

California Health Benefits Review Program

Analysis of Assembly Bill 219: Health Care Coverage: Cancer Treatment

A Report to the 2013-2014 California Legislature

April 4, 2013





The California Health Benefits Review Program (CHBRP) responds to requests from the State Legislature to provide independent analyses of the medical, financial, and public health impacts of proposed health insurance benefit mandates and proposed repeals of health insurance benefit mandates. CHBRP was established in 2002 to respond to requests from the California Legislature to provide independent analysis of the medical, financial, and public health impacts of proposed health insurance benefit mandates and repeals per its authorizing statute.¹ The program was reauthorized in 2006 and again in 2009. CHBRP's authorizing statute defines legislation proposing to mandate or proposing to repeal an existing health insurance benefit as a proposal that would mandate or repeal a requirement that a health care service plan or health insurer: (1) permit covered individuals to obtain health care treatment or services from a particular type of health care provider; (2) offer or provide coverage for the screening, diagnosis, or treatment of a particular disease or condition; (3) offer or provide coverage of a particular type of health care treatment or service, or of medical equipment, medical supplies, or drugs used in connection with a health care treatment or service; and/or (4) specify terms (limits, timeframes, copayments, deductibles, coinsurance, etc.) for any of the other categories.

An analytic staff in the University of California's Office of the President supports a task force of faculty and staff from several campuses of the University of California to complete each analysis within a 60-day period, usually before the Legislature begins formal consideration of a mandate or repeal bill. A certified, independent actuary helps estimate the financial impacts. A strict conflict-of-interest policy ensures that the analyses are undertaken without financial or other interests that could bias the results. A National Advisory Council, drawn from experts from outside the state of California as well as Loma Linda University, the University of Southern California, and Stanford University, and designed to provide balanced representation among groups with an interest in health insurance benefit mandates or repeals, reviews draft studies to ensure their quality before they are transmitted to the Legislature. Each report summarizes scientific evidence relevant to the proposed mandate, or proposed mandate repeal, but does not make recommendations, deferring policy decision making to the Legislature. The State funds this work through an annual assessment on health plans and insurers in California. All CHBRP reports and information about current requests from the California Legislature are available on the CHBRP website, www.chbrp.org.

¹ Available at: www.chbrp.org/documents/authorizing_statute.pdf.

A Report to the 2013–2014 California State Legislature

Analysis of Assembly Bill 219 Health Care Coverage: Cancer Treatment

April 4, 2013

**California Health Benefits Review Program
1111 Franklin Street, 11th Floor
Oakland, CA 94607
Tel: 510-287-3876
Fax: 510-763-4253
www.chbrp.org**

Additional free copies of this and other CHBRP bill analyses and publications may be obtained by visiting the CHBRP website at www.chbrp.org.

Suggested Citation:

California Health Benefits Review Program (CHBRP). (2013). *Analysis of Assembly Bill 219: Health Care Coverage: Cancer Treatment*. Report to California State Legislature. Oakland, CA: CHBRP.

PREFACE

This report provides an analysis of the medical, financial, and public health impacts of Assembly Bill 219. In response to a request from the California Assembly Committee on Health on February 5, 2013, the California Health Benefits Review Program (CHBRP) undertook this analysis pursuant to the program's authorizing statute.

Edward Yelin, PhD, Janet Coffman, MPP, PhD, and Gina Evans-Young all of the University of California, San Francisco, prepared the medical effectiveness analysis. Bruce Abbott, MLS, of the University of California, Davis, conducted the literature search. Joy Melnikow, MD, MPH, Stephen McCurdy, MD, MPH, and Meghan Soulsby, MPH, all of the University of California, Davis, prepared the public health impact analysis. Byung-Kwang Yoo, MD, MS, PhD, of the University of California, Davis, prepared the cost impact analysis. Susan Pantely, FSA, MAAA, and Chankyu Lee of Milliman provided actuarial analysis. Content expert Betty Chan, PharmD, BCOP, of the University of Southern California provided technical assistance with the literature review and expert input on the analytic approach. Hanh Quach of CHBRP staff prepared the *Introduction* and synthesized the individual sections into a single report. A subcommittee of CHBRP's National Advisory Council (see final pages of this report) reviewed the analysis for its accuracy, completeness, clarity, and responsiveness to the Legislature's request.

CHBRP gratefully acknowledges all of these contributions but assumes full responsibility for all of the report and its contents. Please direct any questions concerning this report to:

California Health Benefits Review Program
1111 Franklin Street, 11th Floor
Oakland, CA 94607
Tel: 510-287-3876
Fax: 510-763-4253
[Email: chbrpinfo@chbrp.org](mailto:chbrpinfo@chbrp.org)
www.chbrp.org

All CHBRP bill analyses and other publications are available on the CHBRP website, www.chbrp.org.

Garen Corbett, MS
Director

TABLE OF CONTENTS

LIST OF TABLES AND FIGURES.....	4
EXECUTIVE SUMMARY	5
INTRODUCTION	14
BACKGROUND ON THE DISEASE	22
MEDICAL EFFECTIVENESS	22
BENEFIT COVERAGE, UTILIZATION, AND COST IMPACTS.....	31
PUBLIC HEALTH IMPACTS.....	45
APPENDICES	50
Appendix A: Text of Bill Analyzed.....	50
Appendix B: Literature Review Methods.....	51
Appendix C: Summary Findings on Medical Effectiveness.....	56
Appendix D: Cost Impact Analysis: Data Sources, Caveats, and Assumptions.....	87
Appendix E: Information Submitted by Outside Parties	96
REFERENCES	97

LIST OF TABLES

Table 1. AB 219 Impacts on Benefit Coverage, Utilization, and Cost, 2014	14
Table 2. Outpatient Oral Anticancer Medication Prescriptions, 2014	33
Table 3. Baseline (Premandate) Per Member Per Month Premiums and Total Expenditures by Market Segment, California, 2014.....	41
Table 4. Impacts of the Mandate on Per Member Per Month Premiums and Total Expenditures by Market Segment, California, 2014.....	43
Table C-1. Oral Anticancer Medications Approved by the FDA	56
Table C-2. FDA-Approved Oral Anticancer Agents and Their Indications	58
Table C-3. Studies That Examined the Impact of Cost Sharing on Use of Oral Anticancer Medications.....	81
Table C-4. Summary of Findings from Studies of the Impact of Cost Sharing on Use of Oral Anticancer Medications	83

EXECUTIVE SUMMARY

California Health Benefits Review Program Analysis of Assembly Bill 219

The California Assembly Committee on Health requested on February 5, 2013, that the California Health Benefits Review Program (CHBRP) conduct an evidence-based assessment of the medical, financial, and public health impacts of Assembly Bill (AB) 219 (Perea) on oral anticancer medications. In response to this request, CHBRP undertook this analysis pursuant to the provisions of the program's authorizing statute.²

CHBRP estimates that in 2014 approximately 25.9 million Californians (67%) will have health insurance that may be subject to a health benefit mandate law passed at the state level.³ Of the rest of the state's population, a portion will be uninsured (and so has no health insurance subject to any benefit mandate), and another portion will have health insurance subject to other state laws or only to federal laws.

Uniquely, California has a bifurcated system of regulation for health insurance subject to state benefit mandates. The California Department of Managed Health Care (DMHC)⁴ regulates health care service plans, which offer benefit coverage to their enrollees through health plan contracts. The California Department of Insurance (CDI) regulates health insurers,⁵ which offer benefit coverage to their enrollees through health insurance policies.

All DMHC-regulated plans and/or CDI-regulated policies that provide outpatient prescription drug coverage would be subject to AB 219; therefore, the mandate would affect the health insurance of approximately 25.6 million enrollees (66% of all Californians).

Developing Estimates for 2014 and the Effects of the Affordable Care Act

The Affordable Care Act (ACA)⁶ is expected to dramatically affect health insurance and its regulatory environment in California, with many changes becoming effective in 2014. Beginning in 2014, an expansion of the Medicaid program to cover people up to 133% of the federal poverty level (FPL)⁷ and the availability of subsidized and unsubsidized health insurance coverage purchased through newly established state health insurance exchanges are expected to significantly increase the number of people with health insurance in the United States.

² Available at: www.chbrp.org/docs/authorizing_statute.pdf.

³ CHBRP's estimates are available at: www.chbrp.org/other_publications/index.php.

⁴ DMHC was established in 2000 to enforce the Knox-Keene Health Care Service Plan of 1975; see Health and Safety Code (H&SC), Section 1340.

⁵ CDI licenses "disability insurers." Disability insurers may offer forms of insurance that are not health insurance. This report considers only the impact of the benefit mandate on health insurance policies, as defined in Insurance Code (IC), Section 106(b) or subdivision (a) of Section 10198.6.

⁶ The federal "Patient Protection and Affordable Care Act" (P.L.111-148) and the "Health Care and Education Reconciliation Act" (P.L. 111-152) were enacted in March 2010. Together, these laws are referred to as the Affordable Care Act (ACA).

⁷ The Medicaid expansion, which California will pursue, is to 133% of the federal poverty level (FPL)—138% with a 5% income disregard.

State exchanges will sell health insurance in the small-group and individual markets⁸ through qualified health plans (QHPs), which will be certified by and sold in a state's exchange. QHPs sold through California's state exchange, Covered California,⁹ will be DMHC-regulated plans or CDI-regulated policies, and as such will be subject to California state benefit mandates.

It is important to note that CHBRP's analysis of proposed benefit mandate bills typically address the marginal effects of the proposed bills—specifically, how the proposed mandate would impact benefit coverage, utilization, costs, and public health, holding all other factors constant. CHBRP's estimates of these marginal effects are presented in this report. Because expanded enrollment will not occur until January 2014, CHBRP relies on projections from the California Simulation of Insurance Markets (CalSIM) model¹⁰ to help set baseline enrollment for 2014. From this projected baseline, CHBRP estimates the marginal impact of proposed benefit mandates that could be in effect after January 2014. CHBRP's methods for estimating baseline 2014 enrollment from CalSIM projections are provided in further detail in Appendix D.

Bill-Specific Analysis of AB 219

Bill Language

The full text of AB 219 can be found in Appendix A.

AB 219 would prohibit DMHC-regulated plans and CDI-regulated policies that provide coverage for “prescribed, orally administered anticancer medications” from charging more than \$100 per filled prescription. This would apply to any DMHC-regulated plan and CDI-regulated policy issued, amended, or renewed on or after January 1, 2014.

AB 219 does not require DMHC-regulated plans and CDI-regulated policies that do not already provide coverage for oral anticancer medications to provide coverage for this benefit.

Analytic Approach and Key Assumptions

This analysis relies on a number of assumptions:

- **Definition of oral anticancer medications:** Because the bill specifies “prescribed, orally administered anticancer medications,” CHBRP assumes it would only affect cost sharing for drugs specific to the treatment of cancer. This analysis therefore assumes that AB 219 would not affect cost sharing for other medications, such as antipain or anti-nausea drugs, that a cancer patient might use during the course of chemotherapy.

⁸ Effective 2017, states may allow large-group purchasing through the exchange, which may make some large-group plans and policies subject to essential health benefits requirements [ACA Section 1312(f)(2)(B)].

⁹ The California Health Benefits Exchange Authorizing Statute is available here: <http://www.healthexchange.ca.gov/Documents/California%20Codes%20Governing%20the%20Health%20Benefit%20Exchange.pdf>

¹⁰ CalSIM was developed jointly and is operated by the University of California, Los Angeles, Center for Health Policy Research and the University of California, Berkeley, Center for Labor Research. The model estimates the impact of provisions in the ACA on employer decisions to offer, and individual decisions to obtain, health insurance.

- **Coverage of oral anticancer drugs:** Chemotherapy can be covered under the medical benefit—which provides coverage of hospital and physician/provider services—or *outpatient* prescription drug pharmacy benefit of a DMHC-regulated plan or CDI-regulated policy. Because the bill explicitly names “prescribed, orally administered” medications, CHBRP assumes that the bill applies to the outpatient pharmacy benefit portion of the plan or policy.
- **No expansions of coverage:** AB 219 would not require DMHC-regulated plans and CDI-regulated policies that do not already provide coverage for prescription drugs on an outpatient basis to begin covering them, nor would it require DMHC-regulated plans and CDI-regulated policies that cover only generic prescription drugs on an outpatient basis to begin covering nongeneric (brand) drugs.

CHBRP is aware of 21 states¹¹ and the District of Columbia that have passed legislation to limit cost sharing for oral anticancer medications and/or achieve parity between oral and intravenously injected anticancer medications. In 2013, eight states, including California, have introduced legislation to limit cost sharing for oral anticancer medications.¹²

Background on Disease or Condition

Nearly one in two Californians born today will develop cancer at some point in his or her lifetime (CCR, 2011). In California, there are an estimated 145,000 cases of cancer diagnosed each year, whereas approximately 1.3 million Californians alive today have a history with the disease (CCR, 2011). It is estimated that 45% of cancer cases occur in the nonelderly population (those younger than 65 years of age)—i.e., the population being impacted by AB 219 (CCR, 2011). In California, cancer is the second leading cause of death, accounting for 24% of all deaths, or approximately 55,000 deaths each year (CCR, 2011). Early diagnoses, through population-based screening, as well as advances in cancer treatment, have greatly improved survival rates of cancer patients (NCI, 2013). In California, the relative 5-year survival rate from all cancers is 63% (CCR, 2011).

The treatment options for cancer depend on the type of cancer, as well as the stage of diagnosis, and include surgical removal, radiation treatment, and medications, including chemotherapy (which may include oral anticancer medications). Medications used for patients undergoing cancer treatment include those specific to the treatment of cancer as well as medications that are used to alleviate pain or reduce the side effects of chemotherapy. Because the bill specifies “prescribed, orally administered anticancer medications,” CHBRP assumes it would only affect

¹¹ States with parity for oral anticancer medications include CO, CT, DE, HI, IA, IL, IN, KS, LA, MA, MD, MN, NE, NJ, NM, NY, OR, TX, VA, VT, and WA. Of those states, four states’ laws have passed language similar to what is proposed in AB 219. Those states, Illinois (2011), Maryland (2012), Minnesota (2012), and Virginia (2012), passed legislation to limit cost sharing on oral anticancer medications, but the language did not expand benefit coverage to include oral anticancer medications if health insurance did not already cover it. CHBRP evaluated enrolled or enacted bill language from each state’s legislative website.

¹² States that have introduced legislation to limit cost sharing for oral anticancer medications include CA, FL, ME, MO, OK, RI, PA, and UT. Of these states, three—Utah, Missouri, and Pennsylvania—have introduced legislation to limit cost sharing on oral anticancer medications, but do not expand benefit coverage. CHBRP evaluated introduced bill language from each state’s legislative website.

drugs specific to the treatment of cancer and not affect other medications, such as antipain or antinausea medications, that a cancer patient might use during the course of chemotherapy.

Traditionally, anticancer medications were delivered either through intravenous (IV) fluid or through injection in a physician's office or hospital. Oral anticancer medications have also been used in cancer treatment as an adjunct to IV therapy, or as an alternative to IV therapy. Over the past decade, oral anticancer medications have been prescribed more frequently for cancer treatment, which may be due in part to the approval of new oral anticancer medications by the U.S. Food and Drug Administration (FDA) (DeMario and Ratain, 1998; O'Neill and Twelves, 2002). An estimated 25% of anticancer agents currently in development are planned to be administered orally (Weingart et al., 2008). Studies estimate that a majority of patients (up to 89%) prefer oral anticancer medications to traditional IV fluid or injection therapies (Verbrugge et al., 2013). Many of the most prevalent cancers in California, including breast and colorectal cancer, may be treated with regimens that include oral anticancer medications (CCR, 2011).

Medical Effectiveness

AB 219 would apply to such a large number of oral anticancer medications for such a wide range of cancers that a systematic review of the literature on the effectiveness of all of them was not feasible during the 60 days within which CHBRP must complete its reports. Instead, CHBRP summarized general, descriptive information about these medications.

- All oral anticancer medications must be approved by the U.S. Food and Drug Administration (FDA) before they can be marketed or sold in the United States.
- To date, the FDA has approved 54 oral anticancer medications that are used to treat more than 50 different types of cancer.
- The number of oral anticancer medications has grown by 108% over the past decade. The FDA approved 28 new oral anticancer medications between 2003 and early 2013.
- Approximately 100 oral anticancer medications are currently under development.
- Only 9 of the 54 oral anticancer medications approved by the FDA have intravenous or injected equivalents (either intravenous/injected versions of the same drug or therapeutic equivalents).¹³
- Only 11 of the 54 brand-name oral anticancer medications approved by the FDA have generic equivalents.
- Oral anticancer medications are used alone or in combination with other oral, intravenously administered, or injected anticancer medications, depending on the cancer they are being used to treat and the stage at which the cancer is diagnosed.
- The roles of oral anticancer medications in cancer treatment vary and include:
 - Presurgical treatment
 - Postsurgical treatment

¹³ Personal communication, Betty Chan, PharmD, March 6, 2013.

- Concurrent treatment with radiation
- First-line treatment to kill or retard the growth of cancer cells
- Second-line treatment of cancers that do not respond to first-line treatments
- Treatment of early stage cancers
- Treatment of advanced or metastatic cancers
- Treatment of recurrent cancers
- Treatment of cancers that cannot be surgically removed
- Prevention of cancer recurrence in persons treated for early stage disease
- The outcome of cancer treatment varies with the stage at which cancer is diagnosed and the type of cancer.
 - For some types of early-stage cancers, use of oral anticancer agents and other treatments may enable a person to live cancer-free for many years.
 - For advanced and metastatic cancers, treatment often cannot reverse the disease and may only prolong life for a few months.
- When compared to intravenous and injectable anticancer medications, oral anticancer medications have both advantages and disadvantages. Advantages are that oral anticancer medications may allow administration of the medication on a daily basis, may be more convenient for patients, and may reduce the risk of infection or other complications. Disadvantages include less certainty in patient adherence to treatment regimens and a reduction in interaction between patients and their health care providers to manage complications of treatment. There may also be higher risks of drug-food and drug-drug interactions relative to intravenous and injectable anticancer medications.
- The preponderance of evidence from studies of the effects of cost sharing on use of anticancer medications suggests that cost sharing has at most a small effect on use of specialty oral anticancer medications. Cost sharing has a larger effect on adherence and persistence with aromatase inhibitors for breast cancer, perhaps because these medications are used primarily to prevent recurrence of cancer and are taken over long periods of time regardless of whether patients have symptoms.

Benefit Coverage, Utilization, and Cost Impacts

To perform the analysis, CHBRP measured current cost sharing (as a percentage of the cost of the medication) for oral anticancer medications. CHBRP modeled compliance with the mandate as resulting in the prohibition of charging more than \$100 per filled prescription being applied to oral anticancer medications.

Table 1 summarizes the estimated utilization, cost, and benefit coverage impacts of AB 219.

Benefit coverage impacts

- Although AB 219 would not be expected to expand benefit coverage, CHBRP estimates that almost all enrollees with health insurance subject to the mandate have at least some coverage for anticancer medications.
- AB 219 would affect the health insurance of the 25.6 million enrollees with health insurance whose insurance provides an outpatient prescription drug benefit, out of the 25.9 million enrollees in DMHC-regulated plans and CDI-regulated policies subject to state mandates.
 - Outpatient prescription drug benefits cover oral anticancer medications, though coverage of specific anticancer medications may vary by health plan or insurer.

Utilization impacts

- CHBRP estimates that 0.54% of enrollees with privately purchased health insurance subject to the mandate would use oral anticancer medications during the year following implementation.
- CHBRP does not estimate a measurable increase in the number of enrollees who will require oral anticancer medications nor a measurable increase in the number of prescriptions per enrollee because:
 - The bill does not extend benefit coverage for oral anticancer medications to enrollees currently without coverage. It only affects cost sharing for those enrollees who already have benefit coverage for anticancer medications.
 - The price elasticity of demand¹⁴—the degree to which utilization will change when the price changes—for anticancer medications is relatively small in comparison to the price elasticity for many other medications. Cancer is a life-threatening illness; consequently, patients will generally comply with prescribed treatment regimens.
 - Few oral anticancer medications have injected or intravenously administered substitutes, and clinical indications may differ between administration forms. A limited number of enrollees have a type and stage of cancer that would allow substitution of an oral anticancer medication for an intravenous or injected anticancer medication. Some portion of these may opt for intravenous or injected medications premandate due to cost considerations. This dynamic cannot be quantified due to the complex clinical factors that are involved when considering potential substitutions.

Cost impacts

- AB 219 would shift some oral anticancer medication costs from enrollees to health plans and insurers through reduced cost sharing. In total, enrollees would see a reduction in out-of-pocket costs of an estimated \$2,539,000 due to lesser cost-sharing requirements.
 - On average, the amount of the annual shift is estimated to be \$25.63 per enrollee requiring anticancer medications.

¹⁴ Price elasticity of demand shows how the quantity demanded or supplied will change when the price changes. Price elasticity tends to be smaller when a good/service is a necessity.

- Postmandate amounts shifted from users to plans and insurers would range from \$0 to \$58,744 annually for enrollees requiring anticancer medications. The wide variation is related to the price of particular oral anticancer medications, the utilization of a particular enrollee, and the cost-sharing provisions of any one enrollee's contract or policy.
- Total net annual expenditures are estimated to increase by \$454,000, or 0.0003%, mainly due to the administrative costs associated with the implementation of AB 219.
- The mandate is estimated to increase premiums by about \$2,993,000 (0.0023%). The distribution of the impact on premiums is as follows:
 - Total premiums for private employers are estimated to increase by \$1,969,000, or 0.0025%.
 - Enrollee contributions toward premiums for group insurance are estimated to increase by \$519,000, or 0.0024%.
 - Total premiums for those with individually purchased insurance are estimated to increase by \$505,000, or 0.0037%.
- Increases in insurance premiums vary by privately purchased market segment, ranging from approximately 0.0025% (DMHC-regulated large-group plans) to 0.0047% (CDI-regulated individual policies). Increases as measured by per member per month (PMPM) payments are estimated to be approximately \$0.01 for both DMHC-regulated large-group plans and CDI-regulated small-group policies.
- AB 219 would apply to Medi-Cal Managed Care. However, the California Department of Health Care Services (DHCS), which administers Medi-Cal, would not be expected to face measurable expenditure or premium increases as these plans currently cover oral anticancer medication benefits with minimal or no cost-sharing requirements.
- The estimated premium increases would not have a measurable impact on number of persons who are uninsured.

Public Health Impacts

- CHBRP does not project a measurable increase in utilization of oral anticancer medications as a result of AB 219. Therefore, the only potential public health impact resulting from AB 219 would be a reduction in out-of-pocket costs for oral anticancer medications. This could reduce the financial burden and related health consequences faced by cancer patients.
- Breast cancer is the most prevalent cancer in California, almost exclusively affecting women. Approximately 53.2% of oral anticancer medication prescriptions are for three drugs used to treat breast cancer, corresponding to 2.8% of the total cost for all oral nongeneric anticancer medications. Therefore, to the extent that AB 219 reduces out-of-pocket costs for patients, there is a potential to reduce the financial burden faced by women undergoing treatment for breast cancer.
- After breast cancer, the next three most common cancers in California are colorectal, prostate, and lung cancer. Non-Hispanic blacks in California have higher rates of

diagnoses of all three of these cancers compared to all other racial and ethnic groups. These three cancers may all be treated using oral anticancer medications; therefore, to the extent that AB 219 reduces out-of-pocket costs for oral anticancer medications, non-Hispanic black cancer patients could experience a greater reduction in financial burden compared to other ethnic and racial groups.

