

**REPORT FOR THE JOINT COMMITTEE ON LEGISLATIVE RESEARCH –
OVERSIGHT DIVISION**

Regarding

**ACTUARIAL SERVICES REVIEW OF
SENATE BILL 262, SENATE BILL 159, AND SENATE BILL 161**

Prepared by

**LEWIS & ELLIS, INC.
Actuaries & Consultants
11225 College Blvd., Suite 320
Overland Park, KS 66210
913-491-3388
www.LewisEllis.com**

December 20, 2013

Dallas

Glenn A. Tobleman, F.S.A., F.C.A.S.
S. Scott Gibson, F.S.A.
Cabe W. Chadick, F.S.A.
Michael A. Mayberry, F.S.A.
David M. Dillon, F.S.A.
Gregory S. Wilson, F.C.A.S.
Steven D. Bryson, F.S.A.
Bonnie S. Albritton, F.S.A.
Brian D. Rankin, F.S.A.
Wesley R. Campbell, F.S.A.
Jacqueline B. Lee, F.S.A.
Robert B. Thomas, Jr., F.S.A., C.F.A. (of Counsel)



Kansas City

Gary L. Rose, F.S.A.
Terry M. Long, F.S.A.
Leon L. Langlitz, F.S.A.
Anthony G. Proulx, F.S.A.
Thomas L. Handley, F.S.A.
D. Patrick Glenn, A.S.A., A.C.A.S.
Christopher H. Davis, F.S.A.
Karen E. Elsom, F.S.A.
Jill J. Humes, F.S.A.
Christopher J. Merkel, F.S.A.
Jan E. DeClue, A.S.A.
Patricia A. Peebles, A.S.A.

Baltimore

David A. Palmer, C.F.E.

London/Kansas City

Roger K. Annin, F.S.A., F.I.A.
Timothy A. DeMars, F.S.A., F.I.A.
Scott E. Morrow, F.S.A., F.I.A.

December 20, 2013

Mr. Mickey Wilson
Director, Oversight Division
Joint Committee on Legislative Research
Room 132, Capitol Building
Jefferson City, MO 65101

Re: Actuarial Review for Senate Bill 262, Senate Bill 159, and Senate Bill 161
Missouri Joint Committee on Legislative Research

Dear Mickey:

We have reviewed the impact of Senate Bill 262, Senate Bill 159, and Senate Bill 161 and our findings are summarized in this report. The customary process for analysis and reports such as this normally involves working with the Joint Committee to request experience data from the largest insurance carriers in the state of Missouri. Given the timeframe that this analysis and report was needed, requesting outside data from these carriers was not possible. In performing the analysis necessary for this report, we referenced large volumes of data from the Lewis & Ellis claims database, as well as researching modeling that has previously occurred for similar legislative mandates.

Please read through the report and contact me if you have any questions. It was a pleasure to work with the Missouri Joint Committee on Legislative Research for this analysis and I look forward to working with you again in the future.

Sincerely,

A handwritten signature in blue ink that reads 'Christopher J. Merkel'.

Christopher J. Merkel, FSA, MAAA
Vice President

EXECUTIVE SUMMARY

Orally Administered Anticancer Medication

This research report satisfying Senate Bill No. 262 to ‘Study the disparity in patient copayments between orally and intravenously administered chemotherapies, the reasons for the disparity, and the patient benefits in established co-payment parity between oral and infused chemotherapy agents.’ We note that many state legislatures have reviewed and/or passed legislation to enforce parity between oral chemotherapy and intravenous chemotherapy treatments. When reviewing chemotherapy the two main treatment methods, orally vs intravenously/injected, treatment plans have been shifting to the use of orally-administered treatment for chemotherapy.

Throughout the evolution of benefit designs, intravenous/injected chemotherapy drugs are typically covered through medical benefits, while oral chemotherapy drugs are most often covered through pharmacy benefits. The member cost sharing burden for medical benefits is often relatively low for chemotherapy patients because they may require only an office visit copay or have a cap on out-of-pocket expenditures. In contrast, pharmacy benefits can require a higher member cost sharing burden as some designs require unlimited cost sharing, for example, 20-50% of the drug price with historically no cap on out-of-pocket expenses. With the implementation of the PPACA, there is now a relatively high cap on these out-of-pocket expenses. Such pharmacy benefit structures can make high cost oral anticancer medications financially out of reach for some members which is a deterrent to seeking medical care.

Throughout this report, we have modeled various plan designs that allows us to develop a range of possible cost outcomes for parity of oral and infused chemotherapy agents. While there can be cost outliers due to specific plan design, we anticipate the average cost for the orally administered anticancer parity component of Senate Bill No. 262 to be \$0.57 Per Member Per Month (PMPM), which compares to a typical commercial plan cost of over \$350 PMPM for all benefits. On a percentage basis, this translates to roughly a 0.16% increase in cost. Note that there are unlimited combinations of plan design approaches, so this impact can vary for plans that have high cost sharing versus low cost sharing for oral and intravenous plan combinations. We also expect the pipeline for oral chemotherapy treatment to accelerate in the future due to several reasons, including the movement of parity mandates and the overall ease/effectiveness of oral treatment.

