review Program (CHBRP). *Analysis of Senate Bill 428: Adverse Childhood Experiences Screenings.* Report to the California State Legislature. Berkeley, CA: CHBRP; 2021.

California Health Benefits Review Program (CHBRP). *Analysis of Assembly Bill 2643: Dentistry: General Anesthesia.* Report to the California State Legislature. Berkeley, CA: CHBRP; 2018.

California Health Benefits Review Program (CHBRP). *Analysis of California Senate Bill 473: Insulin Cost Sharing.* Report to California State Legislature. Berkeley, CA: CHBRP; 2021.

California Health Interview Survey (CHIS). 2020 California Health Interview Survey. Los Angeles, CA: UCLA Center for Health Policy Research; 2020.

Centers for Disease Control and Prevention (CDC). Premature mortality in the United States: public health issues in the use of years of potential life lost. *MMWR: Morbidity and Mortality Weekly Report*. 1986:5(2S);1s-11s. Available at: www.cdc.gov/mmwr/preview/mmwrhtml/00001773.htm. Accessed September 30, 2013.

Centers for Disease Control and Prevention (CDC). Lesbian, Gay, Bisexual and Transgender health. Available at: www.cdc.gov/lgbthealth/transgender.htm. Accessed September 14, 2021.

Gardner JW, Sanborn JS. Years of potential life lost (YPLL): what does it measure? *Epidemiology*. 1990;1:322-329.

Goldie SJ, Kohli M, Grima D, et al. Projected clinical benefits and cost-effectiveness of a human papillomavirus 16/18 vaccine. *Journal of the National Cancer Institute.* 2004;96:604-615.

Goodnough A, Davey M, Smith M. When the Water Turned Brown. *The New York Times.* Available at: www.nytimes.com/2016/01/24/us/when-the-water-turned-brown.html?_r=0. Accessed January 23, 2016.

Healthy People 2020 (HP2020). Social Determinants of Health. 2014. Office of Disease Prevention and Health Promotion. Available at: www.healthypeople.gov/2020/topics-objectives/topic/social-determinants-of-health. Accessed August 6, 2021.

Healthy People 2030 (HP2030). Social Determinants of Health. 2021. Office of Disease Prevention and Health Promotion. Available at: https://health.gov/healthypeople/objectives-and-data/social-determinants-health. Accessed September 24, 2021.

National Academies of Sciences, Engineering, and Medicine (NASEM). *Communities in Action: Pathways to Health Equity*. Washington, DC: National Academies Press; 2017.

National Cancer Institute (NCI). Premature Death. 2019. NCI Dictionary of Cancer Terms. Available at: www.cancer.gov/publications/dictionaries/cancer-terms/def/premature-death. Accessed August 29, 2019

National Center for Health Statistics (NCHS). *Health, United States, 2015: With Special Feature on Racial and Ethnic Health Disparities*. Hyattsville, MD: NCHS; 2016.

Philip S, McLaughlin CG, Gluck ME, eds. Informing legislative decisions on health benefit mandates: the California Health Benefits Review Program [Special issue]. *Health Services Research*. 2006;41:991-1158.

Sanders GD, Taira AV. Cost-effectiveness of a potential vaccine for human papillomavirus. *Emerging Infectious Diseases.* 2003;9:37-48.

Sohn H. Racial and ethnic disparities in health insurance coverage: dynamics of gaining and losing coverage over the life-course. *Population Research and Policy Review.* 2017;36(2):181-201.