- There is no projected measurable change in utilization resulting from AB 219. Therefore, there is no expected reduction in premature death or economic loss as a result of passage of this mandate.

Interaction With the Federal Affordable Care Act

A number of ACA provisions have the potential to or do interact with state benefit mandates. Below is an analysis of how this proposed benefit mandate may interact with requirements in the ACA, including the requirement for certain health insurance to cover “essential health benefits” (EHBs).¹⁵

Essential health benefits

Effective 2014, the ACA requires nongrandfathered small-group and individual market health insurance—including but not limited to QHPs that will be sold in Covered California—to cover 10 specified categories of EHBs.¹⁶ 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.¹⁷ California has selected the Kaiser Foundation Health Plan Small Group Health Maintenance Organization (HMO) 30 plan as its benchmark plan.¹⁸

The ACA allows a state to “require that a qualified health plan offered in [an exchange] offer benefits in addition to the essential health benefits.”¹⁹ If the state does so, the state must make payments to defray the cost of those additionally mandated benefits, either by paying the purchaser directly or by paying the QHP.

AB 219 and essential health benefits

Changes to cost sharing required by AB 219 do not fall under the ACA’s—and subsequent regulations’—definition of “state-required benefits.”²⁰ In other words, the state would not be

¹⁵ Resources on EHBs and other ACA impacts are available on the CHBRP website:

www.chbrp.org/other_publications/index.php.

¹⁶ The 10 specified categories of essential health benefits (EHBs) are ambulatory patient services; emergency services; hospitalization; maternity and newborn care; mental health and substance use disorder services, including behavioral health treatment; prescription drugs; rehabilitative and habilitative services and devices; laboratory services; preventive and wellness services and chronic disease management; and pediatric services, including oral and vision care. [ACA Section 1302(b)].

¹⁷ CCIIO, Essential Health Benefits Bulletin. Available at:

http://cciio.cms.gov/resources/files/Files2/12162011/essential_health_benefits_bulletin.pdf. Accessed December 16, 2011.

¹⁸ Health and Safety Code, Section 1367.005; Insurance Code, Section 10112.27.

¹⁹ ACA Section 1311(d)(3).

²⁰ The federal Department of Health and Human Services’ proposed rule on essential health benefits, which was made final in February 2013, specified that “... state rules related to ... cost-sharing ... would not fall under our interpretation of state-required benefits. Even though plans must comply with those state requirements, there would

required to defray costs incurred as a result of AB 219 because the mandate would not be considered a benefit expansion that exceeds EHBs.

As previously noted, AB 219 does not mandate additional benefit coverage for oral anticancer medications; it limits cost sharing for oral anticancer medications. Therefore, to the extent that these DMHC-regulated plans' and CDI-regulated policies' outpatient pharmacy benefits provide benefit coverage for oral anticancer medications on their formulary, AB 219 would then require them to limit cost-sharing to \$100 per prescription.

The ACA and California's EHBs, as defined by the Kaiser HMO 30 plan, require coverage for outpatient prescription drugs. Therefore, QHPs offered through Covered California, as well as nongrandfathered small group and individual market plans and policies, will also cover prescription drugs.

be no federal obligation for states to defray the costs associated with those requirements," Department of Health and Human Services. Patient Protection and Affordable Care Act: Standards Related to Essential Health Benefits, Actuarial Value, and Accreditation. Final Rule. Available at: www.ofr.gov/OFRUpload/OFRData/2013-04084_PL.pdf. Accessed on: February 20, 2013.

Table 1. AB 219 Impacts on Benefit Coverage, Utilization, and Cost, 2014

	Before Mandate	After Mandate	Increase/ Decrease	Change After Mandate
Benefit coverage				
Total enrollees with health insurance subject to state-level benefit mandates(a)	25,899,000	25,899,000	0	0.000%
Total enrollees with health insurance subject to AB 219	25,621,000	25,621,000	0	0.000%
Percentage of individuals with coverage for generic and nongeneric oral anticancer medications	100.0%	100.0%	0.0%	0.000%
Number of individuals with coverage for generic and nongeneric oral anticancer medications	25,621,000	25,621,000	0	0.000%
Utilization and cost				
Annual number of scripts per 1,000 members who have outpatient prescription drug coverage for generic and nongeneric oral anticancer medications	27.4	27.4	0.0	0.000%
Average cost per script, paid by health plans and individuals for generic and nongeneric oral anticancer medications	\$855.52	\$855.52	\$0.00	0.000%
Total annual cost of generic and nongeneric oral anticancer medications				
Costs paid by health plans	\$589,884,000	\$592,423,000	\$2,539,000	0.430%
Costs paid by individuals	\$16,115,000	\$13,576,000	-\$2,539,000	-15.761%
Costs paid by health plans and individuals	\$605,999,000	\$605,999,000	\$0	0.000%
Expenditures				
Premium expenditures by private employers for group insurance	\$78,385,161,000	\$78,387,130,000	\$1,969,000	0.0025%
Premium expenditures for individually purchased insurance	\$13,639,719,000	\$13,640,224,000	\$505,000	0.0037%
Premium expenditures by persons with group insurance, CalPERS HMOs, Covered California, and Medi-Cal Managed Care (b)	\$21,272,946,000	\$21,273,465,000	\$519,000	0.0024%
CalPERS HMO employer expenditures (c)	\$4,016,233,000	\$4,016,233,000	\$0	0.0000%
Medi-Cal Managed Care Plan expenditures	\$12,480,492,000	\$12,480,492,000	\$0	0.0000%
Healthy Families Plan expenditures (d)	\$667,300,000	\$667,300,000	\$0	0.0000%
Enrollee out-of-pocket expenses for covered benefits (deductibles, copayments, etc.)	\$14,462,198,000	\$14,459,659,000	-\$2,539,000	-0.0176%
Enrollee expenses for noncovered benefits (e)	\$6,500,000	\$6,500,000	\$0	0%
Total expenditures	\$144,930,549,000	\$144,931,003,000	\$454,000	0.0003%

Source: California Health Benefits Review Program, 2013.

(a) This population includes persons with privately funded 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 employment-sponsored insurance.

(b) Premium expenditures by enrollees include employee contributions to employer-sponsored health insurance, health insurance purchased through Covered California, and enrollee contributions for Medi-Cal Managed Care.

(c) Of the increase in CalPERS employer expenditures, about 58% or \$0 would be state expenditures for CalPERS members who are state employees, state retirees, or their dependents. This percentage reflects the share of enrollees in CalPERS HMOs as of September 30, 2012. CHBRP assumes the same ratio in 2014.

(d) Children in Healthy Families, California's Children's Health Insurance Program, will be moved into Medi-Cal Managed Care by January 1, 2014, as part of the 2012–2013 budget.

(e) 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 will be newly covered, postmandate. Other components of expenditures in this table include all health care services covered by insurance.

INTRODUCTION

The California Assembly Committee on Health requested on February 5, 2013, that the California Health Benefits Review Program (CHBRP) conduct an evidence-based assessment of the medical, financial, and public health impacts of Assembly Bill (AB) 219 (Perea) on oral anticancer medications. In response to this request, CHBRP undertook this analysis pursuant to the provisions of the program's authorizing statute.²¹

CHBRP estimates that in 2014 approximately 25.9 million Californians (67%) will have health insurance that may be subject to a health benefit mandate law passed at the state level.²² Of the rest of the state's population, a portion will be uninsured (and so has no health insurance subject to any benefit mandate), and another portion will have health insurance subject to other state laws or only to federal laws.

Uniquely, California has a bifurcated system of regulation for health insurance subject to state benefit mandates. The California Department of Managed Health Care (DMHC)²³ regulates health care service plans, which offer benefit coverage to their enrollees through health plan contracts. The California Department of Insurance (CDI) regulates health insurers,²⁴ which offer benefit coverage to their enrollees through health insurance policies.

All DMHC-regulated plans and/or CDI-regulated policies that provide outpatient drug coverage are subject to AB 219. Therefore, the mandate would affect the health insurance of approximately 25.6 million enrollees (66% of all Californians).

Developing Estimates for 2014 and the Effects of the Affordable Care Act

The Affordable Care Act (ACA)²⁵ is expected to dramatically affect health insurance and its regulatory environment in California, with many changes becoming effective in 2014. Beginning in 2014, an expansion of the Medicaid program to cover people up to 133% of the federal poverty level (FPL)²⁶ and the availability of subsidized and unsubsidized health insurance coverage purchased through newly established state health insurance exchanges are expected to significantly increase the number of people with health insurance in the United States.

²¹ Available at: www.chbrp.org/docs/authorizing_statute.pdf.

²² CHBRP's estimates are available at: www.chbrp.org/other_publications/index.php.

²³ DMHC was established in 2000 to enforce the Knox-Keene Health Care Service Plan of 1975; see Health and Safety Code (H&SC), Section 1340.

²⁴ CDI licenses "disability insurers." Disability insurers may offer forms of insurance that are not health insurance. This report considers only the impact of the benefit mandate on health insurance policies, as defined in Insurance Code (IC), Section 106(b) or subdivision (a) of Section 10198.6.

²⁵ The federal "Patient Protection and Affordable Care Act" (P.L. 111-148) and the "Health Care and Education Reconciliation Act" (P.L. 111-152) were enacted in March 2010. Together, these laws are referred to as the Affordable Care Act (ACA).

²⁶ The Medicaid expansion, which California will pursue, is to 133% of the federal poverty level (FPL)—138% with a 5% income disregard.

State exchanges will sell health insurance in the small-group and individual markets²⁷ through qualified health plans (QHPs), which will be certified by and sold in a state’s exchange. QHPs sold through California’s state exchange, Covered California,²⁸ will be DMHC-regulated plans or CDI-regulated policies, and as such will be subject to California state benefit mandates.

It is important to note that CHBRP’s analysis of proposed benefit mandate bills typically address the marginal effects of the proposed bills—specifically, how the proposed mandate would impact benefit coverage, utilization, costs, and public health, holding all other factors constant. CHBRP’s estimates of these marginal effects are presented in this report. Because expanded enrollment will not occur until January 2014, CHBRP relies on projections from the California Simulation of Insurance Markets (CalSIM) model²⁹ to help set baseline enrollment for 2014. From this projected baseline, CHBRP estimates the marginal impact of proposed benefit mandates that could be in effect after January 2014. CHBRP’s methods for estimating baseline 2014 enrollment from CalSIM projections are provided in further detail in Appendix D.

Bill-Specific Analysis of AB 219

Bill Language

The full text of AB 219 can be found in Appendix A.

AB 219 would prohibit DMHC-regulated plans and CDI-regulated policies that provide coverage for “prescribed, orally administered anticancer medications” from charging more than \$100 per filled prescription. This would apply to any DMHC-regulated plan and CDI-regulated policy issued, amended, or renewed on or after January 1, 2014.

AB 219 does not require DMHC-regulated plans and CDI-regulated policies that do not already provide coverage for oral anticancer medications to provide coverage for this benefit.

Analytic Approach and Key Assumptions

This analysis relies on a number of assumptions:

- **Definition of oral anticancer medications:** Because the bill specifies “prescribed, orally administered anticancer medications,” CHBRP assumes it would only affect cost sharing for drugs specific to the treatment of cancer. This analysis therefore assumes that AB 219 would not affect cost sharing for other medications, such as antipain or anti-nausea drugs, that a cancer patient might use during the course of chemotherapy.

²⁷ Effective 2017, states may allow large group purchasing through the exchange, which may make some large-group plans and policies subject to EHB requirements [ACA Section 1312(f)(2)(B)].

²⁸ The California Health Benefits Exchange Authorizing Statute is available here: <http://www.healthexchange.ca.gov/Documents/California%20Codes%20Governing%20the%20Health%20Benefit%20Exchange.pdf>

²⁹ CalSIM was developed jointly and is operated by the University of California, Los Angeles, Center for Health Policy Research and the University of California, Berkeley, Center for Labor Research. The model estimates the impact of provisions in the ACA on employer decisions to offer, and individual decisions to obtain, health insurance.

- **Coverage of anticancer drugs:** Chemotherapy can be covered under the medical benefit—which provides coverage of hospital and physician/provider services—or *outpatient* prescription drug pharmacy benefit of a DMHC-regulated plan or CDI-regulated policy. Because the bill explicitly names “prescribed, orally administered” medications, CHBRP assumes that the bill applies to the outpatient pharmacy benefit portion of the plan or policy.
- **No expansion of coverage:** AB 219 would not require DMHC-regulated plans and CDI-regulated policies that do not already provide coverage for prescription drugs on an outpatient basis to begin covering them, nor would it require DMHC-regulated plans and CDI-regulated policies that cover only generic prescription drugs on an outpatient basis to begin covering nongeneric (brand) drugs.

Interaction with Other California Requirements

No current California mandate requires coverage of prescription medications, and no mandates currently specify the terms of cost-sharing provisions specifically for oral anticancer medications. However, a number of requirements impact coverage of prescription medications.

For DMHC-regulated plans, the department requires that benefits not be subject to “exclusion, exception, reduction, deductible, or copayment that renders the benefit illusory.”³⁰ DMHC-regulated plans are also subject to specific limitations regarding prescription drug cost sharing.³¹ Cost-sharing (copayments, coinsurance, and deductibles) rules require the following:

1. A copayment cannot exceed the retail price of the drug.
2. A copayment or percentage coinsurance shall not exceed 50% of the “cost to the plan.”
3. If a plan uses coinsurance, it must:
 - a. Have a maximum dollar amount cap on the percentage coinsurance that will be charged for an individual prescription;
 - b. Apply toward an annual out-of-pocket maximum for the product; or
 - c. Apply toward an annual out-of-pocket maximum for the prescription drug benefit.

Grandfathered CDI-regulated policies are not subject to these requirements.

Other requirements that might interact with AB 219 are listed below, with Health and Safety Code (H&SC) and Insurance Code (IC) footnoted where applicable:

- **Prescription drugs: Off-label use.**³² Mandate to cover “off-label” uses of FDA-approved drugs—uses other than the specific FDA-approved use—in life-threatening situations and, in cases of chronic and seriously debilitating conditions, when a set of specified provisions regarding evidence are met.

³⁰ California Code of Regulations, Section 1300.67.4.

³¹ California Code of Regulations, Section 1300.67.24.

³² H&SC Section 1367.21 and Section IC 10123.195

- **Prescription drugs: Coverage of previously covered drugs; medically appropriate alternatives.**³³ Mandate to cover prescription drugs if the drug previously had been approved for coverage by the plan for a medical condition of the enrollee and the plan’s prescribing provider continues to prescribe the drug for the medical condition, provided that the drug is appropriately prescribed and is considered safe and effective for treating the enrollee’s medical condition.
- **Breast cancer benefits.**³⁴ Mandate to provide coverage for screening for, diagnosis of, and treatment for breast cancer.³⁵
- **Authorization for nonformulary prescription drugs.**³⁶ Mandate to review coverage for nonformulary drugs.

Requirements in Other States

CHBRP is aware of 21 states³⁷ and the District of Columbia that have passed legislation to limit cost sharing for oral anticancer medications and achieve parity between oral and intravenously injected chemotherapy. In 2013, eight states, including California, have introduced legislation to limit cost sharing for oral chemotherapy.³⁸

Interaction with the Affordable Care Act

A number of ACA provisions have the potential to or do interact with state benefit mandates. Below is an analysis of how this proposed benefit mandate may interact with requirements in the ACA, including the requirement for certain health insurance to cover “essential health benefits” (EHBs).³⁹

³³ H&SC Section 1367.22

³⁴ H&SC Section 1367.6 and IC Section 10123.8

³⁵ Due to this existing mandate, persons enrolled in policies without pharmacy benefits may still have coverage for prescriptions related to breast cancer treatment, including oral anticancer medications. However, responses to CHBRP’s Bill-Specific Survey indicating no coverage for oral anticancer medications did not specify breast cancer treatment as an exception. Therefore, CHBRP assumes in this analysis that no exception would be made for persons with a breast cancer diagnosis.

³⁶ H&SC Section 1367.24

³⁷ States with parity for oral anticancer medications include CO, CT, DE, HI, IA, IL, IN, KS, LA, MA, MD, MN, NE, NJ, NM, NY, OR, TX, VA, VT, and WA. Of those states, four states’ laws have passed language similar to what is proposed in AB 219. Those states, Illinois (2011), Maryland (2012), Minnesota (2012), and Virginia (2012), passed legislation to limit cost sharing on oral anticancer medications, but the language did not expand benefit coverage to include oral anticancer medications if health insurance did not already cover it. CHBRP evaluated enrolled or enacted bill language from each state’s legislative website.

³⁸ States that have introduced legislation to limit cost sharing for oral anticancer medications include CA, FL, ME, MO, OK, RI, PA, and UT. Of these, three states—Utah, Missouri, and Pennsylvania—have introduced legislation to limit cost sharing on oral anticancer medications, but do not expand benefit coverage. CHBRP evaluated introduced bill language from each state’s legislative website.

³⁹ Resources on EHBs and other ACA impacts are available on the CHBRP website:

www.chbrp.org/other_publications/index.php.

Essential Health Benefits

Effective 2014, the ACA requires nongrandfathered small-group and individual market health insurance—including but not limited to QHPs that will be sold in Covered California—to cover 10 specified categories of EHBs.⁴⁰ 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.⁴¹ California has selected the Kaiser Foundation Health Plan Small Group Health Maintenance Organization (HMO) 30 plan as its benchmark plan.⁴²

The ACA allows a state to “require that a qualified health plan offered in [an exchange] offer benefits in addition to the essential health benefits.”⁴³ If the state does so, the state must make payments to defray the cost of those additionally mandated benefits, either by paying the purchaser directly or by paying the QHP. However, as laid out in the Final Rule on EHBs HHS released in February 2013,⁴⁴ state benefit mandates enacted on or before December 31, 2011, would be included in a state’s EHBs for 2014 and 2015 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. State benefit mandates that could exceed EHBs would “be specific to the care, treatment, and services that a state requires issuers to offer to its enrollees,” whereas “state rules related to provider types, cost-sharing, or reimbursement methods” would not meet the definition of state benefit mandates that could exceed EHBs. A state’s exchange 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.⁴⁵

AB 219 and essential health benefits

Changes in cost sharing required by AB 219 do not fall under the ACA’s—and subsequent regulations’—definition of “state-required benefits.”⁴⁶ In other words, the state would not be

⁴⁰ The 10 specified categories of essential health benefits (EHBs) are ambulatory patient services; emergency services; hospitalization; maternity and newborn care; mental health and substance use disorder services, including behavioral health treatment; prescription drugs; rehabilitative and habilitative services and devices; laboratory services; preventive and wellness services and chronic disease management; and pediatric services, including oral and vision care. [ACA Section 1302(b)].

⁴¹ CCIIO, Essential Health Benefits Bulletin. Available at: http://cciio.cms.gov/resources/files/Files2/12162011/essential_health_benefits_bulletin.pdf. Accessed December 16, 2011.

⁴² H&SC Section 1367.005 and IC Section 10112.27

⁴³ ACA Section 1311(d)(3)

⁴⁴ Department of Health and Human Services. Patient Protection and Affordable Care Act: Standards Related to Essential Health Benefits, Actuarial Value, and Accreditation. Final Rule. Available at: www.ofr.gov/OFRUpload/OFRData/2013-04084_PL.pdf. Accessed on: February 20, 2013.

⁴⁵ Essential Health Benefits. Final Rule.

⁴⁶ The federal Department of Health and Human Services’ proposed rule on essential health benefits, which was made final in February 2013, specified that “... state rules related to ... cost-sharing ... would not fall under our interpretation of state-required benefits. Even though plans must comply with those state requirements, there would be no federal obligation for states to defray the costs associated with those requirements,” Department of Health and Human Services. Patient Protection and Affordable Care Act: Standards Related to Essential Health Benefits, Actuarial Value, and Accreditation. Final Rule. Available at: www.ofr.gov/OFRUpload/OFRData/2013-04084_PL.pdf. Accessed on: February 20, 2013.

required to defray costs incurred as a result of AB 219 because the mandate would not be considered a benefit expansion that exceeds EHBs.

As previously noted, AB 219 does not mandate additional benefit coverage for oral anticancer medications; rather, it limits cost sharing for oral anticancer medications. Therefore, to the extent that these DMHC-regulated plans' and CDI-regulated policies' outpatient pharmacy benefits provide benefit coverage for oral anticancer medications on their formulary, AB 219 would then require them to limit cost-sharing to \$100 per prescription.

The ACA and California's EHBs, as defined by the Kaiser HMO 30 plan, requires coverage for outpatient prescription drugs. Therefore, QHPs offered through Covered California, as well as nongrandfathered small-group and individual market plans and policies, will also cover prescription drugs.

BACKGROUND ON THE DISEASE

Nearly one in two Californians born today will develop cancer at some point in his or her lifetime (CCR, 2011). In California, there are an estimated 145,000 cases of cancer diagnosed each year, whereas approximately 1.3 million Californians alive today have a history with the disease (CCR, 2011). It is estimated that 45% of cancer cases occur in the non-elderly population (those younger than 65 years of age), i.e., the population most relevant to AB 219 because it does not affect Medicare coverage (CCR, 2011). In California, cancer is the second leading cause of death, accounting for 24% of all deaths, or approximately 55,000 deaths occurring each year (CCR, 2011). Early diagnoses, through population-based screening, as well as advances in cancer treatment, have greatly improved survival rates of cancer patients (NCI, 2013). In California, the relative 5-year survival rate from all cancers is 63% (CCR, 2011).

The treatment options for cancer depend on the type of cancer, as well as the stage of diagnosis, and include surgical removal, radiation treatment, and medications, including chemotherapy (which may include oral anticancer medications). Medications used for patients undergoing cancer treatment include those specific to the treatment of cancer as well as medications that are used to alleviate pain or reduce the side effects of chemotherapy. Because the bill specifies “prescribed, orally administered anticancer medications,” CHBRP assumes it would only affect drugs specific to the treatment of cancer and not affect other medications, such as antipain or anti-nausea medications, that a cancer patient might use during the course of chemotherapy.

Traditionally, anticancer medications were delivered either through intravenous (IV) fluid or through injection in a physician’s office or hospital. Oral anticancer medications have also been used in cancer treatment either as an adjunct to IV therapy, or as a substitution for IV therapy, or alone. Over the past decade, oral anticancer medications are being prescribed more frequently for cancer treatment, which may be due in part to the approval of new oral anticancer medications by the U.S. Food and Drug Administration (FDA) (DeMario and Ratain, 1998; O’Neill and Twelves, 2002). An estimated 25% of anticancer agents currently in development are planned to be administered orally (Weingart et al., 2008). Studies estimate that a majority of patients (up to 89%) prefer oral anticancer medications to traditional IV fluid or injection therapies (Verbrugge et al., 2013). Many of the most prevalent cancers in California, including breast and colorectal cancer, may be treated with regimens that include oral anticancer medications (CCR, 2011).

MEDICAL EFFECTIVENESS

As indicated in the *Introduction*, AB 219 would prohibit DMHC-regulated health plans and CDI-regulated policies that provide coverage for “prescribed, orally administered anticancer medications” from charging more than \$100 per filled prescription. To date, the FDA has approved 54 oral anticancer medications. These medications are used to treat more than 50 different types of cancers and play a variety of roles in cancer treatment. This section of the report provides an overview of oral anticancer medications. AB 219 would apply to such a large number of medications that a systematic review of the literature on the effectiveness of all of them was not feasible for this analysis. This section also reviews literature on the impact of cost sharing on use of oral anticancer medications.