Diagnosis and Treatment of Eating Disorders

The treatment of eating disorders is the other clinical item requiring Actuarial analysis for Senate Bill No. 262. Eating disorders contained in this Senate bill include anorexia nervosa, bulimia, binge eating, eating disorders non-specified, and any other severe eating disorders contained in

Actuarial Services for Senate Bill 262, Senate Bill 159, and Senate Bill 161

the most recent version of the Diagnostic and Statistical Manual of Mental Disorders published by the American Psychiatric Association.

For treatment of eating disorders, the initial diagnosis can be a drawn out process and often involves more than one clinical professional. Treatment plans are very diverse and many plans also require psychiatric assistance. Most treatment plans occur within an outpatient setting. However, more complex situations involve the patient being admitted to an inpatient setting. Traditionally, the cost incurred for eating disorders has not been significant as most people with an eating disorder do not seek treatment.

When analyzing the cost impacts of the listed eating disorders, the one with the most significant cost impact was binge eating – which impacts around 3% of the population. The other significant cost impact was for patients being admitted to an inpatient setting. Once a patient is admitted to an inpatient setting, the average length of stay is 83 days at \$956 per day.

When analyzing the cost of eating disorders, we summarized our results in the sections below indicated by three scenarios of Low, Mid, and High. In these scenarios, we analyzed the outpatient costs of psychotherapy visits, medical office visits, and all other medical. For inpatient costs, we estimated the cost per day and the average number of days for treatment.

We further stratified the impact of eating disorders into two main categories. One set of scenarios for plans that currently exclude eating disorders, and another for plans that currently provide coverage for eating disorders. We estimate that the treatment cost of eating disorders component of Senate Bill No. 262, for plans that currently exclude eating disorders, to be an increase of 0.66%. For plans that currently provide coverage for eating disorders, we estimate the increase to be 0.21%. This translates to PMPM impacts of \$2.31 & \$0.74 respectively.

Senate Bill No. 159 – Physical Therapy Cost Sharing

The purpose of Senate Bill No. 159 is that no health carrier or health benefit plan shall impose a copayment or coinsurance percentage charged to the insured, for services performed by a physical therapist, be greater than the copayment or coinsurance charged to the insured for the services of a primary care physician (PCP).

When analyzing customary plan designs, the coinsurance percentage (if applicable) assigned to the insured member is generally the same as the underlying coinsurance percentage for the PCP. Given this, most of our analysis was centered around copayment differentials.

We modeled several plan designs scenarios to measure the impact of Senate Bill No. 159 using client data that we have available for large, statistically credible insured groups. We also compared these results to estimates that we developed by using the Lewis & Ellis claim database.

Actuarial Services for Senate Bill 262, Senate Bill 159, and Senate Bill 161

We estimate the cost for Senate Bill No. 159 to be a 0.23% increase in cost. This translates to a PMPM impact of \$0.81. Additional scenarios can be found in the analysis section of this report.

Actuarial Services for Senate Bill 262, Senate Bill 159, and Senate Bill 161

Analysis

Lewis & Ellis, Inc. was contracted to provide an Actuarial analysis determining the financial impacts of Senate Bill 262, Senate Bill 159, and Senate Bill 161. To accomplish this analysis, we referenced an internal claims database that Lewis & Ellis maintains for various client needs, as well as various medical journals and publications. Given the timeframe from where we were initially contacted, there was not enough time allowed to collect a data request from the largest insurance carriers within the state of Missouri. The dataset referenced in this research covers commercial, fully insured and self-insured members.

Orally Administered Anticancer Medication

Per Senate Bill 262, the actuarial analysis assumes that the coverage “Shall not be subject to any greater deductible or co-payment than other health care services provided by the health benefit plan”.

There are three main categories for anticancer drug therapy – cytotoxic agents, biologic agents, and hormonal agents. Both Oral and intravenous/injectable products are included in these categories.

Cytotoxic agents are the traditional therapies that damage cancer cells by interfering with cellular division but have the drawback of killing healthy cells along with cancer cells. Major types of cytotoxic agents include alkylating agents, antimetabolites, and plant alkaloids. Biologic agents, also called targeted agents, target specific cancer biologic pathways. Hormonal therapy interferes with hormone dependent pathways that promote the development or growth of cancer cells and plays an important role in treating breast and prostate cancers.¹

Traditional anticancer treatment plans normally were administered via intravenous therapy. With medical advancements, there has been significant acceleration of available oral anticancer drugs. This method of treatment is now a significant portion of all anticancer treatment pipeline.

Place of service differs between oral vs infused medications. Oral medications are usually covered under the member’s pharmacy benefit and the member obtains their medications from a pharmacy. However, intravenous treatment often occurs at the physician’s office or in a hospital outpatient setting and is administered within the member’s medical benefit. When analyzing the

¹ Weingart SN, Bach PB, Johson SA et al. NCCN task force report: oral chemotherapy. Journal of the National Comprehensive Cancer Network. 2008;6:S1-S17

Actuarial Services for Senate Bill 262, Senate Bill 159, and Senate Bill 161

cost sharing difference between these two places of service, member cost sharing is generally lower for medical benefits and higher for pharmacy benefits.

For traditional pharmacy plan designs, patients generally will have a fixed copay structure, often \$20 - \$50 per prescription filled. However, many plan designs also have created a specialty tier for offering high cost drugs. This specialty tier is often administered via coinsurance, as opposed to a copayment, of 20% - 50%. Previous to recent implementation of health care reform, many times this specialty tier did not have a maximum dollar limit. This high member cost sharing could historically be a deterrent to treatment. With the implementation of the PPACA, there is now a relatively high cap on these out-of-pocket expenses.

For purposes of this analysis, the definition of parity is that coverage for “Orally administered anticancer medication that is used to kill or slow the growth of cancerous cells charged at the same co-payment, deductible, or coinsurance amount as intravenously administered or injected cancer medication that is provided, regardless of formulation or benefit category determination by the health carrier administering the health benefit plan.”

When analyzing and referencing the Lewis & Ellis claims database, incidence rates for new members incurring claims is 0.5% and total patients currently seeking treatment is 1.3% - 1.5% of the population. These incidence rates matched closely to cancer rates that we referenced across various resources, as well as our own claims database and client data. The Centers for Disease Control and Prevention contains a National Program of Cancer Registries (NPCR) which provides cancer statistics by state. Per the NPCR, the incidence rates for the top cancers in Missouri as projected in 2014 are shown in the table below². The total incidence rate of new cancers in Missouri is equal to the national percentage of 0.5%.

² <http://apps.nccd.cdc.gov/USCS/Index.aspx>

Actuarial Services for Senate Bill 262, Senate Bill 159, and Senate Bill 161

Type of Cancer	Projected 2014 Incidence Rates in Missouri	Rank
Lung and Bronchus	75.88	1
Female Breast	59.96	2
Prostate	51.72	3
Colon and Rectum	39.16	4
Melanomas of the Skin	23.66	5
Urinary Bladder	20.16	6
Kidney and Renal Pelvis	20.16	7
Non-Hodgkin Lymphoma	18.19	8
Thyroid	17.40	9
Pancreas	13.32	10
Leukemias	11.92	11
Oral Cavity and Pharynx	11.77	12
Ovary	4.60	13

The top 13 cancers projected in 2014 in Missouri include more than 90% of all cancers expected to be reported.

The data also shows that most members do not receive chemotherapy treatment for their cancer diagnosis. Roughly only 25% - 28% of cancer patients receive chemotherapy during a year. When developing these estimates, we also were able to reference the claim level data of two large groups within the state of Missouri. The estimates we developed throughout this analysis aligned very well to the data of these two groups.

One of the plan design mechanisms that historically have resulted in a high cost sharing burden for the member is to have a specialty tier drug classification that usually had a coinsurance arrangement. The coinsurance for this tier can often result in a 20% - 50% cost sharing burden for the patient. Appendix 1 of this report shows the oral chemotherapy drugs currently available on the market. The appendix shows the oral therapy used for each type of cancer as well as the average monthly cost of the medication.

One of the main behavioral patterns assumed in benefit plan pricing is that the higher the cost sharing burden on a member, he/she is more apt to ignore and avoid treatments due to the cost incurred. Likewise, members with a lower cost sharing burden are more apt to seek services and get treatment.

Actuarial Services for Senate Bill 262, Senate Bill 159, and Senate Bill 161

This phenomenon traditionally increases the cost of any parity mandate. Also, with a reduced cost sharing burden for the member, a pent up spike of new utilization would be expected for members that now decide to seek treatment due to the reduce cost sharing burden. However, with the overall incidence rate of cancer being 0.5 - 1.5% of commercial members, and only 20% - 25% of members actually seeking chemotherapy treatment, the overall cost of an oral anticancer parity mandate has a relatively minimal impact.

We also reviewed any potential cost savings that could emerge from a patient switching treatments from an intravenous/injected to that of an oral treatment plan. Noting that both methods of treatment require structured recurring physician visits. There could be a slight cost reduction due not having the cost of administering the intravenous treatment. However, that cost would be offset on the oral treatment to some degree by accounting for a dispensing fee. For oral treatments, additional hidden cost can exist since these drugs are closely managed by PBMs. Many times, these additional costs are not readily apparent in the health claims.