Appendix C contains two tables that list all of the oral anticancer medications approved by the FDA for marketing and sale in the United States. Table C-1 lists all oral anticancer medications in alphabetical order by brand name and also indicates the name of the agent (i.e., the generic name). Table C-2 provides additional information about each of these medications. Both the brand name and agent are indicated for each drug, as well as the year the FDA initially approved the drug. The cancer(s) that each medication is used to treat is listed, along with a description of the medication’s role in treatment (e.g., used to treat early stage vs. advanced cancer, used alone or in combination with other medications). The table also indicates whether an intravenous/injectable alternative to the medication is available in the United States and whether a generic version is available.

Literature Review Methods

A literature search was performed to retrieve literature that summarized trends in the development of oral anticancer medications and described the manner in which these medications are used. The search was limited to oral medications that are used specifically to treat cancer.⁴⁷ Consistent with previous CHBRP reports on oral anticancer medications, medications that are prescribed to persons with cancer to alleviate pain or to reduce the side effects of chemotherapy (e.g., antianemia medications⁴⁸ and antiemetic medications⁴⁹) were excluded from the literature review.

The literature search was limited to articles published in English from early 2010 to present because the California Health Benefits Review Program (CHBRP) performed a similar search in 2010 for its report *Analysis of Senate Bill 961: Cancer Treatment* (CHBRP, 2010). The following databases that index peer-reviewed journals were searched: PubMed (MEDLINE), the Cochrane Library, EMBASE, and Web of Science. A total of 609 citations were retrieved. Nine

⁴⁷ Some oral medications used to treat cancer are also used to treat other diseases. CHBRP limited its analysis to persons diagnosed with cancer, because AB 219 would apply only where these medications are used to treat cancer.

⁴⁸ Anemia is a condition that develops when a person’s blood does not contain a sufficient number of healthy red blood cells. Persons with cancer who receive anticancer medications are at increased risk for anemia because treatment can kill healthy red blood cells as well as cancer cells. These patients are often prescribed antianemia medications to reduce the risk of developing this condition.

⁴⁹ Antiemetic medications are medications used to alleviate nausea and vomiting, which are common side effects of anticancer medications.

pertinent studies were identified and reviewed. 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 is presented in Appendix B: Literature Review Methods.

Overview of Oral Anticancer Medications and Their Uses

Anticancer medications may be administered intravenously, by injection, or orally. Although oral anticancer medications have been available for many years (Bedell, 2003; Weingart et al., 2008), the number of oral anticancer medications approved by the FDA has grown by 108% over the past decade. The FDA approved 28 new oral anticancer medications between 2003 and early 2013, which increased the total number of oral anticancer medications from 26 to 54 medications. This trend is likely to continue. According to a report issued by the National Comprehensive Cancer Network (NCCN), experts estimate that 400 anticancer medications are currently under development, and approximately 25% of them are planned to be administered orally (Weingart et al., 2008).

Types of Oral Anticancer Medications

Oral anticancer medications may be divided into three major categories of medications:

- Cytotoxic agents
- Targeted agents
- Endocrine agents

Cytotoxic agents were the first type of anticancer medication developed.⁵⁰ They include some of the first oral anticancer medications, such as Myleran (generic name = busulfan), Leukeran (generic name = chlorambucil), Purinethol (generic name = mercaptopurine), and methotrexate sodium (Bedell, 2003; Weingart et al., 2008). One major limitation of both oral and intravenous cytotoxic agents is that they are associated with a high rate of side effects because they kill healthy cells as well as cancer cells (Mazzaferro et al., 2013).

A number of new cytotoxic agents have been approved by the FDA over the past 15 years. One of the most widely used new cytotoxic agents is Xeloda (generic name = capecitabine). Xeloda is an oral prodrug⁵¹ of 5-fluorouracil (5-FU), an intravenous medication. Other newer cytotoxic agents include Revlimid (generic name = lenalidomide) and Zolanza (generic name = vorinostat) (Aisner, 2007).

⁵⁰ Cytotoxic agents can be divided into several major categories. Alkylating agents are a type of cytotoxic agent that interferes with the reproduction of cancer cells by breaking DNA strands. Antimetabolites are a type of cytotoxic agent that prevents the replication of cancer cells by interfering with the synthesis and repair of DNA. Other types of cytotoxic agents include antiangiogenic agents (i.e., medications that prevent the spread of cancer cells by blocking the development of new blood vessels), and natural compounds (i.e., plant alkaloids) (Bedell, 2003).

⁵¹ A prodrug is a type of anticancer medication that is administered in the inactive or a less-active form, which the body metabolizes into an active form. Prodrugs are used to optimize absorption, distribution, metabolism, or excretion of a medication or to improve a medication's ability to target cancer cells.

Targeted agents, also referred to as biological agents, are drugs that are targeted at specific cancer biologic pathways (Bedell, 2003; Weingart et al., 2008). Most new oral anticancer medications are targeted agents. Targeted agents currently approved by the FDA for use in the United States include Afinitor (generic name = everolimus), Caprelsa (generic name = vandetanib), Erivedge (generic name = visnodegib), Gleevec (generic name = imatinib mesylate), Iressa (generic name = gefitinib), Nexavar (generic name = sorafenib), Tarceva (generic name = erlotinib), Tykerb (generic name = lapatinib), and Zelboraf (generic name = vemurafenib) (FDA, 2013; NCCN, 2010; NCI, 2010; Weingart et al., 2008).

Endocrine agents are a third class of oral anticancer medications. Endocrine agents interfere with the activity of hormones in the body that can promote the development, growth, and spread of cancer cells, such as estrogen and androgen. They are used to regulate the production of hormones associated with cancer. Endocrine agents are used to treat cancers in which hormones play a major role, such as certain types of breast cancer, endometrial cancer, ovarian cancer, uterine cancer, and prostate cancer (Mazzaferro et al., 2013). They include tamoxifen, a medication that prevents tumors from using estrogen that is used primarily to treat or prevent breast cancer. Over the past 15 years, a new class of endocrine agents for treatment of cancers associated with estrogen has been developed. These medications, known collectively as aromatase inhibitors, are most frequently used to treat advanced breast cancer and to prevent the recurrence of early stage breast cancer among postmenopausal women (Gibson et al., 2009; NCCN, 2010; NCI, 2010). Other endocrine agents are used to treat prostate cancer.

Roles of Oral Anticancer Medications in Cancer Treatment

Oral anticancer medications are used to treat frequently diagnosed cancers, such as breast, lung, prostate, and colorectal cancers. They are also used for rare cancers, such as adrenocortical cancer (cancer of the adrenal gland), dermatofibrosarcoma protuberans (a cancer of the dermis layer of skin), and retinoblastoma (an eye cancer).

The roles of oral anticancer medications in cancer treatment vary. Some oral anticancer medications, most notably tamoxifen and aromatase inhibitors, are used to reduce the likelihood of recurrence of cancer in patients with early stage cancers who were previously treated with surgery, radiation, and/or intravenous anticancer medications. Others, such as Gleevec (generic name = imatinib mesylate), are taken on an ongoing basis to prevent the growth of cancer cells. Still others, such as Xeloda (generic name = capecitabine) and Zolanza (generic name = vorinostat), are used to treat metastatic cancers, recurrent cancers, or cancers that cannot be surgically removed.

Oral anticancer medications may be used as “first-line” treatments for persons newly diagnosed with cancer or as “second-line” treatments for persons who do not respond to first-line treatments. Treatment of chronic myeloid leukemia provides an illustration. One oral anticancer medication, Gleevec (generic name = imatinib mesylate), is used as a first-line treatment for chronic myeloid leukemia. Persons with chronic myeloid leukemia who cannot tolerate Gleevec or whose cancers do not respond to it may be prescribed one of four other oral medications, Bosulif (generic name = bosutinib), Iclusig (generic name = ponatinib), Sprycel (generic name = dasatinib), or Tassigna (generic name = nilotinib).

Some oral anticancer medications are used alone, whereas others are used in combination with intravenous medications. Specific uses vary depending on the type of cancer or severity or stage of cancer being treated. Many are used following surgery to resect (remove all or part of) a tumor. A few are used to reduce the size of a tumor prior to surgery. Some oral anticancer medications are used concurrently with radiation therapy. An example is Temodar (generic name = temozolomide), which is used concurrently with radiation to treat persons who are newly diagnosed with glioblastoma multiforme, a form of brain cancer (NCCN, 2010; NCI, 2010).

Advantages and Disadvantages of Oral Anticancer Medications

When compared to intravenous and injectable anticancer medications, oral anticancer medications have both advantages and disadvantages. Advantages include that oral anticancer medications may allow administration of the medication on a daily basis, may be more convenient for patients, and may reduce the risk of infection or other complications (Mazzaferro et al., 2013). Disadvantages include less certainty in patient adherence to treatment regimens and a reduction in interaction between patients and their health care providers to manage complications of treatment (Mazzaferro et al., 2013). There may also be higher risks of drug-food and drug-drug interactions relative to intravenous and injectable anticancer medications (Banna et al., 2010).

Availability of Generic Equivalents for Oral Anticancer Medications

Most oral anticancer medications are available only as brand-name (i.e., nongeneric) medications. Generic equivalents are available for 20% of oral anticancer medications approved by the FDA (11 of the 54 medications) (see Table C-2). Many oral anticancer medications are relatively new medications for which the pharmaceutical company that developed the medication (i.e., the brand-name manufacturer) has exclusive marketing rights and/or for which the patent has not expired. In other cases, manufacturers do not currently market generic equivalents of brand-name drugs.

Although generic equivalents are available for only 20% of oral anticancer medications, they account for a large percentage of prescriptions filled for these medications. As Table 2 indicates, CHBRP estimates that tamoxifen, a generic oral anticancer medication used to treat breast, endometrial, ovarian, and uterine cancers, accounted for 24.3% of prescriptions filled for oral anticancer medications in California in 2012. Generic equivalents recently became available for Arimidex (generic name = anastrozole), Aromasin (generic name = exemestane), and Femara (generic name = letrozole), three newer oral medications that are used to treat breast, endometrial, ovarian, and uterine cancers. Prescriptions for these three generic drugs accounted for an estimated 26.6% of prescriptions for oral anticancer medications filled in California in 2012. Methotrexate sodium, a generic oral anticancer medication used to treat 10 types of cancer, was estimated to account for 10.1% of prescriptions filled.⁵²

⁵² Methotrexate sodium is used to treat acute promyelocytic leukemia, multiple types of bladder cancer, bone cancer, breast cancer, central nervous system tumors, desmoid tumors, gestational trophoblastic tumors, head and neck cancers, lung cancer, and multiple types of non-Hodgkin lymphoma. This drug is also used to treat rheumatoid arthritis and severe psoriasis.

Substitutability of Oral and Intravenous/Injectable Anticancer Medications

Intravenous or injected equivalents are available for only 17% of oral anticancer medications (9 of the 54 oral anticancer medications).⁵³ These alternatives may be intravenous or injected versions of the same drug or a very similar drug. They may also be therapeutic equivalents (i.e., different drugs that are equally effective for treating a particular cancer). One of the most widely used oral anticancer medications for which an intravenous or injected alternative is available is Xeloda (generic name = capecitabine), an oral prodrug of 5-fluorouracil (5-FU), an intravenous medication that has been used for a number of years to treat metastatic breast and colon cancers (Aisner, 2007; Walko and Lindley, 2005). Other oral anticancer medications for which intravenous or injected alternatives are available include Temodar (generic name = temozolamide), Cytosan (generic name = cyclophosphamide), Vepesid (generic name = etoposide), and Hycamtin (generic name = topotecan hydrochloride).⁵⁴ (See Table C-2 for a complete listing of oral anticancer medications for which intravenous or injected substitutes are available.)⁵⁵

Effectiveness of Anticancer Medications

It is important to recognize that what constitutes an effective oral anticancer medication varies depending on the purpose for which a medication is being used. In the case of medications that are used to treat an early stage cancer or prevent recurrence of an early stage cancer, an effective medication is one that enables a person to live disease-free for multiple years. Where medications are used to treat advanced or metastatic cancers, patients are unlikely to attain long periods of disease-free survival. In the context of advanced and metastatic cancer, an effective medication is generally considered one that improves quality of life and/or prolongs survival or prevents disease progression for a period of months rather than years.

The complexity of cancer treatment makes it difficult to evaluate the effectiveness of individual oral anticancer medications. Many oral anticancer medications are prescribed as part of multidrug regimens. When patients receive more than one medication at a time, one cannot easily assess the impact of any single medication. In addition, persons with many of the cancers treated with oral anticancer medications are also treated with surgery and/or radiation. Except where all patients prescribed an anticancer medication(s) receive exactly the same surgical or radiation treatments, one cannot determine whether differences in outcomes are due to the medication or to variation in surgical or radiation treatment. Even where treatments are identical, effectiveness may vary depending on the type of cancer, cancer stage (e.g., local vs. metastatic disease), the role of hormones in producing the cancer (if any),⁵⁶ and other factors.

⁵³ Personal communication, Betty Chan, PharmD, March 6, 2013.

⁵⁴ Personal communication, Betty Chan, PharmD, March 6, 2013.

⁵⁵ For some persons with health plans or health insurance policies to which AB 219 would apply, copays and other forms of cost sharing for intravenous or injected anticancer medications are lower than cost sharing for oral anticancer medications. In other cases, cost sharing for intravenous or injected anticancer medications is higher than cost sharing for oral anticancer medications.

⁵⁶ For example, tamoxifen and aromatase inhibitors reduce the risk of recurrence of breast cancer among women with estrogen receptor–positive breast cancers, but do not benefit women with breast cancers that are not triggered by estrogen (i.e., estrogen receptor–negative breast cancer).

Impact of Cost Sharing on Use of Oral Anticancer Medications

CHBRP identified six studies that assess the impact of cost sharing on use of anticancer medications. Findings from these studies are summarized in Appendix C-3. Two studies examined multiple targeted agents, often referred to as specialty medications that are administered orally (Kim et al., 2011; Streeter et al., 2011). Two studies assessed combinations of orally administered and IV-administered targeted anticancer medications (Goldman et al., 2006, 2010). Two studies focused on cost sharing for endocrine agents, orally administered medications that are used to treat breast cancer (Neugut et al., 2011; Sedjo and Devine, 2011).

All six studies analyzed data from health insurance claims for anticancer medications. All but one study (Kim et al., 2011), assessed data obtained from multiple health plans. Five studies examined the effects of variation in the generosity of health plan benefits over a single period of time (Goldman et al., 2006, 2010; Neugut et al., 2011; Sedjo and Devine, 2011; Streeter et al., 2011). One small study compared enrollees whose copayment for a 30-day supply of a specialty medication for cancer and other diseases increased by 25% or more to enrollees whose copayment did not increase (Kim et al., 2011). All of the studies were observational (i.e., patients were not randomly assigned to any particular level of cost sharing).

The six studies examined several indicators of the impact of cost sharing on medication use. Two studies estimated the relationship between the ratio of total out-of-pocket payments for anticancer medications to total payments for medical care and the price elasticity of demand (i.e., the percentage change in use or spending associated with a change in cost sharing). Goldman and colleagues (2006) found no statistically significant association between overall spending for certain specialty anticancer medications and the generosity of benefits for these medications. A subsequent study by Goldman and colleagues (2010) generated estimates for two orally administered anticancer medications (Gleevec and Tarceva) and three intravenously administered medications (Avastin, Herceptin, and Rituxan). The authors found that initiation of treatment with Gleevec or Tarceva was not associated with the generosity of benefits for these medications. However, they also found that there was a statistically significant association between persistence with treatment, defined as the number of claims for either of these medications, and the generosity of benefits. Persons who had lower cost sharing for Gleevec or Tarceva filled more prescriptions for them.

One study assessed the impact of cost sharing on abandonment of prescriptions for specialty oral anticancer medications (Streeter et al., 2011). Abandonment occurs when a patient submits a prescription to a pharmacy but later reverses the claim. Streeter and colleagues (2011) examined abandonment of prescriptions for one of eight specialty oral anticancer medications⁵⁷ by persons who did not subsequently fill a prescription for another anticancer medication. The authors compared persons with seven levels of cost sharing and found that persons who had cost sharing greater than \$250 per prescription were more likely to abandon their prescriptions than persons who had cost sharing of \$100 or less.

⁵⁷ Gleevec (generic name = imatinib), Nexavar (generic name = sorafenib), Revlimid (generic name = lenalidomide), Sutent (generic name = sunitinib), Tarceva (generic name = erlotinib), Temodar (generic name = temozolomide), Tykerb (generic name = lapatinib), Xeloda (generic name = capecitabine).

Three studies examined the impact of cost sharing on adherence to oral anticancer medications. Adherence is an important outcome because it measures whether patients are taking medication as prescribed.⁵⁸ Two studies limited their analyses to aromatase inhibitors, a type of oral anticancer medications used to treat breast cancer (Neugut et al., 2011; Sedjo and Devine, 2011). One study assessed multiple oral anticancer medications (Kim et al., 2011). The two studies of oral medications for breast cancer concluded that patients who had higher cost sharing were less likely to be adherent. Neugut and colleagues' (2011) findings are particularly relevant for AB 219 because the authors compared three levels of cost sharing for a 30-day supply of medication (\$0 to \$29.99, \$30 to \$89.99, and greater than \$90) and found that patients with cost sharing \geq \$90 were significantly less likely to be adherent than patients with cost sharing of \$0 to \$29.99. In contrast, Kim and colleagues' (2011) study of adherence to multiple specialty oral anticancer medications found no association between an increase in cost sharing of greater than \$25 per 30-day supply and adherence.

The difference between Kim and colleagues' findings and Neugut and colleagues (2011) and Sedjo and Devine (2011) findings may reflect differences in the medications studied. Many of the medications Kim and colleagues included are used to treat advanced or metastatic cancers. In contrast, aromatase inhibitors are most frequently prescribed to prevent recurrence of breast cancer and are prescribed for multiple years regardless of whether the patient has symptoms. As a consequence, patients prescribed endocrine agents may be more sensitive to cost sharing than patients who are prescribed specialty oral anticancer medications.

The two studies of the effects of cost sharing on persistence with oral anticancer medications also reached opposite conclusions (Kim et al., 2011; Neugut et al., 2011).⁵⁹ Neugut and colleagues (2011) found that patients who faced cost sharing greater than \$90 for a 30-day supply of medication had lower odds of persistence with aromatase inhibitors than patients who faced cost sharing of \$0 to \$29.99. In contrast, Kim and colleagues (2011) found no statistically significant relationship between an increase in cost sharing of greater than \$25 per 30-day supply and persistence with specialty oral anticancer agents. As with adherence, the difference in findings about the impact of cost sharing on persistence may be due to differences in the medications studied.

Recognizing that income may affect a person's use of prescription drugs, the authors of four of the six studies of the impact of cost sharing on use of oral anticancer medications included variables that measure income in their analyses. Two studies included variables that measured median income in the ZIP codes in which persons resided (Goldman et al., 2006, 2010). The authors used median household income at the ZIP code level because the pharmaceutical claims data they analyzed did not include measures of household income. Two studies controlled for patients' incomes (Neugut et al., 2011; Streeter et al., 2011).

⁵⁸ Neugut and colleagues (2011) and Sedjo and Devine (2011) measured adherence as a categorical variable. Patients were considered adherent if the ratio of the days of medication dispensed to the total number of days in the time period during which adherence was examined was \geq 80%. Kim and colleagues measured adherence as a continuous variable, which consisted of the ratio of the total days of medication supplied to the total number of days in the time period assessed.

⁵⁹ Both Kim and colleagues (2011) and Neugut and colleagues (2011) measured persistence as the length of time until a patient stops taking a medication.

The preponderance of evidence from these studies suggests that cost sharing has at most a small effect on use of specialty oral anticancer medications. Cost sharing has a larger effect on adherence and persistence with aromatase inhibitors for breast cancer, perhaps because these medications are used primarily to prevent recurrence of cancer and are taken over long periods of time.

BENEFIT COVERAGE, UTILIZATION, AND COST IMPACTS

AB 219 would prohibit DMHC-regulated plans and CDI-regulated policies that provide coverage for “prescribed, orally administered anticancer medications” from charging more than \$100 per filled prescription. This would apply to any DMHC-regulated plan and CDI-regulated policy issued, amended, or renewed on or after January 1, 2014.

This section presents, first, the current (baseline) benefit coverage, utilization, and costs related to oral anticancer medications, and then provides estimates of the impacts on coverage, utilization, and cost if AB 219 is enacted. For further details on the underlying data sources and methods, please see Appendix D at the end of this document.

In order to conduct its analysis within the required 60-day timeframe, CHBRP measured current cost sharing (as a percentage of the cost of the medication) for oral anticancer medications. CHBRP then assumed that postmandate compliance would result in the prohibition of charging more than \$100 per filled prescription being applied to oral anticancer medications. This analysis draws on the approach used to analyze AB 1000 (CHBRP, 2011), a bill that would have had benefit coverage, utilization, and cost impacts similar to AB 219. The updated analysis takes into account differences in bill language, but relies on some previous data.

Present Baseline Cost and Coverage

Current Coverage of Mandated Benefit

Current coverage of oral anticancer medications was determined by a survey of the seven largest providers of health insurance in California. CHBRP conducts a bill-specific coverage survey of California’s largest health plans and insurers. Responses to this survey represented 81.44% of enrollees in the privately funded, CDI-regulated market and 67.78% of enrollees in the privately funded, DMHC-regulated market. Combined, responses to this survey represent 85.78% of enrollees in the privately funded market subject to state mandates.

AB 219 would affect the coverage of approximately 25.6 million enrollees in DMHC-regulated health care service plans and CDI-regulated health insurance policies in California with outpatient prescription drug coverage (Table 1).

As discussed in the *Introduction*, all plans and policies subject to AB 219—even those without an *outpatient* prescription drug/pharmacy benefit—cover some form of prescription drugs under benefits covering hospitalization or outpatient visits or procedures. But the bill explicitly does not require plans/policies that do not provide coverage for oral anticancer medications as part of their prescription drug benefit to begin covering them.

Cost-sharing provisions for anticancer medications provided on an outpatient basis vary widely by contract/policy. Enrollees who have coverage for oral anticancer medications generally access the coverage as an outpatient prescription drug benefit. Copayments for these benefits generally

range from \$0 to \$100 per prescription. However, medication cost-sharing provisions for some enrollees are in the form of coinsurance, which can range from 0% to 40% after any applicable deductible has been met. The deductible amount also varies by contract/policy.

In terms of publicly purchased coverage, Medi-Cal Managed Care and CalPERS both provide coverage for oral anticancer medications.

Current Utilization Levels and Costs of the Mandated Benefit

Based on Milliman's analysis of 2011 California claims data (e.g., the MarketScan databases reflecting the healthcare claims experience of employees and dependents covered by the health benefit programs of large employers, as detailed in Appendix D), CHBRP estimates that enrollees with coverage of oral anticancer medications receive 27.4 prescriptions of oral anticancer medication per year per 1,000 enrollees (Table 1) and that 0.54% of privately funded enrollees with coverage subject to the mandate will use oral anticancer medications in a year. It should be noted that the MarketScan databases contains claims data collected from insurance companies, Blue Cross Blue Shield plans, and third-party administrators, but not from Medi-Cal or Workers Compensation.

The estimated average annual cost per oral anticancer medication prescription for 2014 is \$855.52. The percentage distribution of prescriptions, the average cost (health plan cost plus enrollee cost sharing), and the distributions of total cost are presented in Table 2.