We have modeled the cost differential for providing oral chemotherapy cost-sharing parity. We have assumed the following membership in the commercial market in Missouri:

<u>Modeled Commercial Medical Members</u>	<u>Annual Incidence Rate of Cancer Patients</u>	<u>Percent of Cancer Patients with Chemotherapy Treatments</u>	<u>Number of Members with Chemotherapy Treatments</u>
1,200,000	1.5%	28.0%	5,040

For the expected Missouri commercial membership with chemotherapy treatments, we modeled three distributions of chemotherapy patients and the average annual chemotherapy costs. The expected distribution of patients is:

Percentage of Chemotherapy Patients	Distribution of Patients by Type of Chemotherapy Treatment		
	Low	Mid	High
Percent of Cancer Claimant with Injection Chemo Only	70.0%	50.0%	30.0%
Percent of Cancer Claimant with Oral Chemo Only	25.0%	37.5%	50.0%
Percent of Cancer Claimant with Both Chemo Only	5.0%	12.5%	20.0%

The low distribution represents a plan that currently provides oral chemotherapy coverage under the most cost prohibitive scenario (a pharmacy plan with coinsurance or high copays without any out of pocket maximum to the patient). The high distribution represents a plan that currently provides oral chemotherapy coverage under the most cost-friendly scenario (a pharmacy plan

Actuarial Services for Senate Bill 262, Senate Bill 159, and Senate Bill 161

with low copays). The mid distribution is the average of the low and high distributions. We have selected the low and high distributions based on the Lewis & Ellis claims database.

The average annual chemotherapy costs per patient are shown in the following table. While each patient's cost will vary according to the type and stage of cancer, we have found the average costs to be closely represented by the modeled scenario 2. Scenario 2 provides the expected annual costs per claimant in calendar year 2014. Scenarios 1 and 3 are derivatives of scenario 2 modeling a 25% lower expected claim cost per patient in scenario 1 and a 25% higher expected claim cost per patient in scenario 3.

Average Annual Chemotherapy Costs	Average Annual Chemotherapy Costs per Patient		
	Scenario 1	Scenario 2	Scenario 3
Percent of Cancer Claimant with Injection Chemo Only	\$37,500	\$50,000	\$62,500
Percent of Cancer Claimant with Oral Chemo Only	\$4,125	\$5,500	\$6,875
Percent of Cancer Claimant with Both Chemo Only	\$101,250	\$135,000	\$168,750

Our modeling results project the cost of oral chemotherapy parity to be within the range of \$0.43-\$0.71 PMPM. Each of the three scenarios are shown in the tables below.

Total Projected Costs – Scenario 1	Costs are 25% Lower than Expected			PMPM Difference	
	Low	Mid	High		
Percent of Cancer Claimant with Injection Chemo Only	\$132,300,000	\$94,500,000	\$56,700,000		
Percent of Cancer Claimant with Oral Chemo Only	\$5,197,500	\$7,796,250	\$10,395,000		
Percent of Cancer Claimant with Both Chemo Only	\$25,515,000	\$63,787,500	\$102,060,000		
Total Projected Costs – Scenario 1	\$163,012,500	\$166,083,750	\$169,155,000		
PMPM – Scenario 1	\$ 11.32	\$ 11.53	\$ 11.75		\$ 0.43

Total Projected Costs – Scenario 2	Expected Costs			PMPM Difference	
	Low	Mid	High		
Percent of Cancer Claimant with Injection Chemo Only	\$176,400,000	\$126,000,000	\$75,600,000		
Percent of Cancer Claimant with Oral Chemo Only	\$6,930,000	\$10,395,000	\$13,860,000		
Percent of Cancer Claimant with Both Chemo Only	\$34,020,000	\$85,050,000	\$136,080,000		
Total Projected Costs – Scenario 2	\$217,350,000	\$221,445,000	\$225,540,000		
PMPM – Scenario 2	\$ 15.09	\$ 15.38	\$ 15.66		\$ 0.57

Actuarial Services for Senate Bill 262, Senate Bill 159, and Senate Bill 161

Total Projected Costs – Scenario 3	Scenario 3: Costs are 25% Higher than Expected			PMPM Difference
	Low	Mid	High	
Percent of Cancer Claimant with Injection Chemo Only	\$220,500,000	\$157,500,000	\$94,500,000	
Percent of Cancer Claimant with Oral Chemo Only	\$8,662,500	\$12,993,750	\$17,325,000	
Percent of Cancer Claimant with Both Chemo Only	\$42,525,000	\$106,312,500	\$170,100,000	
Total Projected Costs – Scenario 3	\$271,687,500	\$276,806,250	\$281,925,000	
PMPM – Scenario 3	\$ 18.87	\$ 19.22	\$ 19.58	

The current pipeline of treatments that have both oral and chemotherapy options are somewhat limited. However, we would expect for this offering to expand in the future. We also note that many new oral drugs are specially designed to target a specific type of cancer, and therefore impact an overall small number of cancer patients, which will drive up the costs of these new orally administered drugs in the near-to-long term horizon. We would also expect this claims acceleration to outpace the general rate of health care cost increases.