Table 2. Outpatient Oral Anticancer Medication Prescriptions, 2014

Drug name	Drug Type	Percentage of Prescriptions	Average Cost of Prescriptions	Percentage of Total Cost
Tamoxifen Citrate	Generic	24.3%	\$29	0.8%
Anastrozole	Generic	18.8%	\$76	1.7%
Methotrexate	Generic	10.1%	\$25	0.3%
Mercaptopurine	Generic	9.1%	\$169	1.8%
Letrozole	Generic	5.3%	\$384	2.4%
Femara	Brand	4.7%	\$892	4.9%
Megestrol Acetate	Generic	3.6%	\$71	0.3%
Xeloda	Brand	3.1%	\$2,736	9.9%
Hydroxyurea	Generic	2.9%	\$69	0.2%
Exemestane	Generic	2.5%	\$517	1.5%
Gleevec	Brand	2.3%	\$9,109	24.5%
Temodar	Brand	1.7%	\$3,466	6.9%
Aromasin	Brand	1.6%	\$692	1.3%
Arimidex	Brand	1.4%	\$665	1.1%
Bicalutamide	Generic	1.2%	\$97	0.1%
Tarceva	Brand	1.0%	\$6,595	7.3%
Leuprolide Acetate	Generic	0.8%	\$229	0.2%
Sprycel	Brand	0.6%	\$10,305	7.7%
Cyclophosphamide	Generic	0.5%	\$217	0.1%
Sutent	Generic	0.5%	\$9,611	5.3%
Xeloda	Generic	0.5%	\$2,886	1.6%
Tykerb	Brand	0.4%	\$4,956	2.4%
Tasigna	Brand	0.3%	\$10,727	4.3%
Nexavar	Brand	0.3%	\$9,709	3.7%
Afinitor	Brand	0.3%	\$10,159	3.0%
Trexall	Brand	0.2%	\$238	0.1%
Fareston	Brand	0.2%	\$1,081	0.3%
Megace Es	Brand	0.2%	\$903	0.2%
Votrient	Brand	0.1%	\$8,196	1.3%
Purinethol	Brand	0.1%	\$511	0.1%
Zortress	Brand	0.1%	\$1,836	0.3%
Zytiga	Brand	0.1%	\$7,147	1.0%
Thioguanine	Generic	0.1%	\$387	0.1%
Ceenu	Brand	0.1%	\$99	0.0%
Etoposide	Generic	0.1%	\$1,392	0.1%
Tretinoin	Generic	0.1%	\$4,133	0.4%
Flutamide	Generic	0.1%	\$146	0.0%
Targretin	Brand	0.1%	\$7,687	0.5%
Casodex	Brand	0.1%	\$839	0.1%
Other Brand	Brand	0.4%	\$4,072	2.1%
Other Generic	Generic	0.1%	\$1,777	0.2%
Total/Average		100.0%	\$855.52	100.0%

Source: California Health Benefits Review Program, 2013

Notes: "Cost" here represents the total of amounts paid by the health plan/insurer plus amounts paid by the patient, out of pocket, due to cost-sharing provisions of his/her plan contract or policy (cost sharing may take the form of copays or coinsurance and either may have applicable deductibles or annual/lifetime caps).

Table 2 notes which are the three most frequently prescribed oral anticancer medications:

- Tamoxifen Citrate—24.3% of prescriptions;
- Anastrozole—18.8% of prescriptions; and
- Methotrexate—10.1% of prescriptions.

Table 2 also notes that the three most expensive oral anticancer medications on an average cost per prescription basis are:

- Tasigna—\$10,727 per prescription;
- Sprycel—\$10,305 per prescription; and
- Afinitor—\$10,159 per prescription.

The three most expensive oral anticancer medications as a percent of total costs are:

- Gleevec—24.5% of total costs;
- Xeloda—9.9% of total costs; and
- Sprycel—7.7% of total costs.

The Extent to Which Costs Resulting From Lack of Coverage Are Shifted to Other Payers, Including Both Public and Private Entities

Because AB 219 would not expand coverage for oral anticancer medications, the costs potentially being shifted to other payers premandate that may change postmandate would be those for *covered* benefits. CHBRP recognizes that some portion of out-of-pocket expenses for covered benefits by enrollees utilizing oral anticancer medications may be shifted to public programs, or to drug-assistance or charitable programs, but the extent of such a potential shift is unknown. Therefore, this potential shift was not considered in our analysis.

Impacts of Mandated Benefit Coverage

How Would Changes in Coverage Related to the Mandate Affect the Benefit of the Newly Covered Service and the Per-Unit Cost?

Impact on per-unit cost

CHBRP estimates that the mandate would have no measurable short-term effect on the per-unit costs of oral anticancer medications or the per-unit cost of other anticancer medications, primarily because CHBRP does not project a measurable change in utilization of oral anticancer medications due to the mandate.

Postmandate coverage

AB 219 would not require coverage for oral anticancer medications for enrollees currently without it. Therefore, CHBRP estimates that the percentage of affected enrollees with coverage for medications would remain 100.0% postmandate.

Changes in coverage as a result of premium increases

CHBRP projects no measurable impact on the number of persons who are uninsured because the estimated premiums increase is estimated to be approximately 0.0%—which is less than the 1% threshold at which CHBRP would estimate a change in the number of persons covered by insurance.

Changes in per-prescription period

CHBRP assumes no measurable impact on the per-prescription period, i.e., changing from a standard period (e.g., a month or every 30 days) to a shorter period (e.g., every week). Such change might occur, particularly for expensive oral medications, due to the changes in health plans or policies after the mandate. CHBRP concluded that the likelihood of this change would be low given the relatively small financial impact of the proposed mandate.

How Would Utilization Change as a Result of the Mandate?

Overall utilization rates (expenses) are not projected to change as a result of the mandate. Among enrollees who had coverage prior to the mandate, CHBRP estimates a reduction of \$2,539,000 for the insured population subject to the mandate in out-of-pocket expenses due to the mandate's required changes in enrollee cost-sharing provisions.

CHBRP assumes no increase in the number of users and no increase in the units of oral anticancer medication or utilization of oral anticancer medications among existing users of anticancer medications. As with other health benefits, CHBRP recognizes that a decrease in out-of-pocket expenditures may make it easier for some enrollees to use more drugs or more-expensive drugs, regardless of their medical effectiveness. This is because the literature implies that a decrease in out-of-pocket expenditures is likely to increase the utilization in the long-term (Smith et al., 2009) as well as in the short-term (Manning et al., 1987), when measuring the price elasticity of demand for overall medical care. Additionally, CHBRP recognizes there may be pharmaceutical company-induced demand. However, CHBRP concluded that such potential increases would not measurably affect utilization. CHBRP's assumptions are supported by the following evidence:

- AB 219 would not extend benefit coverage for oral anticancer medications to enrollees currently without coverage. It would only affect cost sharing for oral anticancer medications for those enrollees already with benefit coverage for these medications.
- Cancer is a life-threatening illness, and patients will tend to do whatever they can to comply with prescribed treatments. Therefore, changes in the price of anticancer medications do not generate significant changes in demand. Studies have found that price

elasticity⁶⁰ of demand for anticancer medications is low, at least when measured in the short term, as detailed hereafter. Price elasticity of demand for anticancer drugs has been estimated to be as low as -0.01 . In other words, when the price elasticity of demand is -0.01 as in the empirical result above, a 10% reduction in out-of-pocket costs leads to a 0.1% increase in drug spending. This price elasticity of demand for anticancer drugs (-0.01) is much smaller in magnitude than that for traditional pharmaceuticals, which is usually estimated around -0.3 to -0.5 (Goldman et al., 2006). Another study reported that a 10% reduction in out-of-pocket costs increases the number of anticancer drug treatments by at most 0.4% to 1.1% among patients who already initiated anticancer drug therapy (Goldman et al., 2010). This study also reported that a 10% reduction in out-of-pocket costs leads to at most a 2.6% increase in the probability that a patient initiates anticancer drug therapy. It is unknown whether conclusions on price elasticity from this study's estimates on two oral anticancer medications may be generalizable to the other 52 FDA-approved oral anticancer medications.

- Based on a National Comprehensive Cancer Network Task Force report, many oncologists report that patients are unlikely to interrupt primary therapy if at all possible and may seek other funding, such as second mortgages on their homes to pay for treatment (Weingart et al., 2008).
- Although there are exceptions (see Appendix C), many oral anticancer medications have no intravenous or injected substitute, and clinical considerations further limit substitutability.

Although no increase in the number of users of anticancer medications is projected among enrollees with cancer, there is some possibility of substitution of oral in place of intravenous/injected anticancer medications. Although relatively few oral anticancer medications have an intravenous or injected substitute (Appendix C), some do exist. Therefore, enrollees who were undergoing chemotherapy, and who were prescribed an oral anticancer medication for which an intravenous substitute was available and clinically appropriate for the type and stage of cancer, may have been influenced by coverage and cost considerations to use the intravenous option. Postmandate, such persons may switch to an oral anticancer medication. This dynamic cannot be quantified due to the complex clinical factors that are involved when considering potential substitutions.

To What Extent Would the Mandate Affect Administrative and Other Expenses?

Health care plans and policies include a component for administration and profit in their premiums. In estimating the impact of this mandate on premiums, actuarial analysis assumes that health plans will apply their existing administration and profit loads to the increase in health care costs produced by the mandate. Therefore, although there may be administrative costs associated with the mandate, administrative costs as a portion of premiums would not change. In addition, compliance with AB 219 would require that plans and insurers notify members and applicants of their oral anticancer medication coverage changes. Health plans and insurers may also need to

⁶⁰ Price elasticity of demand shows how the quantity demanded or supplied will change when the price changes.

increase staff specialized in utilization management. These administrative changes were reflected in the standard administrative cost load associated with premiums.

Impact of the Mandate on Total Health Care Costs

CHBRP estimates that total net expenditures (including total premiums and out-of-pocket expenditures) for oral anticancer medications and services would increase by \$454,000, or 0.0003%, as a result of AB 219 (Table 1). Though AB 219 is expected to increase the premiums paid by both employers and employees, it would cause a decrease in the out-of-pocket costs paid by members using oral anticancer medications incurred through the cost-sharing provisions of a policy or contract.

Total premiums for private employers are estimated to increase by \$1,969,000, or 0.0025%. Enrollee contributions toward premiums for group insurance are estimated to increase by \$519,000, or 0.0024%. Total premiums for those with individually purchased insurance are estimated to increase by \$505,000, or 0.0037%. The reduction in enrollee expenses for oral anticancer medications due to cost sharing provisions would range from \$0.01 to \$0.01 per member per month (PMPM) in privately purchased health insurance, depending on market segment.

The major impact of the bill would be to shift some oral anticancer medication costs from patients to health plans and policies, ranging from \$0 to \$58,744 per user per year. On average, the amount of the shift is estimated to be \$25.63 per enrollee who uses oral anticancer medications per year. The wide variations in cost sharing are related to the price of a particular oral medication, as well as the benefit structure of a particular health plan or policy, that a patient has.

Therefore, total premiums are estimated to increase by \$2,993,000, but there is also a reduction in out-of-pocket expenses for enrollees using covered oral anticancer medications. This reduction in enrollee expenses for covered medications is \$2,539,000.

Costs or Savings for Each Category of Payer Resulting From the Benefit Mandate

Premium impacts for privately purchased market segments are estimated (see Table 4) to be:

- 0.0025% for the large-group DMHC-regulated plans;
- 0.0022% for the large-group CDI-regulated policies;
- 0.0030% for the small-group DMHC-regulated plans;
- 0.0023% for the small-group CDI-regulated policies;
- 0.0027% for the individual DMHC-regulated plans; and
- 0.0047% for the individual CDI-regulated policies.

Per member per month (PMPM) premiums, impacts are estimated to be:

- \$0.01 PMPM for the large-group DMHC-regulated plans;
- \$0.01 PMPM for the large-group CDI-regulated policies;
- \$0.01 PMPM for the small-group DMHC-regulated plans;
- \$0.01 PMPM for the small-group CDI-regulated policies;
- \$0.01 PMPM for the individual DMHC-regulated plans; and
- \$0.01 PMPM for the individual CDI-regulated policies.

AB 219 would apply to Medi-Cal Managed Care. However, the California Department of Health Care Services (DHCS), which administers Medi-Cal would not be expected to face measurable expenditure or premium increases because those plans currently cover oral anticancer medication benefits with minimal or no cost-sharing requirements.

Impact on Long-Term Costs

Longer-term impacts on health care costs as a result of the mandate are unknown but are likely to increase over time. This is because the literature implies that a decrease in out-of-pocket expenditures is likely to increase the utilization in the long-term (Smith et al., 2009) as well as in the short-term (Manning et al., 1987), when measuring the price elasticity of demand for overall medical care. CHBRP is unaware of an empirical study measuring the long-term effects of a decrease in out-of-pocket expenses on the utilization of oral anticancer medications (including the adherence/compliance), although some studies measured its short-term effects in terms of price elasticity (not the adherence/compliance) (Goldman et al., 2006; Goldman et al., 2010) as explained earlier.

It is estimated that a quarter of anticancer medications in the pipeline are planned as oral medications (Weingart et al., 2008). According to a recent pharmaceutical report on cancer medication development, almost 650 new medications and new indications for existing anticancer medications are in clinical development. Many of the new medications will be expensive. As a result, health plans' and insurers' costs for oncology medications, especially the more targeted and long-term oral anticancer medications, will continue to grow over the next several years.

There are several other factors that may be influential. For example, there is an increase in the number of patients receiving long-term treatment with more targeted oral anticancer medications. In addition, a continued growth in the use of combination treatment for various types of cancers is likely, and there is a trend of expanding indications or off-label use of existing drugs for the treatment of various cancers. In a recent study, the majority of oncologists believe that patients should have access to effective therapies regardless of cost. The implied cost-effectiveness standard among this group of oncologists was \$300,000/quality-adjusted life-year (QALY)⁶¹,

⁶¹ The QALY is based on the number of years of life that would be added by the intervention. Each year in perfect health is assigned the value of 1.0, down to a value of 0.0 for death. If the extra years would not be lived in full

much higher than the generally accepted threshold for health interventions of \$50,000 to \$100,000 per QALY. Some studies in Europe have demonstrated cost savings from replacing intravenous cancer therapy with oral therapy (Findlay et al., 2008).

Impact on Access and Health Service Availability

CHBRP expects that there will be impacts on the access to and availability of oral anticancer medication as a result of AB 219 in the long run. To the extent that cost sharing will be reduced and limits will be removed, access to expensive oral medications would be expected to increase for the small number of enrollees who seek oral anticancer medications. Nonetheless, possible implementation of prior authorization requirements and formularies are expected to mediate the response by the health plans and insurers to this increase in demand. CHBRP is unable to estimate these effects quantitatively.

Public Demand for Coverage

Considering the criteria specified by CHBRP's authorizing statute, CHBRP reviews public demand for benefits relevant to a proposed mandate in two ways. CHBRP:

- Considers the bargaining history of organized labor; and
- Compares the benefits provided by self-insured health plans or policies (which are not regulated by the DMHC or CDI and so not subject to state-level mandates) with the benefits that are provided by plans or policies that would be subject to the mandate.

On the basis of conversations with the largest collective bargaining agents in California, CHBRP concluded that unions *currently* do not include cost-sharing arrangements for oral anticancer medications in their health insurance negotiations. In general, unions negotiate for broader contract provisions such as coverage for dependents, premiums, deductibles, and broad coinsurance levels.⁶²

Among publicly funded self-insured health insurance policies, the preferred provider organization (PPO) plans offered by CalPERS currently have the largest number of enrollees. The CalPERS PPOs *currently* provide benefit coverage similar to what is available through group health insurance plans and policies that would be subject to the mandate.

To further investigate public demand, CHBRP used the bill-specific coverage survey to ask carriers who act as third-party administrators for (non-CalPERS) self-insured group health insurance programs whether the relevant benefit coverage differed from what is offered in group market plans or policies that would be subject to the mandate. The responses indicated that there *currently* are no substantive differences.

Given the lack of specificity in labor-negotiated benefits and the general match between health insurance that would be subject to the mandate and self-insured health insurance (not subject to

health, for example if the patient would lose a limb, or be blind, or be confined to a wheelchair, then the extra life-years are given a value between 0 and 1 to account for this.

⁶² Personal communication, S Flocks, California Labor Federation, February 2010.

state-level mandates), CHBRP concludes that public demand for coverage is essentially satisfied by the current state of the market.

Table 3. Baseline (Premandate) Per Member Per Month Premiums and Total Expenditures by Market Segment, California, 2014

	DMHC-Regulated							CDI-Regulated			Total
	Privately Funded Plans (by Market) (a)			CalPERS HMOs (b)	Medi-Cal Managed Care Plans			Privately Funded Plans (by Market) (a)			
	Large Group	Small Group	Individual		65 and Over (c)	Under 65	Medi- Cal/Formerly Healthy Families Program (d)	Large Group	Small Group	Individual	
Total enrollees in plans/policies subject to state mandates (e)	11,289,000	2,479,000	1,029,000	854,000	688,000	5,203,000	626,000	539,000	1,315,000	1,877,000	25,899,000
Total enrollees in plans/policies subject to AB 219	11,023,883	2,479,000	1,029,000	854,000	688,000	5,203,000	626,000	538,696	1,304,827	1,874,807	25,621,000
Average portion of premium paid by employer	\$437.53	\$313.63	\$0.00	\$391.90	\$279.00	\$163.00	\$88.83	\$483.35	\$421.89	\$0.00	\$95,549,186,000
Average portion of premium paid by employee	\$83.30	\$169.52	\$546.88	\$97.98	\$0.00	\$0.00	\$8.79	\$135.14	\$190.22	\$305.75	\$34,912,666,000
Total premium	\$520.83	\$483.15	\$546.88	\$489.88	\$279.00	\$163.00	\$97.62	\$618.49	\$612.11	\$305.75	\$130,461,851,000
Enrollee expenses for covered benefits (deductibles, copays, etc.)	\$28.54	\$46.99	\$109.38	\$25.99	\$0.00	\$0.00	\$4.51	\$87.22	\$209.80	\$163.07	\$14,462,198,000
Enrollee expenses for benefits not covered (f)	\$0.05	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.02	\$0.00	\$6,500,000
Total expenditures	\$549.41	\$530.15	\$656.26	\$515.87	\$279.00	\$163.00	\$102.13	\$705.72	\$821.92	\$468.82	\$144,930,550,000

Source: California Health Benefits Review Program, 2013.

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

(b) As of September 30, 2012, 57.5%, or 469,000, CalPERS members were state retirees, state employees, or their dependents. CHBRP assumes the same ratio for 2014.

(c) Medi-Cal Managed Care Plan expenditures for members over 65 include those who also have Medicare coverage.

(d) Children in Healthy Families, California's Children's Health Insurance Program, will be moved into Medi-Cal Managed Care by January 1, 2014, as part of the 2012–2013 budget.

(e) 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.

(f) 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 will 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; DMHC=Department of Managed Health Care.

Table 4. Impacts of the Mandate on Per Member Per Month Premiums and Total Expenditures by Market Segment, California, 2014

	DMHC-Regulated							CDI-Regulated			Total
	Privately Funded Plans (by Market) (a)			CalPERS HMOs (b)	Medi-Cal Managed Care Plans			Privately Funded Plans (by Market) (a)			
	Large Group	Small Group	Individual		65 and Over (c)	Under 65	Medi- Cal/Formerly Healthy Families Program (d)	Large Group	Small Group	Individual	
Total enrollees in plans/policies subject to state mandates (e)	11,289,000	2,479,000	1,029,000	854,000	688,000	5,203,000	626,000	539,000	1,315,000	1,877,000	25,899,000
Total enrollees in plans/policies subject to AB 219	11,023,883	2,479,000	1,029,000	854,000	688,000	5,203,000	626,000	538,696	1,304,827	1,874,807	25,621,212
Average portion of premium paid by employer	\$0.01	\$0.01	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.01	\$0.01	\$0.00	\$1,969,000
Average portion of premium paid by employee	\$0.00	\$0.01	\$0.01	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.01	\$1,024,000
Total premium	\$0.01	\$0.01	\$0.01	\$0.00	\$0.00	\$0.00	\$0.00	\$0.01	\$0.01	\$0.01	\$2,993,000
Enrollee expenses for covered benefits (deductibles, copays, etc.)	-\$0.01	-\$0.01	-\$0.01	\$0.00	\$0.00	\$0.00	\$0.00	-\$0.01	-\$0.01	-\$0.01	-\$2,539,000
Enrollee expenses for benefits not covered (f)	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0
Total expenditures	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$454,000
Percentage impact of mandate											
Insured premiums	0.0025%	0.0030%	0.0027%	0.0000%	0.0000%	0.0000%	0.0000%	0.0022%	0.0023%	0.0047%	0.0023%
Total expenditures	0.0003%	0.0005%	0.0004%	0.0000%	0.0000%	0.0000%	0.0000%	0.0003%	0.0003%	0.0006%	0.0003%

Source: California Health Benefits Review Program, 2013.

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

(b) As of September 30, 2012, 57.5%, or 469,000, CalPERS members were state retirees, state employees, or their dependents. CHBRP assumes the same ratio for 2014.

(c) Medi-Cal Managed Care Plan expenditures for members over 65 include those who also have Medicare coverage.

(d) Children in Healthy Families, California's Children's Health Insurance Program, will be moved into Medi-Cal Managed Care by January 1, 2014, as part of the 2012–2013 budget.

(e) 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.

(f) 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 will 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; DMHC=Department of Managed Health Care.

PUBLIC HEALTH IMPACTS

A total of 144,800 new cancer cases and 55,415 deaths from cancer were projected to occur in California in 2012 (CCR, 2011). It was estimated that 45% of new cancer cases would occur in the non-elderly population (those younger than 65 years of age)—i.e., the population most relevant to AB 219 because it does not affect Medicare coverage. AB 219 would prohibit DMHC-regulated plans and CDI-regulated policies that provide coverage for “prescribed, orally administered anticancer medications” from charging more than \$100 per filled prescription. This section presents the overall public health impact of passage of AB 219, followed by an analysis examining the potential for reduction in gender and racial/ethnic disparities in health outcomes, and the potential for the mandate to reduce premature death and societal economic losses as a result of cancer. This section also draws heavily on research conducted for CHBRP’s previous analyses of proposed mandate bills with similar scope, including AB 1000 (CHBRP, 2011), SB 961 (CHBRP, 2010), and SB 161 (CHBRP, 2009).

Estimated Public Health Outcomes

As presented in the *Medical Effectiveness* section, the FDA has approved 54 oral anticancer medications to treat over 50 different types of cancers. Oral anticancer medications are used to treat frequently diagnosed cancers, such as breast or lung cancer, as well as rare cancers, such as adrenocortical cancer (cancer of the adrenal gland). The roles of oral anticancer medications in cancer treatment vary and include reducing the likelihood of recurrence in persons who have been treated for early stage disease, first-line treatment to prevent growth of cancer cells, treatment of advanced or metastatic cancers, treatment of recurrent cancers, and treatment of cancers that cannot be surgically removed. As the *Medical Effectiveness* section notes, oral anticancer medications have both advantages and disadvantages over intravenous and injectable anticancer medications. Oral anticancer medications may be more convenient for patients and reduce their risk of infection or complications, yet there is less certainty in patient adherence to treatment regimens.

As presented in the *Benefit Coverage, Utilization, and Cost Impacts* section, 98.9% of enrollees in DMHC-regulated plans and CDI-regulated policies subject to AB 219 with coverage for outpatient prescription drugs currently have coverage for both generic and nongeneric oral anticancer medications affected by the bill. CHBRP does not project a change in utilization of oral anticancer medications as a result of this mandate. Therefore, no measureable impacts on health outcomes are projected.