During the course of our research, we referenced several other states that have reviewed and/or passed legislation similar to parity language found in Senate Bill 262. When comparing our estimate developed by using the Lewis and Ellis claims database, as well as other research, we found that we arrived at a conclusion that was similar to other reports.

Diagnosis and Treatment of Eating Disorders

The American Psychiatric Association *Practice Guideline for the Treatment of Patients with Eating Disorders, Third Edition* states that a complete assessment of the patient’s history, symptoms, behaviors, and mental status is the first step in making a diagnosis of an eating disorder. A complete patient assessment generally requires several hours.³

Academy of Eating Disorders suggests the initial assessment involve a consultation with a physician and a registered dietician. After the initial assessment, a diagnosis is established and a treatment plan is determined. Treatment plans are diverse and may include: outpatient treatment, psychotherapy, psychopharmacology, nutrition counseling, medical treatment, day hospital care, inpatient treatment or residential care. Most often, multiple clinicians from various health disciplines are involved including psychologists, psychotherapists, physicians, dieticians, and nurses.

³ The American Psychiatric Association, *Practice Guideline for the Treatment of Patients with Eating Disorders, Third Edition*, (June 2006): 11-12.

Actuarial Services for Senate Bill 262, Senate Bill 159, and Senate Bill 161

Patients with eating disorders usually have physical and medical concerns as well as mental. Patients with anorexia nervosa frequently have considerable medical problems and need to be examined frequently while patients with bulimia nervosa are not seen as regularly. For patients with binge eating disorder, they may have an assortment of complications ranging from obesity to diabetes and hypertension.

The majority of eating disorder patients are treated in the outpatient setting with a team approach between the patient, a psychotherapist, a physician and a dietician. Psychotherapies may include cognitive-behavioral therapy, interpersonal psychotherapy, family therapy, and behavior therapy. Nutrition counseling should occur on a regular basis to help regain weight or stabilize eating behaviors. Psychiatric medication is often prescribed, typically an antidepressant.

Day hospital treatment plans are mostly reserved for patients that are not successful in the outpatient setting. This treatment involves 3-8 hours a day with controlled eating sessions and assorted therapies. With a day hospital treatment plan, the patient lives at home and may be able to continue with work or school as normal. Inpatient treatment plans provide a structured, restricted environment with 24-hour a day support. Frequently, the day hospital program is affiliated with the inpatient program so a patient can move back and forth between day hospital and inpatient as needed.

Residential care programs provide a lengthy treatment option. The typical patient in residential care will have been hospitalized in the past and not reached a significant degree of medical or psychological stability.⁴ In a 2006 survey of residential treatment centers, facilities were queried about their eating disorder treatment programs. Of the facilities that participated in the survey, that average length of stay was reported as 83 days with an average cost (in 2006) of \$956 per day. The authors of the survey found the number of residential programs tripled in more in ten years, making residential treatment more available for patients and offering an alternative to hospital inpatient treatment plans.⁵

Because physicians are not required to report eating disorders to a health agency, and because people with these problems tend to be secretive, denying that they even have a disorder, we have no way of knowing exactly how many people in this country are affected.⁶ The National Institute of Mental Health (NIMH) provides statistics on eating disorders with treatment data based on a person's lifetime. One survey performed in 2002 found that only 1 in 10 men and

⁴ "Treatment", http://www.aedweb.org/Treatment/4021.htm#_UrMyb9LW68A, (accessed December 18, 2013).

⁵ Evaluating Residential Treatment Programs: *Eating Disorders Review*; (May/June 2006 Volume 17, Number 3, p6.

⁶ "ANRED anorexia nervosa and related eating disorders", <http://www.anred.com/stats.html>, (accessed December 19, 2013).

Actuarial Services for Senate Bill 262, Senate Bill 159, and Senate Bill 161

women with eating disorders receive treatment and only 35% of the people that receive treatment for eating disorders get treatment at a specialized facility for eating disorders.⁷

To estimate the cost to commercial plans covering eating disorders, we reviewed published statistics and the Lewis & Ellis claims database. Approximately half of the L&E clients do not provide coverage for eating disorders. For the clients that do provide coverage for eating disorders, we calculated the average annual cost per claimant for outpatient treatment versus inpatient or residential treatment. Our client data reveals that 80% of patients seeking treatment for eating disorders have outpatient treatment while the other 20% of patients receive inpatient/residential treatment. All patients in our client database have 30 or fewer days of treatment coverage. We believe most plans that cover eating disorders will limit treatment to 30 days. Therefore, there is an additional costs to plans that already offer coverage for eating disorders.