Estimated Impact on Financial Burden

As presented in the *Medical Effectiveness* section, relatively few oral anticancer medications have an injected or intravenous substitute. AB 219 is not projected to increase utilization of oral anticancer medications. Therefore, the only public health impact of AB 219 is that it could lead to a decrease of \$2.54 million (in 2014 dollars) in out-of-pocket expenditures paid by cancer patients. Research shows that the financial burden faced by cancer patients can be substantial. A 2006 Kaiser Family Foundation report found that nearly half of respondents reported that the

cost of cancer care was a minor (29%) or major financial burden (29%) (USA Today/KFF, 2006). Another study found that 7.8% of cancer survivors forgo medical care and 9.9% forgo prescription medications due to financial burden (Weaver et al., 2010). A survey of patients with breast, colon, lung, and prostate cancer found that 40% of insured patients with annual incomes less than \$40,000 (in 2008 dollars) decided to forgo a recommended treatment because it was too expensive (Markham and Luce, 2010). Cancer treatment can also have significant long-term economic consequences; one survey found that 25% of respondents had spent all or most of their savings as a result of the financial burden of cancer, while another 7% borrowed money, took out a loan or another mortgage, and 3% declared bankruptcy (USA Today/KFF, 2006). Nonmedical costs due to cancer treatment, such as transportation costs and lost wages, can also result in a substantial burden for cancer patients and their families (Bennett et al., 1998). To the extent that AB 219 would result in a reduction of out-of-pocket costs, it has the potential to reduce the financial burden faced by cancer patients.

Impact on Gender and Racial Disparities

Several competing definitions of “health disparities” exist. CHBRP relies on the following definition:

A health disparity/inequality is a particular type of difference in health or in the most important influences of health that could potentially be shaped by policies; it is a difference in which disadvantaged social groups (such as the poor, racial/ethnic minorities, women or other groups that have persistently experienced social disadvantage or discrimination) systematically experience worse health or great health risks than more advantaged groups (Braveman, 2006).

CHBRP investigated the effects that AB 219 would have on health disparities by gender, race, and ethnicity.

Impact on Gender Disparities

Among women, breast cancer is the most prevalent cancer in California, accounting for 42% of existing female cancer patients’ diagnoses (CCR, 2011). In California, the lifetime risk of breast cancer is one in eight—translating into an incidence of approximately 23,000 new diagnoses a year, for a total prevalence of 292,000 women alive today who have had a breast cancer diagnosis (CCR, 2011). An estimated 55% of the cases of breast cancer occur in women less than 65 years old—i.e., the population most relevant to AB 219 (CCR, 2005). Although treatment may vary by stage of diagnosis and other factors, as shown in Table 2, 53.2% of oral anticancer medication prescriptions are for one of three drugs (Methotrexate Sodium, Tamoxifen Citrate, and Anastrozole), all of which are used in the treatment of breast cancer. These three drugs represent approximately 2.8% of the cost of all nongeneric oral anticancer medication prescriptions (Table 2).

Women with breast cancer are likely to suffer from financial burden. Tamoxifen and Anastrozole may be prescribed for years to reduce the risk of breast cancer recurrence, and therefore have the potential for a high overall cost burden. Out-of-pocket expenditures and lost income for women with breast cancer vary widely but average \$1,455 per month, and women with breast cancer

face a financial burden of care ranging from 26% to 98% of their monthly income, depending on income levels (Arozullah et al., 2004).

To the extent to which AB 219 would reduce their out-of-pocket costs for oral anticancer medications, there is a potential to reduce the financial burden faced by women undergoing breast cancer treatment who are enrolled in DMHC-regulated plans or CDI-regulated policies to which AB 219 would apply.

Impact on Racial/Ethnic Disparities

Evaluating the impact on racial and ethnic health disparities is particularly important because racial and ethnic minorities report having poorer health status and worse health indicators (KFF, 2007). One important contributor to racial and ethnic health disparities is differences in the prevalence of insurance; minorities are more likely than whites to be uninsured. However, coverage disparities still exist within the insured population and may contribute to gaps in access and/or utilization among those covered (Kirby et al., 2006; Lille-Blanton and Hoffman, 2005; Rosenthal et al., 2008). To the extent that racial/ethnic groups are disproportionately distributed among policies with more or less coverage, a mandate bringing all policies to parity may impact an existing disparity.

CHBRP analyses are limited to the insured population (because the uninsured would not be affected by a health benefit mandate). Therefore, to assess a mandate's possible effects on health disparities (assuming the covered intervention is medically effective), CHBRP must answer two questions:

- (1) Are there known racial/ethnic disparities in the prevalence or incidence of cancer; and
- (2) Are there known racial/ethnic disparities in premandate benefit coverage and/or utilization?

There is a differential burden of cancer in racial/ethnic minorities in California (CCR, 2011). The reasons for these differences are not well understood, but are thought to result from a combination of socioeconomic factors such as poverty, education, and inadequate health insurance (Brawley, 2009; Ward et al., 2004). Numerous studies have documented that individuals from lower socioeconomic groups and specific racial and ethnic minorities have greater cancer risk and poorer cancer-related outcomes. This differential burden results in lower overall survival rates, a generally more advanced stage of cancer at time of diagnosis, and a higher eventual risk of death (Albain et al., 2009; Sloane, 2009). Compared with whites, African Americans have poorer survival once cancer is diagnosed. Five-year relative survival is lower in blacks than in whites within every stratum of stage of diagnosis for nearly every cancer site (Jamal et al., 2009; Ward et al., 2004). As cancer treatments become more sophisticated, the disparity between whites and non-whites is likely to widen (Meropol and Schulman, 2007). This is likely because disparities in socioeconomic status lead to disparities in access to new medical advances and ultimately in health status. Therefore, medical advances (such as oral anticancer medications) can exacerbate disparities in relative racial/ethnic cancer survival rates (Tehranifar et al., 2009).

In California, non-Hispanic black men have the highest rates of cancer compared to all other racial or ethnic groups (CCR, 2011). This higher prevalence may result in non-Hispanic black men having higher out-of-pocket medical costs for cancer treatment compared to people of other race/ethnicities. African Americans are more likely to have lower incomes compared to whites, so out-of-pocket costs for oral chemotherapy could comprise a higher percentage of annual household income (Arozullah et al., 2004; Pisu et al., 2011). Compared to whites, African American cancer survivors are also more likely to forgo prescription medications due to financial burden (Weaver et al., 2010).

To the extent that AB 219 reduces their out-of-pocket costs for oral anticancer medications, non-Hispanic blacks who are enrolled in DMHC-regulated plans or CDI-regulated policies to which AB 219 would apply could experience a reduced financial burden with the passage of this mandate.

Impacts on Premature Death and Economic Loss

Premature Death

Premature death is often defined as death before the age of 75 years (Cox, 2006). The overall impact of premature death due to a particular disease can be measured in years of potential life lost prior to age 75 and summed for the population (generally referred to as “YPLL”) (Cox, 2006; Gardner and Sanborn, 1990). In California, it is estimated that there are nearly 102,000 premature deaths each year, accounting for more than two million YPLL (CDPH, 2011; Cox, 2006). In order to measure the impact of premature mortality across the population impacted by a proposed mandate, CHBRP first collects baseline mortality rates. Next, the literature is examined to determine whether the proposed mandated benefit impacts mortality and whether YPLL have been established for the given condition. Some diseases and conditions do not result in death, and therefore a mortality outcome is not relevant.

Cancer represents the greatest contributor to premature death in California, with 21.1% of all YPLL attributable to cancer (CDPH, 2009). It is estimated that in California in 2007, the YPLL due to cancer was 1,209 per 100,000 population per year, corresponding to an annual state total of nearly 200,000 YPLL (CDPH, 2009).

Although cancer is a substantial cause of premature mortality in California, AB 219 is not estimated to have a measurable change the utilization of oral anticancer medications or result in a corresponding reduction in premature death.

Economic Loss

Economic loss associated with disease is generally presented in the literature as an estimation of the value of the YPLL in dollar amounts (i.e., valuation of a population’s lost years of work over a lifetime). For CHBRP analyses, a literature review is conducted to determine whether the literature provides evidence of lost productivity associated with a disease. In addition, morbidity associated with the disease or condition of interest can also result in lost productivity by causing

the individual to miss days of work either due to their illness or due to their role as a caregiver for someone else who is ill.

The National Institutes of Health have estimated that the overall cost of cancer in 2005 was \$209.9 billion (USCSWG, 2005). Of this, it was estimated that \$74 billion (35%) was for direct medical costs, including health expenditures, whereas the remaining 65% was attributable to lost productivity due to illness (\$17.5 billion) and premature death (\$118.4 billion) (USCSWG, 2005). By 2020, annual productivity costs attributable to cancer mortality are projected to surpass \$147 billion (Bradley et al., 2008). Breast cancer alone is estimated to cost employers \$1,911 and \$6,157 (in 2008 dollars) due to absenteeism and short-term disability (respectively) per woman within the first year of her cancer diagnosis (Fu et al., 2011).

Although cancer in California is a substantial cause of lost productivity and premature death, AB 219 is not projected to lead to a measurable change in the utilization of oral anticancer medications or result in a corresponding reduction in lost productivity.

APPENDICES

Appendix A: Text of Bill Analyzed

On February 5, 2013, the Assembly Committee on Health requested that CHBRP analyze AB 219.

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

SECTION 1. Section 1367.656 is added to the Health and Safety

Code, to read:

1367.656. (a) Notwithstanding any other law, a health care service plan contract issued, amended, or renewed on or after January 1, 2014, that provides coverage for prescribed, orally administered anticancer medications shall not require an enrollee to pay a total cost-sharing amount of more than one hundred dollars (\$100) per filled prescription.

SEC. 2. Section 10123.206 is added to the Insurance Code, to read:

10123.206. (a) Notwithstanding any other law, a health insurance policy issued, amended, or renewed on or after January 1, 2014, that provides coverage for prescribed, orally administered anticancer medications shall not require an insured to pay a total cost-sharing amount of more than one hundred dollars (\$100) per filled prescription.

SEC. 3. 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: Literature Review Methods

Appendix B describes methods used in the medical effectiveness literature review conducted for this report. A discussion of CHBRP’s system for grading evidence, as well as lists of MeSH Terms, Publication Types, and Keywords, follows.

AB 219 would apply to such a large number of medications that a systematic review of the literature on the effectiveness of all of them was not feasible for this analysis.

A literature search was performed to retrieve literature that summarized trends in the development of oral anticancer medications, described the manner in which these medications are used, or assessed the impact of cost sharing on use of these medications. The search was limited to oral medications that are used to kill or slow the growth of cancer cells and that are prescribed to persons with a cancer diagnosis.⁶³ Oral medications that are prescribed to persons with cancer to alleviate pain or to reduce the side effects of chemotherapy (e.g., antianemia medications,⁶⁴ antiemetic medications⁶⁵) were excluded because AB 219 would not apply to them.

The literature search was limited to articles published in English from early 2010 to present because CHBRP performed a similar search in 2010 for its report *Analysis of Senate Bill 961: Cancer Treatment* (CHBRP, 2010). The following databases that index peer-reviewed journals were searched: PubMed (MEDLINE), the Cochrane Library, EMBASE, and Web of Science.

Two reviewers screened the title and abstract of each citation retrieved by the literature search to determine eligibility for inclusion. The reviewers acquired the full text of articles that were deemed eligible for inclusion in the review and reapplied the initial eligibility criteria.

Abstracts for 609 articles were identified, nine were retrieved and reviewed.

Evidence Grading System

In making a “call” for each outcome measure, the medical effectiveness lead and the content expert consider the number of studies as well the strength of the evidence. Further information about the criteria CHBRP uses to evaluate evidence of medical effectiveness can be found in CHBRP’s *Medical Effectiveness Analysis Research Approach*.⁶⁶ To grade the evidence for each outcome measured, the team uses a grading system that has the following categories:

- Research design;

⁶³ Some oral medications used to treat cancer are also used to treat other diseases. CHBRP limited its analysis to persons diagnosed with cancer, because AB 219 would apply only where these medications are used to treat cancer.

⁶⁴ Anemia is a condition that develops when a person’s blood does not contain a sufficient number of healthy red blood cells. Persons with cancer who receive anticancer medications are at increased risk for anemia because treatment can kill healthy red blood cells as well as cancer cells. These patients are often prescribed antianemia medications to reduce the risk of developing this condition.

⁶⁵ Antiemetic medications are medications used to alleviate nausea and vomiting, which are common side effects of anticancer medications.

⁶⁶ Available at: www.chbrp.org/analysis_methodology/docs/medeffect_methods_detail.pdf.

- Statistical significance;
- Direction of effect;
- Size of effect; and
- Generalizability of findings.

The grading system also contains an overall conclusion that encompasses findings in these five domains. The conclusion is a statement that captures the strength and consistency of the evidence of an intervention's effect on an outcome. The following terms are used to characterize the body of evidence regarding an outcome:

- Clear and convincing evidence;
- Preponderance of evidence;
- Ambiguous/conflicting evidence; and
- Insufficient evidence.

A grade of *clear and convincing evidence* indicates that there are multiple studies of a treatment and that the large majority of studies are of high quality and consistently find that the treatment is either effective or not effective.

A grade of *preponderance of evidence* indicates that the majority of the studies reviewed are consistent in their findings that treatment is either effective or not effective. This can be further subdivided into preponderance of evidence from high-quality studies and preponderance of evidence from low-quality studies.

A grade of *ambiguous/conflicting evidence* indicates that although some studies included in the medical effectiveness review find that a treatment is effective, a similar number of studies of equal quality suggest the treatment is not effective.

A grade of *insufficient* evidence indicates that there is not enough evidence available to know whether or not a treatment is effective, either because there are too few studies of the treatment or because the available studies are not of high quality. It does not indicate that a treatment is not effective.

Search Terms

The search terms used to locate studies relevant to AB 219 were as follows:

MeSH terms used to search PubMed

- Cohort studies
- Computer simulation
- Costs and cost analysis
- Decision support techniques

- Diffusion of innovation
- Health care costs
- Health care reform
- Health policy
- Life expectancy
- Life tables
- Markov chains
- Models, econometric
- Models, economic
- Models, statistical
- Monte Carlo method
- Predictive value of tests
- Research design
- Resource allocation
- Survival analysis

Major MeSH terms used to search PubMed

- Decision support techniques
- Mass screening
- Models, statistical
- Patient compliance

Keywords used to search PubMed, Cochrane Library, EconLit, Web of Science, and relevant websites

- 17-(3-pyridyl)-5,16-androstadien-3beta-acetate
- 4-(4-(((4-chloro-3-(trifluoromethyl)phenyl)carbonyl)amino)-3-fluorophenoxy)-n-methylpyridine-2-carboxamide
- 4-methyl-N-(3-(4-methylimidazol-1-yl)-5-(trifluoromethyl)phenyl)-3-((4-pyridin-3-yl)pyrimidin-2-yl)amino)benzamide
- abiraterone acetate
- anastrozole
- Antibodies, Monoclonal

- antineoplastic agents
- AP24534
- axitinib
- bexarotene
- bicalutamide
- Biological Agents
- biological therap\$
- biologics
- bosutinib
- cabozantinib
- cancer
- capecitabine
- chloramphenicol
- crizotinib
- cyclophosphamide
- drug benefits
- drug cost
- Embase
- english language
- enzalutamide
- etoposide
- exemestane
- flutamide
- HhAntag691
- humans
- idarubicin
- imatinib
- imatinib mesylate
- INCB018424
- letrozole
- MDV 3100

- megestrol
- molecular targeted therapy
- monoclonal antibody
- N-(4-bromo-2-fluorophenyl)-6-methoxy-7-((1-methylpiperidin-4-yl)methoxy)quinazolin-4-amine
- neoplasms
- nilotinib
- oral drug administration
- PLX4032
- ponatinib
- regorafenib
- ruxolitinib
- systematic reviews
- tamoxifen
- targeted therapy
- temozolomide
- thalidomide
- tretinoin
- vandetanib
- vemurafenib
- vinorelbine
- vismodegib

Publication Types

- Clinical Trial
- Comparative Study
- Controlled Clinical Trial
- Meta-Analysis
- Practice Guideline
- Randomized Control Trial

Appendix C: Summary Findings on Medical Effectiveness

Table C-1 lists all oral anticancer medications that the FDA has approved for marketing and sale in the United States in alphabetical order by brand name. Table C-2 provides information about each of these medications. Both the brand name and agent are indicated for each medication, along with the year the FDA initially approved the medication, the cancer(s) that each medication is used to treat is listed, and a description of the medication's role in cancer treatment (e.g., treatment of early stage versus metastatic cancers, used alone or in combination with other medications). The table also indicates whether an intravenous/injectable alternative to the medication is available in the United States. Tables C-3 and C-4 list and summarize findings from studies on the impact of cost sharing on utilization of oral anticancer medications.

Table C-1. Oral Anticancer Medications Approved by the FDA

Brand Name	Agent (Generic Name)
Afinitor	Everolimus
Alkeran	Melphalan
Arimidex	Anastrozole
Aromasin	Exemestane
Bosulif	Bosutinib
Caprelsa	Vandetanib
Casodex	Bicalutamide
CeeNU	Lomustine
Cometriq	Cabozantinib
Cytosan	Cyclophosphamide
Droxia, Hydrea	Hydroxyurea
Emcyt	Estramustine
Erivedge	Visnidegib
Eulexin	Flutamide
Fareston	Toremifene
Femara	Letrozole
Gleevec	Imatinib mesylate
Hexalen	Altretamine
Hycamtin	Topotecan hydrochloride
Iclusig	Ponatinib
Inlyta	Axitinib
Iressa	Gefitinib
Jakafi	Ruxolitinib
Leukeran	Chlorambucil
Lysodren	Mitotane
Matulane	Procarbazine
Megace	Megestrol acetate
Myleran	Busulfan
Nexavar	Sorafenib tosylate
Nilandron	Nilutamide

Table C-1. Oral Anticancer Medications Approved by the FDA (Cont'd)

Brand Name	Agent (Generic Name)
Nolvadex	Tamoxifen citrate
Pomalyst	Pomalidomide
Purinethol	Mercaptopurine
Revlimid	Lenalidomide
Rheumatrex, Trexall	Methotrexate sodium
Sprycel	Dasatinib
Stivarga	Regorafenib
Sutent	Sunitinib malate
Tabloid	Thioguanine
Tarceva	Erlotinib hydrochloride
Targretin	Bexarotene
Tasigna	Nilotinib hydrochloride monohydrate
Temodar	Temozolomide
Thalomid	Thalidomide
Tykerb	Lapatinib
Vepesid	Etoposide
Vesanoid	Tretinoin
Votrient	Pazopanib
Xalkori	Crizotinib
Xeloda	Capecitabine
Xtandi	Enzalutamide
Zelboraf	Vemurafenib
Zolinza	Vorinostat
Zytiga	Abiraterone acetate

Table C-2. FDA-Approved Oral Anticancer Agents and Their Indications

Brand Name	Agent (Generic Name)	Class	Generic Equivalent Available	Year FDA Approved	Indication(s)	Treatment Role	IV/Injectable Alternative Available
Afinitor	Everolimus	Targeted agents	No	2009	Kidney cancer	Used to treat patients with advanced, inoperable, or recurrent kidney cancer who have not responded to treatment with Nexavar or Sutent	Yes; therapeutic equivalent IV-administered drug (Temsirolimus)
Alkeran	Melphalan	Cytotoxic agents	No	1964	Epithelial ovarian cancer, Hodgkin lymphoma, melanoma, multiple myeloma, multiple types of non-Hodgkin lymphoma, solitary plasmacytoma	Used alone or in combination with other anticancer medications as first- and second-line treatment of, metastatic, inoperable, progressive, and recurrent cancers; sometimes used in combination with other anticancer medications	Yes; IV formulation of same drug

Table C-2. FDA-Approved Oral Anticancer Agents and Their Indications (Cont'd)

Brand Name	Agent (Generic Name)	Class	Generic Equivalent Available	Year FDA Approved	Indication(s)	Treatment Role	IV/Injectable Alternative Available
Arimidex	Anastrozole	Endocrine agents	Yes	1995	Breast cancer, endometrial cancer, ovarian cancer, uterine sarcoma	Preoperative and postoperative treatment of postmenopausal women with early stage or locally advanced estrogen-receptor-positive breast cancers; treatment for postmenopausal women with advanced or metastatic breast cancers that have progressed despite treatment with tamoxifen; treatment of premenopausal women with breast cancer whose ovaries have been removed; also used to treat recurrent ovarian cancer, recurrent or metastatic endometrial cancer, and advanced, metastatic, inoperable, and recurrent uterine sarcoma	No

Table C-2. FDA-Approved Oral Anticancer Agents and Their Indications (Cont'd)

Brand Name	Agent (Generic Name)	Class	Generic Equivalent Available	Year FDA Approved	Indication(s)	Treatment Role	IV/Injectable Alternative Available
Aromasin	Exemestane	Endocrine agents	Yes	1999	Breast cancer, endometrial cancer, uterine sarcoma	Preoperative and postoperative treatment of postmenopausal women with early stage or locally advanced estrogen-receptor-positive cancers; treatment for postmenopausal women with advanced, estrogen-receptor positive cancers that have not progressed despite treatment with tamoxifen; treatment of premenopausal women with recurrent or metastatic breast cancer whose ovaries have been removed; also used to treat recurrent or metastatic endometrial cancer and advanced, metastatic, inoperable, and recurrent uterine sarcoma	No
Bosulif	Bosutinib	Targeted agents	No	2012	Chronic, accelerated, or blast phase Ph+ chronic myelogenous leukemia	Used to treat adult patients with chronic, accelerated, or blast phase Ph+ chronic myelogenous leukemia (CML) with resistance or intolerance to prior therapy	No

Table C-2. FDA-Approved Oral Anticancer Agents and Their Indications (Cont'd)

Brand Name	Agent (Generic Name)	Class	Generic Equivalent Available	Year FDA Approved	Indication(s)	Treatment Role	IV/Injectable Alternative Available
Caprelsa	Vandetanib	Targeted agents	No	2011	Thyroid cancer	Used to treat symptomatic or progressive medullary thyroid cancer in patients with unresectable locally advanced or metastatic disease	No
Casodex	Bicalutamide	Endocrine agents	Yes	1995	Prostate cancer	Used alone to treat localized cancer or as a second-line therapy following recurrence; used in combination with androgen deprivation therapy (ADT) to treat metastatic cancers, cancers that do not respond to ADT, and to enhance the effectiveness of radiation	No
CeeNU	Lomustine	Cytotoxic agents	No	1976	Brain tumors, Hodgkin lymphoma	Second-line treatment for inoperable, progressive, and recurrent brain tumors following radiation or surgery; second-line treatment for progressive or recurrent Hodgkin lymphoma	No

Table C-2. FDA-Approved Oral Anticancer Agents and Their Indications (Cont'd)