Per the NIMH, about 42% of all members with an eating disorder will ultimately seek treatment in their lifetime. However, the 2002 article *Characteristics and Treatment of Patients with Chronic Eating Disorders* (Dr. Greta Noordenbox, *International Journal of Eating Disorders*) found that only 1 in 10 members will seek treatment. We have estimated the additional costs to assume only 1 and 10 members will seek treatment in a plan year.

The lifetime incidence rate of eating disorders for adults as provided by NIHM is:

	Women	Men
Anorexia	0.9%	0.3%
Bulemia	1.5%	0.5%
Binge-Eating Disorder	3.5%	2.0%

The incidence rate for teenagers within the ages of 13-18 is provided in the National Comorbidity Study-Adolescent Supplement.⁸ The teen incidence rate is combined for all eating disorders and is provided by gender as follows:

	Girls	Boys
All Eating Disorders	3.8%	1.5%

⁷ Characteristics and Treatment of Patients with Chronic Eating Disorders, by Dr. Greta Noordenbox, *International Journal of Eating Disorders*, Volume 10: 15-29, 2002.

⁸ Merikangas KR, He J, Burstein M, Swanson SA, Avenevoli S, Cui L, Benjet C, Georgiades K, Swendsen J. Lifetime prevalence of mental disorders in U.S. adolescents: Results from the National Comorbidity Study-Adolescent

Actuarial Services for Senate Bill 262, Senate Bill 159, and Senate Bill 161

The average annual costs were modeled for three situations: Low, Mid and High. Using the L&E client data, we used the 10% percentile of charges for the Low situation, the 50% percentile of charges for the Mid situation and the 90% percentile of charges for the High situation. For outpatient treatments, we analyzed the costs for psychotherapy visits, medical office visits, and all other medical separately. For inpatient/residential treatment, we estimated the cost per day and the number of days of treatment. The charts below show the average annual costs per patient. The average annual costs were then weighted by 80% outpatient and 20% inpatient or residential.

Outpatient Situation	Average Annual Cost for Psych Visits	Average Annual Cost for Medical Office Visits	Average Annual Cost for Other Medical	Total Average Annual Costs Outpatient
Low	\$91	\$69	\$23	\$183
Mid	\$455	\$69	\$155	\$679
High	\$2,039	\$502	\$1,922	\$4,463

Inpatient or Residential Situation	Average Cost Per Day	Average Number of Patient Days	Total Average Annual Costs Inpatient or Residential
Low	\$1,100	30	\$33,000
Mid	\$1,225	60	\$73,500
High	\$1,350	90	\$121,500

The average annual costs were then multiplied by the expected distribution of claimants to seek treatment for an eating disorder. The final results are given for two types of plans – plans that currently do not provide coverage for eating disorders and plans that do currently provide coverage for eating disorders. For plans that do currently provide coverage for eating disorders, the additional costs represent the value to remove any plan limitations such as visit or day maximums.

	Additional Cost for Plans that Currently Exclude Eating Disorders	Additional Cost for Plans that Currently Provide Coverage for Eating Disorders
Low	0.15%	0.04%
Mid	0.66%	0.21%
High	1.22%	0.40%

Actuarial Services for Senate Bill 262, Senate Bill 159, and Senate Bill 161

Senate Bill No. 159 – Physical Therapy Cost Sharing

The purpose of Senate Bill No. 159 is that no health carrier or health benefit plan shall impose a copayment or coinsurance percentage charged to the insured be, for services performed by a physical therapist, be no greater than the copayment or coinsurance charged to the insured for the services of a primary care physician (PCP).

When analyzing customary plan designs, the coinsurance percentage (if applicable) assigned to the insured member is generally the same as the underlying coinsurance percentage for the PCP. Given this, most of our analysis was centered around copayment differentials.

We modeled several plan designs scenarios to measure the impact of Senate Bill No. 159 using client data that we have available for large, statistically credible insured groups. We also compared these results to estimates that we developed by using the Lewis & Ellis claim database.

In developing plan designs scenarios, we focused on the material components and benefit ranges that drive the cost of this Senate Bill. Below are the results of our Low, Mid, and High scenarios.

Benefit Range	Plan Design Comparison	Change in Plan Costs
Low	30% Coinsurance versus \$20 Copay	0.43%
Mid	20% Coinsurance versus \$20 Copay	0.23%
High	10% Coinsurance versus \$20 Copay	0.03%

We estimate the cost for Senate Bill No. 159 to be a 0.23% increase in cost. This translates to a PMPM impact of \$0.81. The estimated costs can be further illustrated from the scenarios above, ranging from a cost impact of 0.03% to 0.43%, or \$0.11 PMPM and \$1.51 PMPM respectively.