Brand Name	Agent (Generic Name)	Class	Generic Equivalent Available	Year FDA Approved	Indication(s)	Treatment Role	IV/Injectable Alternative Available
Cometriq	Cabozantinib	Targeted agent	No	2012	Thyroid cancer	Used to treat patients with progressive, metastatic medullary thyroid cancer	No
Cytosan	Cyclophosphamide	Cytotoxic agents	No	1999	Bone cancer, breast cancer, Hodgkin lymphoma, Merkel cell carcinoma, multiple myeloma, multiple types of leukemia, multiple types of non-Hodgkin lymphoma, neuroblastoma, ovarian cancer, paraganglioma, pheochromocytoma, retinoblastoma, small-cell lung cancer, solitary plasmacytoma, thymic malignancies	Used alone or in combination with other anticancer medications for preoperative treatment, postoperative treatment, first-line treatment of early stage, locally advanced, and metastatic cancers, second-line treatment for early stage, advanced, residual, progressive, and recurrent cancers (specific uses vary by cancer); for some cancers, used in combination with radiation or growth factor; single-agent treatment for brain metastases if active against primary tumor	Yes—IV formulation of same drug
Droxia, Hydrexa	Hydroxyurea	Cytotoxic agents	Yes—only 500 mg strength	1967	Acute myeloid, leukemia, chronic myeloid leukemia, head and neck cancers, melanoma, ovarian cancer	Used alone as low-intensity treatment for acute myeloid leukemia; used in combination with another anticancer medication and radiation to treat head and neck cancers; used to treat inoperable, metastatic, and recurrent ovarian cancer	No

Table C-2. FDA-Approved Oral Anticancer Agents and Their Indications (Cont'd)

Brand Name	Agent (Generic Name)	Class	Generic Equivalent Available	Year FDA Approved	Indication(s)	Treatment Role	IV/Injectable Alternative Available
Emcyt	Estramustine	Agents with both cytotoxic and endocrine properties	No	1981	Prostate cancer	Used in combination with another anticancer drug to treat metastatic or progressive cancers	No
Erivedge	Vismodegib	Targeted agent	No	2012	Metastatic basal cell carcinoma, recurring locally advanced basal cell carcinoma	Used to treat adults with metastatic basal cell carcinoma, or with locally advanced basal cell carcinoma that has recurred following surgery or who are not candidates for surgery, and who are not candidates for radiation	No
Eulexin	Flutamide	Endocrine agents	Yes	1989	Prostate cancer	Used alone to treat localized cancer or as a second-line therapy following recurrence; used in combination with androgen deprivation therapy (ADT) to treat metastatic cancers, cancers that do not respond to ADT, and to enhance the effectiveness of radiation	No
Fareston	Toremifene	Endocrine agents	No	1997	Breast cancer, Desmoid tumors	First-line or second-line treatment for women with recurrent or metastatic breast cancer; treatment for residual and inoperable Desmoid tumors	No

Table C-2. FDA-Approved Oral Anticancer Agents and Their Indications (Cont'd)

Brand Name	Agent (Generic Name)	Class	Generic Equivalent Available	Year FDA Approved	Indication(s)	Treatment Role	IV/Injectable Alternative Available
Femara	Letrozole	Endocrine agents	Yes	1997	Breast cancer, endometrial cancer, ovarian cancer, uterine sarcoma	Preoperative and postoperative treatment of postmenopausal women with early stage or locally advanced or metastatic estrogen-receptor positive breast cancers; treatment of postmenopausal women whose breast cancers have progressed despite hormone therapy; treatment of premenopausal women with recurrent or metastatic breast cancer whose ovaries have been removed; also used to treat recurrent ovarian cancer, recurrent or metastatic endometrial cancer, and advanced, metastatic, inoperable, and recurrent uterine sarcoma	No

Table C-2. FDA-Approved Oral Anticancer Agents and Their Indications (Cont'd)

Brand Name	Agent (Generic Name)	Class	Generic Equivalent Available	Year FDA Approved	Indication(s)	Treatment Role	IV/Injectable Alternative Available
Gleevec	Imatinib mesylate	Targeted agents	No	2003	Acute lymphoblastic leukemia, chronic eosinophilic leukemia, chronic myeloid leukemia, dermatofibrosarcoma protuberans, desmoids tumors, gastrointestinal stromal tumors, myelodysplastic/ myeloproliferative diseases, systemic mastocytosis	Used alone or in combination with other anticancer medications for first-line treatment, follow-up to first-line treatment, postoperative treatment, post-transplant treatment, and treatment of metastatic, residual, inoperable, progressive, and recurrent disease (specific uses vary across cancers)	No
Hexalen	Altretamine	Cytotoxic agents	No	1990	Ovarian cancer	Used alone to treat persons with persistent, or recurrent cancers	No
Hycamtin	Topotecan hydrochloride	Cytotoxic agents	No	2007	Central nervous system tumors, cervical cancer, Merkel cell carcinoma, ovarian cancer, small-cell lung cancer	Used alone or in combination with other cancer medications or radiation; first-line treatment for early stage, advanced, persistent, progressive, metastatic, inoperable, and recurrent cancers; second-line treatment for advanced, metastatic, progressive, and recurrent cancers	Yes—IV formulation of same drug

Table C-2. FDA-Approved Oral Anticancer Agents and Their Indications (Cont'd)

Brand Name	Agent (Generic Name)	Class	Generic Equivalent Available	Year FDA Approved	Indication(s)	Treatment Role	IV/Injectable Alternative Available
Iclusig	Ponatinib	Targeted agents	No	2012	Chronic myeloid leukemia, Philadelphia chromosome positive acute lymphoblastic leukemia	Used to treat adult patients with chronic phase, accelerated phase, or blast phase chronic myeloid leukemia (CML) that is resistant or intolerant to prior tyrosine kinase inhibitor therapy or Philadelphia chromosome positive acute lymphoblastic leukemia (Ph+ALL) that is resistant or intolerant to prior tyrosine kinase inhibitor therapy (1)	No
Inlyta	Axitinib	Targeted agents	No	2012	Advanced renal cell carcinoma	Used to treat advanced renal cell carcinoma after failure of one prior systemic therapy	No
Iressa	Gefitinib ⁶⁷	Targeted agents	No	2003	Non-small-cell lung cancer	Used to treat locally advanced or metastatic cancer that has not responded to other cancer medications	No
Jakafi	Ruxolitinib	Targeted agent	No	2011	Myelofibrosis	Used to treat patients with intermediate or high-risk myelofibrosis, including primary myelofibrosis, post-polycythemia vera myelofibrosis and post-essential thrombocythemia myelofibrosis	No

⁶⁷ Only available through a special program under which both health professionals and patients must register with the manufacturer.

Table C-2. FDA-Approved Oral Anticancer Agents and Their Indications (Cont'd)

Brand Name	Agent (Generic Name)	Class	Generic Equivalent Available	Year FDA Approved	Indication(s)	Treatment Role	IV/Injectable Alternative Available
Leukeran	Chlorambucil	Cytotoxic agents	No	1957	Chronic lymphoblastic leukemia, multiple types of lymphoma	First-line treatment for advanced cancers; second-line treatment for early stage, advanced, and progressive cancers	No
Lysodren	Mitotane	Cytotoxic agents	No	2003	Adrenocortical cancer	Used to treat inoperable adrenal cortical carcinoma	No
Matulane	Procarbazine	Cytotoxic agents	No	1969	Brain tumors, Hodgkin lymphoma, multiple types of non-Hodgkin lymphoma	Used in combination with other anticancer medications for second-line therapeutic or palliative treatment of progressive and recurrent brain tumors; lymphomas; a second-line treatment for advanced Hodgkin lymphoma or for progressive and recurrent Hodgkin lymphoma in persons initially treated with radiation alone; second-line treatment for progressive and recurrent cancers in persons with multiple types of non-Hodgkin lymphoma	No

Table C-2. FDA-Approved Oral Anticancer Agents and Their Indications (Cont'd)

Brand Name	Agent (Generic Name)	Class	Generic Equivalent Available	Year FDA Approved	Indication(s)	Treatment Role	IV/Injectable Alternative Available
Megace	Megestrol acetate	Agents with both cytotoxic and endocrine properties	Yes	1971	Breast cancer, endometrial cancer, ovarian cancer, uterine sarcoma	Used to treat metastatic, inoperable, and recurrent breast cancer, endometrial cancer, and uterine sarcoma; also used to treat persistent, progressive, or recurrent ovarian cancer	No
Myleran	Busulfan	Cytotoxic agents	No	1954	Chronic myeloid leukemia	Combined with cyclophosphamide to prepare patients for hematopoietic progenitor cell transplantation	Yes—IV formulation of same drug
Nexavar	Sorafenib tosylate	Targeted agents	No	2005	Angiosarcoma, gastrointestinal stromal tumors, hepatocellular cancer, kidney cancer, thyroid cancer	Used alone as first-line treatment for advanced, metastatic, inoperable, progressive, and recurrent cancers; second-line treatment for persons who no longer benefit from Gleevec or Sutent; also used to treat persons with potentially operable hepatocellular cancers who decline surgery	No

Table C-2. FDA-Approved Oral Anticancer Agents and Their Indications (Cont'd)

Brand Name	Agent (Generic Name)	Class	Generic Equivalent Available	Year FDA Approved	Indication(s)	Treatment Role	IV/Injectable Alternative Available
Nilandron	Nilutamide	Endocrine agents	No	1996	Prostate cancer	Used alone as postoperative treatment for metastatic cancers and as a second-line treatment for recurrent cancers; used in combination with androgen deprivation therapy (ADT) to treat metastatic cancers, cancers that do not respond to ADT, and to enhance the effectiveness of radiation	No

Table C-2. FDA-Approved Oral Anticancer Agents and Their Indications (Cont'd)

Brand Name	Agent (Generic Name)	Class	Generic Equivalent Available	Year FDA Approved	Indication(s)	Treatment Role	IV/Injectable Alternative Available
Nolvadex	Tamoxifen citrate	Endocrine agents	Yes	1977	Breast cancer, Desmoid tumors, endometrial cancer, ovarian cancer, uterine sarcoma	Preoperative treatment of women with hormone receptor positive cancers who fulfill all criteria for breast conserving surgery except tumor size; postoperative treatment of postmenopausal women with early stage or locally advanced breast cancer; treatment of women with recurrent or metastatic breast cancer; used as an alternative to radiation or removal of the ovaries for premenopausal women with metastatic breast cancer; used to reduce the risk of invasive breast cancer in women with ductal carcinoma in situ; used to reduce the risk of breast cancer in women at high risk for developing the disease; also used to treat recurrent or residual ovarian cancer, recurrent or metastatic endometrial cancer, advanced, inoperable, recurrent, and metastatic uterine sarcoma, residual or inoperable Desmoid tumors	No

Table C-2. FDA-Approved Oral Anticancer Agents and Their Indications (Cont'd)

Brand Name	Agent (Generic Name)	Class	Generic Equivalent Available	Year FDA Approved	Indication(s)	Treatment Role	IV/Injectable Alternative Available
Pomalyst	Pomalidomide	Cytotoxic agents	No	2013	Multiple myeloma	Thalidomide analogue indicated for patients with multiple myeloma who have received at least two prior therapies including lenalidomide and bortezomib and have demonstrated disease progression on or within 60 days of completion of the last therapy	No
Purinethol	Mercaptopurine	Cytotoxic agents	Yes	1953	Acute lymphatic leukemia, acute promyelocytic leukemia	Used in combination with other anticancer medications to prevent recurrence of cancer	No
Revlimid	Lenalidomide ⁶⁸	Cytotoxic agents	No	2005	Mantle cell lymphoma, multiple myeloma, myelodysplastic syndromes, solitary plasmacytoma	Second-line treatment for relapsed or progressive mantle cell lymphoma; first-line treatment or palliative treatment for multiple myeloma; used to treat lower risk patients with myelodysplastic syndromes who have symptomatic anemia; used to treat progressive solitary plasmacytoma or smoldering myeloma that has progressed beyond stage II or active myeloma	No

⁶⁸ Only available through a special program under which both health professionals and patients must register with the manufacturer.

Table C-2. FDA-Approved Oral Anticancer Agents and Their Indications (Cont'd)

Brand Name	Agent (Generic Name)	Class	Generic Equivalent Available	Year FDA Approved	Indication(s)	Treatment Role	IV/Injectable Alternative Available
Rheumatrex, Trexall	Methotrexate sodium	Cytotoxic agents	Yes—for some strengths	1953	Acute promyelocytic leukemia, multiple types of bladder cancer, bone cancer, breast cancer, central nervous system tumors; Desmoid tumors, gestational trophoblastic tumors, head and neck cancers, lung cancer, multiple types of non-Hodgkin lymphoma	Used alone or in combination with other cancer medications, radiation, and/or growth factor; preoperative treatment of advanced cancers; postoperative treatment for early stage, advanced, and residual cancers; first-line treatment for early stage, advanced, metastatic, inoperable, progressive, and recurrent cancers; second-line treatment for advanced, metastatic, progressive, and recurrent cancers; used to prevent recurrence of cancer	Yes—IV formulation of the same drug

Table C-2. FDA-Approved Oral Anticancer Agents and Their Indications (Cont'd)

Brand Name	Agent (Generic Name)	Class	Generic Equivalent Available	Year FDA Approved	Indication(s)	Treatment Role	IV/Injectable Alternative Available
Sprycel	Dasatinib	Targeted agents	No	2006	Acute lymphoblastic leukemia, chronic myeloid leukemia	Used alone or in combination with other anticancer medications to treat persons with both types of leukemia who cannot tolerate the first-line anticancer medication for these cancers (i.e., Gleevec) or whose cancers do not respond to that medication; also used to treat persons with chronic myeloid leukemia whose cancers have relapsed following bone marrow transplantation	No
Stivarga	Regorafenib	Targeted agents	No	2012	Metastatic colorectal cancer	Used to treat patients with metastatic colorectal cancer (CRC) who have been previously treated with fluoropyrimidine-, oxaliplatin- and irinotecan-based chemotherapy, an anti-VEGF therapy, and, if KRAS wild type, an anti-EGFR therapy	No

Table C-2. FDA-Approved Oral Anticancer Agents and Their Indications (Cont'd)

Brand Name	Agent (Generic Name)	Class	Generic Equivalent Available	Year FDA Approved	Indication(s)	Treatment Role	IV/Injectable Alternative Available
Sutent	Sunitinib malate	Targeted agents	No	2006	Angiosarcoma, gastrointestinal stromal tumor, kidney cancer, thyroid cancer	Used alone or in combination with other anticancer medications to treat persons with gastrointestinal stromal tumors who cannot tolerate the first-line anticancer medication for these cancers (i.e., Gleevec) or whose cancers do not respond to that medication; also used to treat angiosarcoma, recurrent or inoperable kidney cancer, and progressive or symptomatic metastatic thyroid cancer	No
Tabloid	Thioguanine	Cytotoxic agents	No	1966	Acute nonlymphocytic leukemia	First-line treatment or treatment to prevent recurrence of cancer	No

Table C-2. FDA-Approved Oral Anticancer Agents and Their Indications (Cont'd)

Brand Name	Agent (Generic Name)	Class	Generic Equivalent Available	Year FDA Approved	Indication(s)	Treatment Role	IV/Injectable Alternative Available
Tarceva	Erlotinib hydrochloride	Targeted agents	No	2004	Non-small-cell lung cancer, pancreatic cancer	First-line treatment either alone or in combination with other anticancer medications for persons with non-small-cell lung cancer who never smoked and who have a known active EGFR mutation or gene amplification; second-line treatment for persons with locally advanced or metastatic non-small-cell lung cancer that has not responded to initial chemotherapy treatment; used in combination with gemcitabine as first-line or second-line treatment for locally advanced, metastatic, and inoperable pancreatic cancers	No

Table C-2. FDA-Approved Oral Anticancer Agents and Their Indications (Cont'd)

Brand Name	Agent (Generic Name)	Class	Generic Equivalent Available	Year FDA Approved	Indication(s)	Treatment Role	IV/Injectable Alternative Available
Targretin	Bexarotene	Cytotoxic agents	No	1999	Cutaneous T-cell lymphoma, mycosis fungoides, and Sezary syndrome	Used alone or in combination with other anticancer medications, radiation, interferons, phototherapy, photopheresis, or skin-directed therapies as first-line treatment for early stage, advanced, refractory or progressive cancers	No
Tasigna	Nilotinib hydrochloride monohydrate	Targeted agents	No	2007	Chronic myeloid leukemia, gastrointestinal stromal tumors	Used alone or in combination with other anticancer medications to treat persons who cannot tolerate the first-line anticancer medication for these cancers (i.e., Gleevec) or whose cancers do not respond to that medication; also used to treat persons whose cancers relapse following bone marrow transplantation	No

Table C-2. FDA-Approved Oral Anticancer Agents and Their Indications (Cont'd)

Brand Name	Agent (Generic Name)	Class	Generic Equivalent Available	Year FDA Approved	Indication(s)	Treatment Role	IV/Injectable Alternative Available
Temodar	Temozolomide	Cytotoxic agents	No	1999	Carcinoid tumors, central nervous system cancers, islet cell tumors, melanoma, mycosis fungoides, Sezary syndrome	Used concurrently with radiation treatment and as post-radiation treatment, postoperative treatment, treatment for early stage, advanced, metastatic, progressive, or recurrent cancers	Yes—IV formulation of same drug
Thalomid	Thalidomide	Cytotoxic agents	No	1998	Mantle-cell lymphoma, multiple myeloma	Used alone or in combination with other anticancer medications as a first-line treatment for newly diagnosed persons and as a second-line treatment for progressive and recurrent cancers	No
Tykerb	Lapatinib	Targeted agents	No	2007	Breast cancer	Used in combination with Xeloda to treat persons with advanced, metastatic, or recurrent breast cancers that are human epidermal growth factor receptor 2 (HER2) positive and hormone receptor negative and who have received prior therapy including an anthracycline, a taxane, and trastuzumab	No

Table C-2. FDA-Approved Oral Anticancer Agents and Their Indications (Cont'd)

Brand Name	Agent (Generic Name)	Class	Generic Equivalent Available	Year FDA Approved	Indication(s)	Treatment Role	IV/Injectable Alternative Available
Vepesid	Etoposide	Cytotoxic agents	No	2001	Bone cancer, breast cancer, central nervous system cancers, Hodgkin lymphoma, Merkel cell carcinoma, multiple myeloma, neuro-endocrine tumors, multiple types of non-Hodgkin lymphoma, non-small-cell lung cancer, occult primary malignancy, ovarian cancer, prostate cancer, small-cell lung cancer, solitary plasmacytoma, testicular cancer, thymic malignancies	Used alone or in combination with other anticancer medications, radiation, and/or growth factor as preoperative, postoperative, post-radiation, first-line, and post-local control treatment for early stage, advanced, metastatic, and inoperable cancers; also used as second-line treatment for residual, advanced, metastatic, progressive, and recurrent cancers (specific uses vary across cancers)	Yes—IV formulation of same drug
Vesanoid	Tretinoin	Cytotoxic agents	Yes	2004	Acute promyelocytic leukemia	Treatment of persons whose cancers have not responded to anthracycline-based cytotoxic chemotherapeutic regimens or who cannot tolerate these drugs	No

Table C-2. FDA-Approved Oral Anticancer Agents and Their Indications (Cont'd)

Brand Name	Agent (Generic Name)	Class	Generic Equivalent Available	Year FDA Approved	Indication(s)	Treatment Role	IV/Injectable Alternative Available
Votrient	Pazopanib	Targeted Agents	No	2009	Advanced renal cell cancer, kidney cancer, thyroid cancer	Used in treatment of advanced cancers	No
Xalkori	Crizotinib	Targeted agents	No	2011	Advanced or metastatic non-small-cell lung cancer (NSCLC) that is anaplastic lymphoma kinase (ALK)-positive	Used to treat patients with locally advanced or metastatic non-small-cell lung cancer (NSCLC) that is anaplastic lymphoma kinase (ALK)-positive as detected by an FDA-approved test. This indication is based on response rate	No
Xeloda	Capecitabine	Cytotoxic agents	No	1998	Brain tumors, breast cancer, carcinoid tumors, colon cancer, esophageal cancer, gastric cancer, hepatobiliary cancers, islet cell tumors, kidney cancer, ovarian cancer, pancreatic adenocarcinoma, rectal cancer	Used alone or in combination with other anticancer medications and/or radiation as preoperative therapy or postoperative therapy; used to treat residual, locally advanced, advanced, metastatic, inoperable, progressive, and/or recurrent cancers	Yes—similar to an IV-administered drug (fluorouracil)
Xtandi	Enzalutamide	Endocrine agents	No	2012	Metastatic castration-resistant prostate cancer	Used to treat patients with metastatic castration-resistant prostate cancer who have previously received docetaxel	No

Table C-2. FDA-Approved Oral Anticancer Agents and Their Indications (Cont'd)

Brand Name	Agent (Generic Name)	Class	Generic Equivalent Available	Year FDA Approved	Indication(s)	Treatment Role	IV/Injectable Alternative Available
Zelboraf	Vemurafenib	Targeted agents	No	2011	Unresectable or metastatic melanoma with BRAFV600E mutation	Used to treat patients with unresectable or metastatic melanoma with BRAFV600E mutation as detected by an FDA-approved test	No
Zolinza	Vorinostat	Cytotoxic agents	No	2006	Cutaneous T-cell lymphoma, mycosis fungoides, Sezary syndrome	Used to treat persons with persistent, progressive, and recurrent cutaneous T-cell lymphoma; used alone or in combination with other anticancer medications and/or skin-directed therapies as first-line treatment for localized or advanced mycosis fungoides and Sezary syndrome	No
Zytiga	Abiraterone acetate	Endocrine agent	No	2011	Metastatic castration-resistant prostate cancer	Used in combination with prednisone for the treatment of patients with metastatic castration-resistant prostate cancer	No

Sources: Betty Chan, PharmD, Department of Clinical Pharmacy, University of Southern California; Medline Plus: Drugs, Supplements, and Herbal Information; National Cancer Institute Drug Information Summaries; National Comprehensive Cancer Network, Drugs and Biologicals Compendium; U.S. Food and Drug Administration Approved Drug Products and Patient Information Sheets and Orange book: Approved drug products with therapeutic equivalence evaluations.

Table C-3. Studies That Examined the Impact of Cost Sharing on Use of Oral Anticancer Medications

Type of Intervention	Citation	Type of Trial ⁶⁹	Intervention versus Comparison Group	Population Studied	Location
Plan generosity: ratio of total out-of-pocket payments for certain specialty drugs relative to total payments ⁷⁰	Goldman et al., 2006	Level III—nonrandomized study with comparison groups	More generous coverage vs. less generous coverage (variation in plan generosity)	Persons with cancer, kidney disease, multiple sclerosis or rheumatoid arthritis enrolled in employer-sponsored commercial health plans (N=1.5 million)	US
Plan generosity: ratio of total out-of-pocket payments for certain specialty drugs relative to total payments for 5 cancer drugs ⁷¹	Goldman et al., 2010	Level III—nonrandomized study with comparison groups	More generous coverage vs. less generous coverage (variation in plan generosity)	Persons with cancer enrolled in employer-sponsored commercial health plans (N=29,539)	US
Plan generosity: 4 categories of out-of-pocket payment for oral medications for early-stage breast cancer ⁷²	Sedjo and Devine, 2011	Level III—nonrandomized study with comparison groups	Compared 4 categories of out-of-pocket costs per 30-day adjusted supply of medication: <\$10 \$10–\$19 \$20–\$29 ≥\$30	Post-menopausal women with primary or secondary breast cancer diagnoses for at least 2 years and continuously enrolled in employer-sponsored commercial health plans (N=13,593)	US
Plan generosity: 3 categories of copayments for oral medications for early-stage breast cancer ⁷³	Neugut et al., 2011	Level III—nonrandomized study with comparison groups	Compared 3 categories of out-of-pocket costs per 90-day supply of medication: \$0–\$29.99 \$30.00–\$89.99 ≥\$90.00	Women age 50 to 64 years with early stage breast cancer enrolled in various prescription benefit plans (N=8,118)	US

⁶⁹ Level I = well-designed randomized controlled trials, Level II = randomized controlled trials with major weaknesses, Level III = nonrandomized studies with comparison groups, Level IV = case series, Level V = case studies

⁷⁰ The study included medications for cancer as well as kidney multiple sclerosis, and rheumatoid arthritis. Because AB 219 would only apply to coverage for anticancer medications, CHBRP only presents findings from this study for oral anticancer medications.