Conclusion

Orally Administered Anticancer Medication

Based on our review of the historical costs and incidence rates, as well as analyzing the future pipeline of chemotherapy treatments, we estimate the increased cost for oral vs intravenous/infused therapy to be \$0.57 Per Member Per Month (PMPM). In the course of developing this estimate, we modeled multiple scenarios and arrived at a projected cost range of \$0.43 - \$0.71 PMPM. As mentioned above, there can be significant fluctuations in this estimate as there are unlimited plan designs in the marketplace that all cover benefits differently.

Actuarial Services for Senate Bill 262, Senate Bill 159, and Senate Bill 161

In developing this estimate, we analyzed the current drug pipeline to project how treatment costs would be impacted in the near-term horizon. Long term impacts were not quantified in this analysis.

Diagnosis and Treatment of Eating Disorders

Depending on the treatment plan prescribed, the cost incurred for eating disorders can be a significant increase. When modeling the various scenarios contained in this report, the additional cost for plans that currently exclude eating disorders ranged from 0.15% to a 1.22% increase. For plans that already provide coverage for eating disorders, this increase has a smaller impact and results in a range of 0.04% to 0.40%.

As mentioned above, the significant drivers of cost are treatment plans that involve an inpatient setting, as well as patient diagnosed with an eating disorder involving binge eating.

Senate Bill No. 159 – Physical Therapy Cost Sharing

During our analysis of typical plan designs, we found that the coinsurance percentage (if applicable) assigned to the insured member is generally the same as the underlying coinsurance percentage for the PCP. Therefore, a significant portion of our analysis was centered around the impact of copayments.

We estimate the cost for Senate Bill No. 159 to be a 0.23% increase in cost. During the course of this analysis, we modeled the sensitivity of many plan design and arrived at three main scenarios that produced a range of costs estimate from 0.03% to 0.43%, or \$0.11 PMPM and \$1.51 PMPM respectively.

Qualification

The use of this report by parties outside of the Missouri Joint Committee on Legislative Research is unauthorized. Outside parties rely on this report at their own risk.

Sincerely,



Christopher J. Merkel, FSA, MAAA
Vice President

Actuarial Services for Senate Bill 262, Senate Bill 159, and Senate Bill 161

APPENDIX 1

LIST OF ORAL CHEMOTHERAPY DRUGS

Type of Cancer	Brand Drug Name	Generic Drug Name	Average Cost	Type of Chemotherapy
LUNG	TARCEVA	Erlotinib	\$6,000 per month	Tyrosine Kinase Inhibitor
	VEPESID	Etoposide	\$615 per month (generic)	Anti-cancer Chemo
	XALKORI	Crizotinib	\$11,300 per month (250mg)	Tyrosine Kinase Inhibitor
	HEXALEN	Altretamine	\$3,100 per month	Anti-cancer Chemo
	HYCAMTIN	Topotecan Hydrochloride	\$31,200 per month (1mg)	Anti-cancer Chemo
	IRESSA	Gefitinib	\$3,400 per month	EGFR Inhibitor
BREAST	ARIMIDEX	Anastrozole	\$10.50 per month (generic)	Hormone Therapy
	AROMASIN	Exemestane	\$180 per month (generic)	Hormone Therapy
	FEMARA	Letrozole	\$9 per month (generic)	Hormone Therapy
	NOLVADEX	Tamoxifen	\$16 per month (20mg generic)	Hormone Therapy
	TREXALL	Methotrexate	\$60 per month (15mg)	Anti-cancer Chemo
	TYKERB	Lapatinib	\$3,400 per month	Tyrosine Kinase Inhibitor
	XELODA	Capecitabine	\$6,300 per month (500 mg)	Anti-cancer Chemo
	FARESTON	Toremifene	\$930 per month	Hormone Therapy
	MEGACE	Megestrol Acetate	\$3.50 per month (40mg generic)	Hormone Therapy
PROSTATE	EMCYT	Estramustine	\$1,400 per month	Anti-cancer Chemo
	VEPESID	Etoposide	\$615 per month (generic)	Anti-cancer Chemo
	XTANDI	Enzalutamide	\$2,050 per month	Androgen Receptor Inhibitor
	ZYTIGA	Abiraterone	\$7,100 per month	Hormone Therapy
	CASODEX	Bicalutamide	\$20.50 per month (generic)	Hormone Therapy
	EULEXIN	Flutamide	\$142.00 per month (generic)	Hormone Therapy
	NILANDRON	Nilandron	\$4,400 per month	Hormone Therapy
COLORECTAL	XELODA	Capecitabine	\$6,300 per month (500 mg)	Anti-cancer Chemo
NON-HODGKIN'S LYMPHOMA	CYTOXAN	Cyclophosphamide	\$21.50 per month (50mg generic)	Anti-cancer Chemo
	TREXALL	Methotrexate	\$60 per month (15mg)	Anti-cancer Chemo
	LEUKERAN	Chlorambucil	\$1,015 per month	Anti-cancer Chemo
	ZOLINZA	Vorinostat	\$10,900 per month	Anti-cancer Chemo