⁷¹ Avastin (generic name = bevacizumab), Gleevec (generic name = imatinib mesylate), Herceptin (generic name = trastuzumab), Rituxan (generic name = rituximab), Tarceva (generic name = erlotinib). Gleevec and Tarceva are administered orally. Avastin, Herceptin, and Rituxan are administered intravenously.

⁷² Aromatase inhibitors: Arimidex (generic name = anastrozole), Aromasin (generic name = exemestane), Femara (generic name = letrozole).

Table C-3. Studies That Examined the Impact of Cost Sharing on Use of Oral Anticancer Medications (Cont'd)

Type of Intervention	Citation	Type of Trial ⁷⁴	Intervention versus Comparison Group	Population Studied	Location
Plan generosity: 7 categories of copayments for oral anticancer medications	Streeter et al., 2011	Level III—nonrandomized study with comparison groups	Compared 7 categories of patient cost sharing	Persons with cancer with Medicare and commercial insurance who had at least one pharmacy claim adjudicated for 1 of 8 oral anticancer medications ⁷⁵ (N=10,508)	US
Increase in copayment for specialty medications per 30-day supply of medication of $\geq 25\%$ ⁷⁶	Kim et al., 2011	Level III—nonrandomized study with comparison group	Increase in out-of-pocket costs vs. no change in out-of-pocket costs	Persons using anti-inflammatory, immunosuppressants, cancer, and multiple sclerosis medications for at least 2 years who were enrolled in an employer-sponsored commercial health plan (N=380)	US

Sources: Goldman et al., 2006; 2010; Kim et al., 2011; Neugut et al., 2011; Sedjo and Devine, 2011; Streeter et al., 2011.

⁷⁴ Level I = well-designed randomized controlled trials, Level II = randomized controlled trials with major weaknesses, Level III = nonrandomized studies with comparison groups, Level IV = case series, Level V = case studies

⁷⁵ Gleevec (generic name = imatinib), Nexavar (generic name = sorafenib), Revlimid (generic name = lenalidomide), Sutent (generic name = sunitinib), Tarceva (generic name = erlotinib), Temodar (generic name = temozolomide), Tykerb (generic name = lapatinib), Xeloda (generic name = capecitabine).

⁷⁶ This study included anticancer medications as well as anti-inflammatory, immunosuppressant, and multiple sclerosis medications. Because AB 219 would only apply to coverage for anticancer medications, CHBRP only presents findings from this study for anticancer medications.

Table C-4. Summary of Findings from Studies of the Impact of Cost Sharing on Use of Oral Anticancer Medications

Outcome	Citation (s)	Research Design ⁷⁷	Statistical Significance	Direction of Effect	Size of Effect	Conclusion
Overall elasticity of specialty anticancer medications ⁷⁸	Goldman et al., 2006	Level III—nonrandomized study with comparison groups	Cancer specialty drugs: Not statistically significant	Cancer specialty drugs: No difference	Cancer specialty drugs: No effect	Findings from one study suggest that out-of-pocket costs do not have an effect on overall spending for specialty anticancer medications
Price elasticity of demand for initiation of a specialty anticancer medication	Goldman et al., 2010	Level III — nonrandomized study with comparison groups	Avastin, Gleevec, Herceptin, and Tarceva: Not statistically significant Rituxan: Statistically significant	Avastin, Gleevec, Herceptin, and Tarceva: No difference Rituxan: Favors lower cost sharing	Price elasticity: Avastin, Gleevec, Herceptin, and Tarceva: -0.19 (not significant) Rituxan: -0.26	Findings from one study suggest that initiation of treatment with the two oral anticancer medications studied (Gleevec and Tarceva) generosity of insurance was not associated with initiation of treatment

⁷⁷ Level I = well-designed randomized controlled trials, Level II = randomized controlled trials with major weaknesses, Level III = nonrandomized studies with comparison groups, Level IV = case series, Level V = case studies

⁷⁸ This study did not distinguish between orally administered medications and intravenously administered/injectable medications.

Table C-4. Summary of Findings from Studies of the Impact of Cost Sharing on Use of Oral Anticancer Medications (Cont'd)

Outcome	Citation (s)	Research Design	Statistical Significance	Direction of Effect	Size of Effect	Conclusion
Number of claims (treatments) for a specialty anticancer medication	Goldman et al., 2010	Level III—nonrandomized study with comparison groups	Statistically significant	Favors lower cost sharing	Price elasticity: Avastin, Gleevec, Herceptin, and Tarceva: -0.11 Rituxan: -0.04	Findings from one study suggest that having higher out-of-pocket costs for the two oral anticancer medications studied (Gleevec and Tarceva) reduces the number of claims (treatments) for these medications
Abandonment of prescriptions for specialty oral anticancer medications ⁷⁹	Streeter et al., 2011	Level III—nonrandomized study with comparison groups	Statistically significant for 5 of 6 comparisons	Favors lower cost sharing	\$0–100 vs. \$251–350: OR = 2.31, 95% CI = 1.59 to 3.36 \$0–100 vs. \$351–500 OR = 3.28, 95% CI = 2.20 to 4.88 \$0–100 vs. >\$500 OR = 4.46; 95% CI = 3.80 to 5.22	Higher cost sharing for specialty oral anticancer medications is associated with higher odds of abandoning prescriptions

⁷⁹ Defined as reversal of an adjudicated pharmacy claim without a subsequent paid claim for any oncolytic (oral or intravenous) within the ensuing 90 days.

Table C-4. Summary of Findings from Studies of the Impact of Cost Sharing on Use of Oral Anticancer Medications (Cont'd)

Outcome	Citation (s)	Research Design	Statistical Significance	Direction of Effect	Size of Effect	Conclusion
Nonadherence to prescriptions for aromatase inhibitors (oral medications for primary and secondary breast cancer) ⁸⁰	Sedjo and Devine, 2011	Level III—nonrandomized study with comparison groups	<\$10 vs. \$10–\$19 Statistically significant <\$10 vs. \$20–\$29 Statistically significant <\$10 vs. ≥\$30 Statistically significant	Favors lower cost sharing	<\$10 vs. \$10–\$19 OR = 1.52, 95% CI = 1.34 to 1.73 <\$10 vs. \$20–\$29 OR = 1.79, 95% CI = 1.54 to 2.07 <\$10 vs. ≥\$30 OR = 2.07, 95% CI = 1.80 to 2.37	Study findings suggest that having higher out-of-pocket costs for aromatase inhibitors increases the odds of non-adherence
Proportion of days covered for specialty anticancer medications ⁸¹	Kim et al., 2011	Level III—nonrandomized study with comparison groups	Cancer specialty drugs: Not statistically significant	Cancer specialty drugs: No difference	Cancer specialty drugs: No effect	Results suggest that a copayment increases ≥25% per 30 day supply of medication under a specialty formulary was not associated with a reduction in adherence to anticancer medications

⁸⁰ Defined as having a ratio of days supply dispensed to total days evaluated ≥80%.

⁸¹ Defined as the ratio of days supply dispensed to total days evaluated.

Table C-4. Summary of Findings from Studies of the Impact of Cost Sharing on Use of Oral Anticancer Medications (Cont'd)

Outcome	Citation (s)	Research Design	Statistical Significance	Direction of Effect	Size of Effect	Conclusion
Adherence to aromatase inhibitors (oral medication for primary and secondary breast cancer) ⁸²	Neugut et al., 2011	Level III—nonrandomized study with comparison groups	Women under age 65: \$0–29.99 vs. ≥\$90 per 90-day supply: Statistically significant \$0–29.99 vs. \$30–\$89.99 per 90-day supply: Not statistically significant	Women under age 65: Favors lower cost sharing	Women under age 65: \$0–29.99 vs. ≥\$90 per 90-day supply: OR = .069, CI = 0.58 to 0.83	Having out-of-pocket costs ≥\$90 per 90-day supply was associated with lower odds of adherence to aromatase inhibitors
Duration of time patient remains on a specialty anticancer medication	Kim et al., 2011	Level III—nonrandomized study with comparison group	Cancer specialty drugs: Not statistically significant	Cancer specialty drugs: No difference	Cancer specialty drugs: No effect	Persistence with specialty oral anticancer drugs did not change after a copayment increase of ≥25% per 30-day supply of medication was implemented
Persistence with aromatase inhibitors (oral medication for primary and secondary breast cancer) ⁸³	Neugut et al., 2011	Level III—nonrandomized study with comparison groups	Women under age 65: \$0–29.99 vs. ≥\$90 per 90-day supply: Statistically significant \$0–29.99 vs. \$30–\$89.99 per 90-day supply: Not statistically significant	Women under age 65: Favors lower cost sharing	Women under age 65: \$0–29.99 vs. ≥\$90 per 90-day supply: OR = 0.82, CI = 0.72 to 0.94	Having out-of-pocket costs ≥\$90 per 90-day supply was associated with lower odds of adherence to aromatase inhibitors

Sources: Goldman et al., 2006; 2010; Kim et al., 2011; Neugut et al., 2011; Sedjo and Devine, 2011; Streeter et al., 2011.

⁸² Defined as a medication possession ratio ≥80%

⁸³ Defined as calculated drug supply based on the last prescription date plus any surplus from a prior prescription indicated a minimum 45-day supply gap with no aromatase inhibitor on hand, with no subsequent refills before the end of the study period.

Appendix D: Cost Impact Analysis: Data Sources, Caveats, and Assumptions

This appendix describes data sources, estimation methodology, as well as general and mandate-specific caveats and assumptions used in conducting the cost impact analysis. For additional information on the cost model and underlying methodology, please refer to the CHBRP website at www.chbrp.org/analysis_methodology/cost_impact_analysis.php.

The cost analysis in this report was prepared by the members of the cost team, which consists of CHBRP task force members and contributors from the University of California, San Diego, the University of California, Los Angeles, the University of California, Davis, and the University of California, Berkeley, as well as the contracted actuarial firm, Milliman, Inc. (Milliman).⁸⁴

Data Sources

In preparing cost estimates, the cost team relies on a variety of data sources as described below.

Baseline model

1. The California Simulation of Insurance Markets (CalSIM) is used to project health insurance status of Californians aged 64 and under in 2014. CalSIM is a microsimulation model that projects the effects of the Affordable Care Act on firms and individuals.⁸⁵ CalSIM relies on national Medical Expenditure Panel Survey (MEPS) Household Component and Person Round Plan, California Health Interview Survey (CHIS) 2009, and California Employer Health Benefits Survey data.
2. California Health Interview Survey (CHIS) (2011) data is used to estimate the number of Californians aged 65 and older, and the number of Californians dually eligible for both Medi-Cal and Medicare coverage. CHIS 2011 is also used to determine the number of Californians with incomes below 400% of the federal poverty level. CHIS is a continuous survey that provides detailed information on demographics, health insurance coverage, health status, and access to care. CHIS 2011 surveyed approximately 23,000 households and is conducted in multiple languages by the UCLA Center for Health Policy Research. More information on CHIS is available at www.chis.ucla.edu.
3. The latest (2012) California Employer Health Benefits Survey is used to estimate:
 - a. Size of firm
 - b. Percentage of firms that are purchased/underwritten (versus self-insured)
 - c. Premiums for health care service plans regulated by the Department of Managed Health Care (DMHC) (primarily health maintenance organizations [HMOs] and point of service [POS] plans)

⁸⁴ CHBRP's authorizing legislation requires that CHBRP use a certified actuary or "other person with relevant knowledge and expertise" to determine financial impact (www.chbrp.org/docs/authorizing_statute.pdf).

⁸⁵ UC Berkeley Center for Labor Research and Education and UC Los Angeles Center for Health Policy Research. *Methodology & Assumptions, California Simulation of Insurance Markets (CalSIM) Version 1.7*, June 2012. Available at: www.healthpolicy.ucla.edu/pubs/files/calsim_methods.pdf. Accessed October 19, 2012.

- d. Premiums for health insurance policies regulated by the California Department of Insurance (CDI) (primarily preferred provider organizations [PPOs] and fee-for-service [FFS] plans)

This annual survey is currently released by the California Health Care Foundation/National Opinion Research Center (CHCF/NORC) and is similar to the national employer survey released annually by the Kaiser Family Foundation and the Health Research and Educational Trust. Information on the CHCF/NORC data is available at: www.chcf.org/publications/2010/12/california-employer-health-benefits-survey.

4. Milliman data sources are relied on to estimate the premium impact of mandates. Milliman's projections derive from the Milliman Health Cost Guidelines (HCGs). The HCGs are a health care pricing tool used by many of the major health plans in the United States. See www.milliman.com/expertise/healthcare/products-tools/milliman-care-guidelines/index.php. Most of the data sources underlying the HCGs are claims databases from commercial health insurance plans. The data are supplied by health insurance companies, HMOs, self-funded employers, and private data vendors. The data are mostly from loosely managed health care plans, generally those characterized as preferred provider organization (PPO) plans. The HCGs currently include claims drawn from plans covering 37 million members. In addition to the Milliman HCGs, CHBRP's utilization and cost estimates draw on other data, including the following:
 - a. The MarketScan databases, which reflects the healthcare claims experience of employees and dependents covered by the health benefit programs of large employers. These claims data are collected from approximately 100 different insurance companies, Blue Cross Blue Shield plans, and third-party administrators. These data represent the medical experience of insured employees and their dependents for active employees, early retirees, individuals with COBRA continuation coverage, and Medicare-eligible retirees with employer-provided Medicare Supplemental plans. No Medicaid or Workers Compensation data are included.
 - b. An annual survey of HMO and PPO pricing and claim experience. The most recent survey (2010 Group Health Insurance Survey) contains data from seven major California health plans regarding their 2010 experience.
 - c. Ingenix MDR Charge Payment System, which includes information about professional fees paid for healthcare services, based upon approximately 800 million claims from commercial insurance companies, HMOs, and self-insured health plans.
 - d. These data are reviewed for applicability by an extended group of experts within Milliman but are not audited internally.
5. Premiums and enrollment in DMHC-regulated health plans and CDI-regulated policies by self-insured status and firm size are obtained annually from CalPERS for active state and local government public employees and their dependents who receive their benefits through CalPERS. Enrollment information is provided for DMHC-regulated health care service plans covering non-Medicare beneficiaries—about 74% of CalPERS total

enrollment. CalPERS self-funded plans—approximately 26% of enrollment—are not subject to state mandates. In addition, CHBRP obtains information on current scope of benefits from evidence of coverage (EOC) documents publicly available at www.calpers.ca.gov. For the 2013 model, CHBRP assumes CalPERS’s enrollment in 2014 will not be affected by the ACA.

6. Enrollment in Medi-Cal Managed Care (beneficiaries enrolled in Two-Plan Model, Geographic Managed Care, and County Operated Health System plans) is estimated based on data maintained by the Department of Health Care Services (DHCS). CHBRP assesses enrollment information online at: www.dhcs.ca.gov/dataandstats/statistics/Pages/RASB_Medi-Cal_Enrollment_Trends.aspx. Starting with the 2013 model, the most recent Medi-Cal enrollment data from DHCS is projected to 2014 based on CalSIM’s estimate of the impact of the Medi-Cal expansion in 2014.

Estimate of premium impact of AB 219

7. CHBRP’s Annual Enrollment and Premium Survey collects information from the seven largest providers of health insurance in California (Aetna, Anthem Blue Cross of California, Blue Shield of California, CIGNA, Health Net, Kaiser Foundation Health Plan, and United Healthcare/PacifiCare) to obtain estimates of baseline enrollment by purchaser (i.e., large and small group and individual), type of plan (i.e., DMHC-regulated or CDI-regulated), grandfathered and nongrandfathered status, and average premiums. Enrollment in plans or policies offered by these seven insurers represents an estimated 97.5% of the persons with health insurance subject to state mandates. This figure represents an estimated 97.9% of enrollees in full-service (nonspecialty) DMHC-regulated health plans and an estimated 96.1% of enrollees in full-service (nonspecialty) CDI-regulated policies.

For CHBRP reports analyzing specific benefit mandates, CHBRP surveys the seven major carriers on current coverage relevant to the benefit mandate. CHBRP reports the share of enrollees—statewide and by market segment—reflected in CHBRP’s bill-specific coverage survey responses. The proportions are derived from data provided by CDI and DMHC. CDI provides data by market segment (large, small, and individual) based on “CDI Licenses With HMSR Covered Lives Greater Than 100,000” as part of the Accident and Health Covered Lives Data Call September 30, 2011, by the California Department of Insurance, Statistical Analysis Division. The Department of Managed Health Care’s interactive website “Health Plan Financial Summary Report,” July–September 2012, provides data on DMHC-regulated plans by segment.⁸⁶

The following table describes the data sources mentioned above, and the data items that they inform.

⁸⁶ CHBRP assumes DMHC-regulated PPO group enrollees and POS enrollees are in the large-group segment. <http://wps0.dmhc.ca.gov/flash/>.

Table D-1. Population and Cost Model Data Sources and Data Items

Data Source	Items
California Simulation of Insurance Markets (CalSIM)	Uninsured, age: 0–17; 18–64 Medi-Cal (non-Medicare) (a), age: 0–17; 18–64 Other public (b), age: 0–64 Individual market, age: 0–17; 18–64 Small group, age: 0–17; 18–64 Large group, age: 0–17; 18–64
California Health Interview Survey, 2011 (CHIS 2011)	Uninsured, age: 65+ Medi-Cal (non-Medicare), age: 65+ Other public, age: 65+ Employer-sponsored insurance, age: 65+
CalPERS data, annually, enrollment as of September 30	CalPERS HMO and PPO enrollment • Age: 0–17; 18–64; 65+ HMO premiums
California Employer Survey, conducted annually by NORC and funded by CHCF	Enrollment by HMO/POS, PPO/indemnity self-insured, fully insured Premiums (not self-insured) by: • Size of firm (3–25 as small group and 25+ as large group) • Family vs. single • HMO/POS vs. PPO/indemnity vs. HDHP employer vs. employer premium share
DHCS administrative data for the Medi-Cal program, annually, 11-month lag from the end of November	Distribution of enrollees by managed care or FFS distribution by age: 0–17; 18–64; 65+ Medi-Cal Managed Care premiums
CMS administrative data for the Medicare program, annually (if available) as of end of September	HMO vs. FFS distribution for those 65+ (noninstitutionalized)
CHBRP enrollment survey of the seven largest health plans in California, annually as of end of September 2012	Enrollment by: • Size of firm (2–50 as small group and 51+ as large group) • DHMC vs. CDI regulated • Grandfathered vs. nongrandfathered Premiums for individual policies by: • DMHC vs. CDI regulated • Grandfathered vs. nongrandfathered
Department of Finance population projections, for intermediate CHIS years	Projected civilian, noninstitutionalized CA population by age: 0–17; 18–64; 65+
Medical trend influencing annual premium increases	Milliman estimate

Notes: (a) Includes children previously enrolled in Healthy Families, California’s Children’s Health Insurance Program. By January 1, 2014, children enrolled in Healthy Families will be transitioned into Medi-Cal as required in the 2012–2013 state budget agreement.

(b) Includes individuals dually eligible for Medi-Cal and Medicare.

Key: CDI=California Department of Insurance; CHCF=California HealthCare Foundation; CHIS= California Health Interview Survey; CMS=Centers for Medicare & Medicaid Services; DHCS=Department of Health Care Services; DMHC=Department of Managed Health Care; FFS=fee-for-service; HMO=health maintenance organization; NORC=National Opinion Research Center; PPO=preferred provider organization.

Projecting the Effects of the Affordable Care Act in 2014

This subsection discusses adjustments made to CHBRP's Cost and Coverage Model to account for the potential impacts of the ACA effective January 2014. It is important to emphasize that CHBRP's analysis of specific mandate bills typically addresses the marginal effects of the mandate bill—specifically, how the proposed mandate would impact benefit coverage, utilization, costs, and public health, *holding all other factors constant*. CHBRP's estimates of these marginal effects are presented in the *Benefit Coverage, Utilization, and Cost Impacts* section of this report.

Baseline premium rate development methodology—2014 post-ACA

Mandate bills introduced during 2013 would, if passed, become effective in 2014. Many significant provisions of the Affordable Care Act also become effective in 2014. In many cases, provisions required in the ACA would become effective on the same date as a mandate proposed to California law.

CHBRP's analyses of mandates effective in 2014 assume that carriers implement the new ACA provisions first. The baseline premiums reflect the estimated 2014 premium levels costs *after* carriers have implemented the 2014 ACA provisions. The estimated cost impact of a proposed mandate is then calculated relative to this post-ACA baseline.

The key components of the baseline model for utilization and expenditures are estimates of the per member per month (PMPM) values for each of the following:

- Insurance premiums PMPM;
- Gross claims costs PMPM;
- Member cost sharing PMPM; and
- Health care costs paid by the health plan.

For each plan type, CHBRP first obtained an estimate of the insurance premium PMPM by taking the 2012 reported premium from the above-mentioned data sources and trending that value to 2014. CHBRP uses trend rates published in the Milliman Health Cost Guidelines to estimate the health care costs for each plan segment in 2014.

In 2014, four plan segments in the previous CHBRP model⁸⁷ were split into 12 segments. Each of the two small-group segments (CDI-regulated and DMHC-regulated), and individual segments (CDI-regulated and DMHC-regulated) were split into grandfathered non-exchange, nongrandfathered non-exchange, and exchange groups in order to separately calculate the impact of ACA and specific mandates that may apply differently to these three subgroups. The premium rate information received from NORC did not split the premiums based on grandfathered or exchange status. The 2012 CHBRP Annual Enrollment and Premium Survey asked the seven

⁸⁷ In the past, CHBRP's model has reflected large-group, small-group, and individual market segments. These market segments were further subdivided by regulator: DMHC-regulated and CDI-regulated. The four plan segments refer to the small and individual market subdivisions by regulator.

largest insurance carriers in California to provide their average premium rates separately for grandfathered and nongrandfathered plans. The ratios from the carrier survey data are then applied to the NORC aggregate premium rates, to estimate premium rates for grandfathered and nongrandfathered plans that were consistent with the NORC results.

The marginal impact of ACA on 2014 premiums was established as follows:

- For nongrandfathered small-group and individual market segments, a 3% increase in medical costs is applied to reflect the total cost of requiring each plan to cover the essential health benefits.
- For nongrandfathered small-group plans, a 5% increase in medical costs is applied to reflect the other additional costs of ACA (e.g., age rating, health status, increased premium taxes and fees, change in actuarial value, etc.).
- For DMHC-regulated individual plans and CDI-regulated individual policies, an increase of 20% and 31%, respectively, in medical costs is applied to reflect the other additional costs of ACA.

The remaining three values were then estimated by the following formulas:

- Health care costs paid by the health plan = insurance premiums PMPM \times (1 – profit/administration load).
- Gross claims costs PMPM = health care costs paid by the health plan \div percentage paid by health plan
- Member cost sharing PMPM = gross claims costs \times (1 – percentage paid by health plan)

In the above formulas, the quantity “profit/administration load” is the assumed percentage of a typical premium that is allocated to the health plan’s administration and profit. These values vary by insurance category, and under the ACA, are limited by the minimum medical loss ratio requirement. CHBRP estimated these values based on Milliman’s knowledge of the health care market.

In the above formulas, the quantity “percentage paid by health plan” is the assumed percentage of gross health care costs that are paid by the health plan, as opposed to the amount paid by member cost sharing (deductibles, copays, etc.). In ACA terminology, this quantity is known as the plan’s “actuarial value.” These values vary by insurance category. For each insurance category, Milliman estimated the member cost sharing for the average or typical plan in that category. Milliman then priced these plans using the Milliman Health Cost Guidelines to estimate the percentage of gross healthcare costs that are paid by the carrier.

Medi-Cal Managed Care

Given that:

- California has not yet decided on Medi-Cal’s EHBs for Californians newly eligible for Medi-Cal Managed Care; and,

- The ACA does not require coverage of EHBs for individuals currently eligible for Medicaid,

CHBRP has estimated that the PMPM cost for Medi-Cal’s newly eligible population—in the absence of further guidance on EHBs for the newly eligible population—will equal the projected cost of Medi-Cal’s currently eligible family population, excluding maternity costs.

General Caveats and Assumptions

The projected cost estimates are estimates of the costs that would result if a certain set of assumptions were exactly realized. Actual costs will differ from these estimates for a wide variety of reasons, including:

- Prevalence of mandated benefits before and after the mandate may be different from CHBRP assumptions.
- Utilization of mandated benefits (and, therefore, the services covered by the benefit) before and after the mandate may be different from CHBRP assumptions.
- Random fluctuations in the utilization and cost of health care services may occur.
- The impact of ACA on the mandated benefit cost may be different from CHBRP assumptions.

Additional assumptions that underlie the cost estimates presented in this report are:

- Cost impacts are shown only for plans and policies subject to state benefit mandate laws.
- Cost impacts are only for the first year after enactment of the proposed mandate.
- Employers and employees will share proportionately (on a percentage basis) in premium rate increases resulting from the mandate. In other words, the distribution of the premium paid by the subscriber (or employee) and the employer will be unaffected by the mandate.
- For state-sponsored programs for the uninsured, the state share will continue to be equal to the absolute dollar amount of funds dedicated to the program.
- When cost savings are estimated, they reflect savings realized for 1 year. Potential long-term cost savings or impacts are estimated if existing data and literature sources are available and provide adequate detail for estimating long-term impacts. For more information on CHBRP’s criteria for estimating long-term impacts, please see: http://chbrp.org/documents/longterm_impacts08.pdf.
- Several studies have examined the effect of private insurance premium increases on the number of uninsured (Chernew et al., 2005; Glied and Jack, 2003; Hadley, 2006). Chernew et al. (2005) estimate that a 10% increase in private premiums results in a 0.74 to 0.92 percentage point decrease in the number of insured, whereas Hadley (2006) and Glied and Jack (2003) estimate that a 10% increase in private premiums produces a 0.88 and a 0.84 percentage point decrease in the number of insured, respectively. Because each of these studies reported results for the large-group, small-group, and individual insurance markets combined, CHBRP employs the simplifying assumption that the

elasticity is the same across different types of markets. For more information on CHBRP's criteria for estimating impacts on the uninsured, please see: http://chbrp.org/documents/uninsured_010109.pdf.

There are other variables that may affect costs, but which CHBRP did not consider in the cost projections presented in this report. Such variables include, but are not limited to:

- Population shifts by type of health insurance: If a mandate increases health insurance costs, some employer groups and individuals may elect to drop their health insurance. Employers may also switch to self-funding to avoid having to comply with the mandate.
- Changes in benefit plans: To help offset the premium increase resulting from a mandate, subscribers/policyholders may elect to increase their overall plan deductibles or copayments. Such changes would have a direct impact on the distribution of costs between the health plan and policies and enrollees, and may also result in utilization reductions (i.e., high levels of patient cost sharing result in lower utilization of health care services). CHBRP did not include the effects of such potential benefit changes in its analysis.
- Adverse selection: Theoretically, individuals or employer groups who had previously foregone health insurance may now elect to enroll in a health plan or policy, postmandate, because they perceive that it is to their economic benefit to do so.
- Medical management: Health plans and insurers may react to the mandate by tightening medical management of the mandated benefit. This would tend to dampen the CHBRP cost estimates. The dampening would be more pronounced on the plan types that previously had the least effective medical management (i.e., PPO plans).
- Geographic and delivery systems variation: Variation in existing utilization and costs, and in the impact of the mandate, by geographic area and delivery system models: Even within the health insurance types CHBRP modeled (HMO—including HMO and POS plans—and non-HMO—including PPO and FFS policies), there are likely variations in utilization and costs by type. Utilization also differs within California due to differences in the health status of the local population, provider practice patterns, and the level of managed care available in each community. The average cost per service would also vary due to different underlying cost levels experienced by providers throughout California and the market dynamic in negotiations between providers and health plans or insurers. Both the baseline costs prior to the mandate and the estimated cost impact of the mandate could vary within the state due to geographic and delivery system differences. For purposes of this analysis, however, CHBRP has estimated the impact on a statewide level.
- Compliance with the mandate: For estimating the postmandate coverage levels, CHBRP typically assumes that plans and policies subject to the mandate will be in compliance with the coverage requirements of the bill. Therefore, the typical postmandate coverage rates for populations subject to the mandate are assumed to be 100%.

Bill Analysis–Specific Caveats and Assumptions

In most instances, orally administered anticancer medications are subject to the plans or policies' outpatient pharmacy benefits' cost-sharing provisions, often in the form of flat-dollar copayments per prescription, coupled in some instances with a calendar-year deductible. The differences in forms of cost sharing between outpatient prescription drug benefit coverage and physician's office visit complicate the quantification of the impacts of AB 219 on costs borne by the enrollee and the plan/insurer.

The following is a brief description of methodology and assumptions used to develop the estimates of cost impacts.

- 2011 MedStat claims data for commercial members under age 65 was used to develop baseline cost and utilization information for oral anticancer medications. Claims data for enrollees who reside in California, had a diagnosis of cancer, and received anticancer medications on an outpatient basis was used. Baseline cost of oral anticancer medications was trended from 2011 to 2014, at a 10% annual rate of increase in cost per prescription. Because observed utilization rates were stable from 2008 to 2011, no utilization trending rates were applied to adjust to 2014.
- One caveat of using 2011 MedStat claims data (the most recent data at the time of CHBRP analysis) is the lack of the utilization data regarding 13 new oral anticancer medications approved by the FDA from January 2011 through March 2013. None of these medications are substitutes for older oral anticancer medications. Therefore, both the utilization and the cost projections for 2014 in this report are likely to underestimate the actual utilization and cost. This caveat is hard to address perfectly for two reasons. First, even if 2013 Medstat data was available and used, the projection for the new medications to be approved in 2014 is difficult to estimate. Second, the demand for new medications would depend on the individual level disease status (i.e., responsiveness to other anticancer medications). Namely, for some new medications, the FDA labeling states that the medication should be used only by persons whose cancers have not been successfully treated with older oral or IV/injectable anticancer medications.
- No changes in utilization of oral cancer medications due to the introduction of AB 219 was assumed, only a shift of cost sharing from patients to health plans/insurers based on the evidences summarized in the *Benefit Coverage, Utilization, and Cost Impacts* section.
- Formularies, preauthorization requirements, and other coverage provisions (other than patient cost sharing) were assumed to be unchanging from January 2011 through March 2013.

Appendix E: Information Submitted by Outside Parties

In accordance with CHBRP policy to analyze information submitted by outside parties during the first two weeks of the CHBRP review, the following parties chose to submit information.

No information was submitted by interested parties for this analysis.

For information on the processes for submitting information to CHBRP for review and consideration please visit: www.chbrp.org/requests.html.

REFERENCES

- Aisner J. Overview of the changing paradigm in cancer treatment: Oral chemotherapy. *American Journal of Health-System Pharmacy*. 2007;64:S4-S7.
- Albain KS, Unger JM, Crowley JJ, Coltman CA Jr., Hershman DL. Racial disparities in cancer survival among randomized clinical trials patients of the southwest oncology group. *Journal of the National Cancer Institute*. 2009;101:984-992.
- Arozullah AM, Calhoun EA, Wolf M, et al. The financial burden of cancer: Estimates from a study of insured women with breast cancer. *The Journal of Supportive Oncology*. 2004;2:227-278.
- Banna GL, Colloca E, Gebbia V, et al. Anticancer oral therapy: Emerging related issues. *Cancer Treatment Reviews*. 2010;36(8):595-605.
- Bedell CH. A changing paradigm for cancer treatment: The advent of new oral chemotherapy agents. *Clinical Journal of Oncology Nursing*. 2003;7(Suppl):5-9.
- Bennett CL, Weinberg PD, Lieberman JJ. Cancer insurance policies in Japan and the United States. *Western Journal of Medicine*. 1998;168:17-22.
- Bradley CJ, Yabroff KR, Dahman B, et al. Productivity costs of cancer mortality in the United States: 2000-2020. *Journal of the National Cancer Institute*. 2008;100:1763-1770.
- Braveman P. Health disparities and health equity: concepts and measurement. *Annual Review of Public Health*. 2006;27:167-194.
- Brawley OW. Is race really a negative prognostic factor for cancer? *Journal of the National Cancer Institute*. 2009;101:970-971.
- California Cancer Registry (CCR). *Facts and Figures 2012*. Oakland, CA: American Cancer Society, California Division. September 2011. Available at: http://www.ccrca.org/pdf/Reports/ACS_2012.pdf. Accessed March 1, 2013.
- California Cancer Registry (CCR). *Female Breast Cancer in California, 2005*. Sacramento, CA; California Department of Health Services, Cancer Surveillance Section, July 2005. Available at: <http://www.ccrca.org/pdf/Reports/BreastMin05.pdf>. Accessed April 5, 2010.
- California Department of Public Health (CDPH). *Table 1: YPLL-75 rates for selected causes of death by sex and race/ethnicity, California, 2000-2007*. Center for Health Statistics. July 2009. Available at: <http://www.cdph.ca.gov/programs/ohir/Documents/YPLL2007Tables.pdf>. Accessed March 15, 2010.
- California Department of Public Health (CDPH). *Premature Mortality Trends 2000-2007*. (2011) Available at: <http://www.cdph.ca.gov/programs/ohir/Pages/YPLL2007Printer.aspx>. Accessed December 2011.
- California Health Benefits Review Program (CHBRP). (2011). *Analysis of Assembly Bill 1000: Cancer Treatment*. Report to California State Legislature. Oakland, CA: CHBRP. 11-15. Available at: http://chbrp.ucop.edu/index.php?action=read&bill_id=125&doc_type=3.

- California Health Benefits Review Program (CHBRP). *Analysis of Senate Bill 961: Health Care Coverage: Cancer Treatment*. Report to California State Legislature. Oakland, CA: CHBRP. 10-05.2010. Available at: http://chbrp.ucop.edu/index.php?action=read&bill_id=73&doc_type=3.
- California Health Benefits Review Program (CHBRP). *Analysis of Senate Bill 161: Health Care Coverage: Chemotherapy Treatment*. Report to California State Legislature. Oakland, CA: CHBRP. 09-07. 2009. Available at: http://chbrp.ucop.edu/index.php?action=read&bill_id=39&doc_type=3.
- Chernew M, Cutler M, Seliger Keenan P. Competition, markets, and insurance: Increasing health insurance costs and the decline in insurance coverage. *Health Services Research*. 2005;40:1021-1039.
- Cox DH. *Premature mortality in California, 2004*. Center for Health Statistics. December 2006. Available at: www.cdph.ca.gov/pubsforms/Pubs/OHIRprematuremortality2004.pdf. Accessed November 30, 2011.
- DeMario MD, Ratain MJ. Oral chemotherapy: Rationale and future directions. *Journal of Clinical Oncology*. 1998;16:2557-2567.
- Food and Drug Administration (FDA). Drugs@FDA: FDA-approved products. Available at: <http://www.accessdata.fda.gov/scripts/cder/drugsatfda/>. Accessed February 2013.
- Fu AZ, Chen L, Sullivan SD, Christiansen NP. Absenteeism and short-term disability associated with breast cancer. *Breast Cancer Research and Treatment*. 2011;130:235-242.
- Gardner JW, Sanborn JS. Years of potential life lost (YPLL)—what does it measure? *Epidemiology*. 1990;1:322-329.
- Gibson L, Lawrence D, Dawson C, Bliss J. Aromatase inhibitors for treatment of advanced breast cancer in postmenopausal women. *Cochrane Database of Systematic Reviews*. 2009;(4):CD003370.
- Glied S, Jack K. *Macroeconomic conditions, health care costs and the distribution of health insurance*. Cambridge, MA: National Bureau of Economic Research. 2003. Working Paper (W10029). Available at: www.nber.org/papers/W10029. Accessed on August 2, 2010.
- Goldman DP, Jena AB, Lakdawalla DN, Malin JL, Malkin JD, Sun E. The value of specialty oncology drugs. *Health Services Research Journal*. 2010;45:115-32.
- Goldman DP, Joyce GF, Lawless G, Crown WH, Willey V. Benefit design and specialty drug use. *Health Affairs (Millwood)*. 2006;25:1319-31.
- Hadley J. The effects of recent employment changes and premium increases on adults' insurance coverage. *Medical Care Research and Review*. 2006;63:447-476.
- Kaiser Family Foundation (KFF). *Key Facts: Race, Ethnicity and Medical Care, 2007 Update*. January 2007. Available at: www.kff.org/minorityhealth/upload/6069-02.pdf. Accessed March 2009.

- Kim YA, Rascati KL, Prasla K, [Godley P](#), [Goel N](#), [Dunlop D](#). Retrospective Evaluation of the Impact of Copayment Increases for Specialty Medications on Adherence and Persistence in an Integrated Health Maintenance Organization System. *Clinical Therapeutics*. 2011;33(5):598-607.
- Kirby JB, Taliaferro G, Zuvekas SH. Explaining racial and ethnic disparities in health care. *Medical Care*. 2006;44(suppl):I64-I72.
- Lillie-Blanton M, Hoffman C. The role of health insurance coverage in reducing racial/ethnic disparities in health care. *Health Affairs (Millwood)*. 2005;24:398-408.
- Markham M, Luce R. Impact of the cost of cancer treatment: An internet-based survey. *Journal of Oncology Practice*. 2010;6(2):69-72.
- Mazzaferro S, Bouchemal K, Ponchel G. Oral delivery of anticancer drugs I: general considerations. *Drug Discovery Today*. 2013;18(1-2):25-34.
- Meropol NJ, Schulman KA. Cost of cancer care: Issues and implications. *Journal of Clinical Oncology*. 2007;25:180-186.
- National Comprehensive Cancer Network (NCCN). *NCCN Drugs & Biologics Compendium (NCCN Compendium)*. Available at: http://www.nccn.org/professionals/drug_compendium/content/contents.asp. Accessed February 2010.
- National Cancer Institute (NCI). *Cancer drug information*. National Cancer Institute Web site. Available at: <http://www.cancer.gov/cancertopics/druginfo/alphalist>. Accessed February 2010.
- National Cancer Institute (NCI). Cancer Trends Progress Report: 2011/2012 Update. National Cancer Institute Web site. Available at: http://progressreport.cancer.gov/doc_detail.asp?pid=1&did=2009&chid=95&coid=927&mid. Accessed March 2013.
- Neugut AI, Subar M, Wilde ET, et al. Association Between Prescription Co-Payment Amount and Compliance With Adjuvant Hormonal Therapy in Women With Early-Stage Breast Cancer. *Journal of Clinical Oncology*. 2011;29(18):2534-42.
- O'Neill VJ, Twelves CJ. Oral cancer treatment: Developments in chemotherapy and beyond. *British Journal of Cancer*. 2002;87:933-937.
- Pisu M, Azuero A, Meneses K, Pisu M, Azuero A, Meneses K. Out of pocket cost comparison between Caucasian and minority breast cancer survivors in the Breast Cancer Education Intervention (BCEI). *Breast Cancer Research and Treatment*. 2011;127:521-529.
- Rosenthal MB, Landon BE, Normand SL, Ahmad TS, Epstein AM. Engagement of health plans and employers in addressing racial and ethnic disparities in health care. *Medical Care Research and Review*. 2008;66:219-231.
- Sedjo RL, Devine S. Predictors of non-adherence to aromatase inhibitors among commercially insured women with breast cancer. *Breast Cancer Research and Treatment*. 2011;125(1):191-200.

- Sloane D. Cancer epidemiology in the United States: Racial, social, and economic factors. *Methods in Molecular Biology*. 2009;471:65-83.
- Streeter SB, Schwartzberg L, Husain N, et al. Patient and Plan Characteristics Affecting Abandonment of Oral Oncolytic Prescriptions. *Journal of Oncology Practice*. 2011;7(3 Suppl):46s-51s.
- Tehraniifar P, Neugut AI, Phelan JC, et al. Medical advances and racial/ethnic disparities in cancer survival. *Cancer Epidemiology, Biomarkers & Prevention*. 2009;18:2701-2708.
- USA Today, Kaiser Family Foundation, Harvard School of Public Health (USA Today/KFF). *National Survey of Households Affected by Cancer*. Kaiser Family Foundation, November 2006. Available at: <http://www.kff.org/kaiserpolls/7591.cfm>.
- U.S. Cancer Statistics Working Group (USCSWG). *United States Cancer Statistics: 2002 Incidence and Mortality*. Atlanta, GA: U.S. Department of Health and Human Services, Centers for Disease Control and Prevention and National Cancer Institute; 2005. Available at: http://wonder.cdc.gov/wonder/help/cancer/uscs_2002.pdf. Accessed March 16, 2010.
- Verbrugge M, Verhaeghe S, Lauwaert K, et al. Determinants and associated factors influencing medication adherence and persistence to oral anticancer drugs: a systematic review. *Cancer Treatment Reviews*. 2013; in press.
- Walko CM, Lindley C. Capecitabine: A review. *Clinical Therapeutics*. 2005;27:23-44.
- Ward E, Jemal A, Cokkinides V, [Singh GK](#), [Cardinez C](#), [Ghafoor A](#), [Thun M](#). Cancer disparities by race/ethnicity and socioeconomic status. *CA: A Cancer Journal for Clinicians*. 2004;54:78-93.
- Weaver KE, Rowland JH, Bellizzi KM, Aziz NM. Forgoing medical care because of cost: Assessing disparities in healthcare access among cancer survivors living in the United States. *Cancer*. 2010;116:3493-3504.
- Weingart SN, Brown E, Bach PB, et al. NCCN Task Force Report: Oral chemotherapy. *Journal of the National Comprehensive Cancer Network*. 2008;6(Suppl 3):S1-S14.

California Health Benefits Review Program Committees and Staff

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 six 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. The **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. The level of involvement of members of the CHBRP Faculty Task Force and staff varies on each report, with individual participants more closely involved in the preparation of some reports and less involved in others. As required by CHBRP's authorizing legislation, UC contracts with a certified actuary, Milliman Inc., to assist in assessing the financial impact of each legislative proposal mandating or repealing a health insurance benefit. Milliman also helped with the initial development of CHBRP methods for assessing that impact.

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 and thoughtful critiques provided by the members of the National Advisory Council. However, the Council does not necessarily approve or disapprove of or endorse this report. CHBRP assumes full responsibility for the report and the accuracy of its contents.

Faculty Task Force

Todd Gilmer, PhD, *Vice Chair for Cost*, University of California, San Diego
Joy Melnikow, MD, MPH, *Vice Chair for Public Health*, University of California, Davis
Ed Yelin, PhD, *Vice Chair for Medical Effectiveness*, University of California, San Francisco
Susan L. Ettner, PhD, University of California, Los Angeles
Theodore Ganiats, MD, University of California, San Diego
Sheldon Greenfield, MD, University of California, Irvine
Sylvia Guendelman, PhD, LCSW, University of California, Berkeley

Task Force Contributors

Wade Aubry, MD, University of California, San Francisco
Diana Cassady, DrPH, University of California, Davis
Janet Coffman, MPP, PhD, University of California, San Francisco
Gina Evans-Young, University of California, San Francisco
Margaret Fix, MPH, University of California, San Francisco
Brent Fulton, PhD, University of California, Berkeley
Jennifer Kempster, MS, University of California, San Diego
Shana Lavarreda, PhD, MPP, University of California, Los Angeles
Stephen McCurdy, MD, MPH, University of California, Davis
Sara McMenamin, PhD, University of California, San Diego
Ninez Ponce, PhD, University of California, Los Angeles
Dominique Ritley, MPH, University of California, Davis
Meghan Soulsby, MPH, University of California, Davis
Chris Tonner, MPH, University of California, San Francisco
Byung-Kwang (BK) Yoo, MD, MS, PhD, University of California, Davis

National Advisory Council

Lauren LeRoy, PhD, Fmr. President and CEO, Grantmakers In Health, Washington, DC, *Chair*

Stuart H. Altman, PhD, Professor of National Health Policy, Brandeis University, Waltham, MA
Deborah Chollet, PhD, Senior Fellow, Mathematica Policy Research, Washington, DC
Joseph P. Ditré Esq, Executive Director, Consumers for Affordable Health Care, Augusta, ME
Allen D. Feezor, Fmr. Deputy Secretary for Health Services, North Carolina Department of Health and Human Services, Raleigh, NC
Charles “Chip” Kahn, MPH, President and CEO, Federation of American Hospitals, Washington, DC
Jeffrey Lerner, PhD, President and CEO, ECRI Institute Headquarters, Plymouth Meeting, PA
Trudy Lieberman, Director, Health and Medicine Reporting Program, Graduate School of Journalism, City University of New York, New York City, NY
Donald E. Metz, Executive Editor, Health Affairs, Bethesda, Maryland
Marilyn Moon, PhD, Vice President and Director, Health Program, American Institutes for Research, Silver Spring, MD
Carolyn Pare, CEO, Buyers Health Care Action Group, Bloomington, MN
Michael Pollard, JD, MPH, Senior Fellow, Institute for Health Policy Solutions, Washington, DC
Christopher Queram, President and CEO, Wisconsin Collaborative for Healthcare Quality, Madison, WI
Richard Roberts, MD, JD, Professor of Family Medicine, University of Wisconsin-Madison, Madison, WI
Frank Samuel, LLB, Former Science and Technology Advisor, Governor’s Office, State of Ohio, Columbus, OH
Patricia Smith, President and CEO, Alliance of Community Health Plans, Washington, DC
Prentiss Taylor, MD, Corporate Medical Director, Advocate Health Centers, Advocate Health Care, Chicago, IL
J. Russell Teagarden, Vice President, Clinical Practices and Therapeutics, Medco Health Solutions, Inc, Brookfield, CT
Alan Weil, JD, MPP, Executive Director, National Academy for State Health Policy, Washington, DC

CHBRP Staff

Garen Corbett, MS, Director
John Lewis, MPA, Associate Director
Laura Grossmann, MPH, Principal Policy Analyst
Hanh Kim Quach, Principal Policy Analyst
Nimit Ruparel, Graduate Health Policy Intern
Karla Wood, Program Specialist

California Health Benefits Review Program
University of California
Office of the President
1111 Franklin Street, 11th Floor
Oakland, CA 94607
Tel: 510-287-3876 Fax: 510-763-4253
chbrpinfo@chbrp.org
www.chbrp.org

The California Health Benefits Review Program is administered by the Division of Health Sciences and Services at the University of California, Office of the President. The Division is led by John D. Stobo, MD, Senior Vice President.