Actuarial Services for Senate Bill 262, Senate Bill 159, and Senate Bill 161

Type of Cancer	Brand Drug Name	Generic Drug Name	Average Cost	Type of Chemotherapy
MELANOMAS (SKIN)	EFUDEX	Flourouracil	\$182 per tube (CREAM)	Anti-cancer Chemo
	TREXALL	Methotrexate	\$60 per month (15mg)	Anti-cancer Chemo
KIDNEY	AFINITOR	Everolimus	\$9,300 per month (10mg)	mTOR Inhibitor
	NEXAVAR	Sorafenib	\$10,185 per month	Tyrosine Kinase Inhibitor
	SUTENT	Sunitinib	\$12,600 per month (50mg)	Tyrosine Kinase Inhibitor
	VOTRIENT	Pazopanib	\$7,400 per month	Tyrosine Kinase Inhibitor
CORPUS AND UTERUS	MEGACE	Megestrol Acetate	\$3.50 per month (40mg generic)	Hormone Therapy
THYROID	CAPRELSA	Vandetanib	\$10,600 per month (300mg)	Tyrosine Kinase Inhibitor
	COMETRIQ	Caboxantinib	\$10,800 per month (140mg)	Tyrosine Kinase Inhibitor
PANCREATIC	TARCEVA	Erlotinib	\$6,000 per month	Tyrosine Kinase Inhibitor
LEUKEMIAS	CYTOXAN	Cyclophosphamide	\$21.50 per month (50mg generic)	Anti-cancer Chemo
	GLEEVEC	Imatinib	\$7,250 per month (400mg)	Tyrosine Kinase Inhibitor
	TREXALL	Methotrexate	\$60 per month (15mg)	Anti-cancer Chemo
	DROXIA (HYDREA)	Hydroxyurea	\$37 per month (generic)	Anti-cancer Chemo
	LEUKERAN	Chlorambucil	\$1,015 per month	Anti-cancer Chemo
	MYLERAN	Busulfan	\$670 per month	Anti-cancer Chemo
	OFORTA	Fludarabine	\$1,900 per month	Nucleotide metabolic inhibitor
	PURINETHOL	Mercaptopurine	\$108 per month (generic)	Anti-cancer Chemo
	SPRYCEL	Dasatinib	\$9,200 per month	Tyrosine Kinase Inhibitor
	TABLOID	Thioguanine	\$2,000 per month	Anti-cancer Chemo
	TASIGNA	Nilotinib	\$9,250 per month (200mg)	Tyrosine Kinase Inhibitor
	VESANOID	Tretinoin	\$5,300 per month (10mg, generic)	Anti-cancer Chemo
BRAIN	TEMODAR	Temozolomide	\$2,450 per month (250mg generic)	Anti-cancer Chemo
	CEENU	Lomustine	\$70 per month (generic)	Anti-cancer Chemo
OVARIAN	CYTOXAN	Cyclophosphamide	\$21.50 per month (50mg generic)	Anti-cancer Chemo
	ALKERAN	Melphalan	\$770 per month	Anti-cancer Chemo
	DROXIA (HYDREA)	Hydroxyurea	\$37 per month (generic)	Anti-cancer Chemo
	HEXALEN	Altretamine	\$3,100 per month	Anti-cancer Chemo
	HYCAMTIN	Topotecan Hydrochloride	\$31,200 per month (1mg)	Anti-cancer Chemo

Actuarial Services for Senate Bill 262, Senate Bill 159, and Senate Bill 161

Type of Cancer	Brand Drug Name	Generic Drug Name	Average Cost	Type of Chemotherapy
LIVER	NEXAVAR	Sorafenib	\$10,185 per month	Tyrosine Kinase Inhibitor
MULTIPLE MYELOMAS	TREXALL	Methotrexate	\$60 per month (15mg)	Anti-cancer Chemo
	CYTOXAN	Cyclophosphamide	\$21.50 per month (50mg generic)	Anti-cancer Chemo
	REVLIMID	Lenalidomide	\$9,300 per month (25mg)	Immunomodulatory agent
	THALOMID	Thalidomide	\$8,700 per month (200mg)	Immunomodulatory agent
	ALKERAN	Melphalan	\$770 per month	Anti-cancer Chemo
	DROXIA (HYDREA)	Hydroxyurea	\$37 per month (generic)	Anti-cancer Chemo