APPENDIX

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Literature Review Methodology

DerSimonian and Laird (D-L) Random-effects Literature Review Methodology

For this study, a random-effects literature review model was adopted for use in cases where the dietary supplement in question had a significant number of scientific/clinical studies that explored the specific question this study aims to address: What is the impact on the odds of a disease event occurring, given the use of the dietary supplement in question? This question is in the same mold of many questions that pharmacoeconomic/clinical studies aim to address, which is the determination of an overall treatment effect on a given event outcome when a treatment regimen is applied to one group versus a control group. From these type of analyses, risk—and, subsequently, risk reduction—of an event can be calculated and applied into a cost-effectiveness model, which helps key decision makers (including physicians, patients, governments, insurance companies, and employers) determine whether it is worth the increased cost of treatment for the potential savings derived from avoided events.

However, the key problem is how one properly assesses the results of a set of studies, which we define as $\boldsymbol{K}$, that address the same research question, when each study (element of set $\boldsymbol{K}$ = study $\boldsymbol{i}$) varies significantly in terms of sample size, study protocol, the research team, and a host of other study qualities. Researchers, specifically DerSimonian and Laird (DerSimonian & Laird, 1986, DerSimonian & Kacker, 2007), have addressed this critical issue over the last several decades, and the research consensus has determined that the random-effects model is one of the best approaches available to researchers when key quality variables are unknown.

The random-effects model assumes that the observed effect of a treatment in a given study $\boldsymbol{i}$, $\boldsymbol{Y_i}$ is a function of two components, the overall effect of treatment, $\boldsymbol{Y_i^*}$, and a sampling error in study $\boldsymbol{i}$, ε_i. It is assumed that the functional relationship is linear, or

- $Y_i = Y_i^* + \varepsilon_i$.

Sampling error can be caused by many factors internal to the given study, such as inadvertently selecting a biased sample from the population, but it mostly due to the relative size of the study sample, $\boldsymbol{N_i}$. The sampling error also provides insight into the precision of the findings—the larger the error, the more likely the findings are less precise and, consequently, the lower the confidence one should have in the results when compared with another study's results, if that study has a smaller sampling error.

Sampling error is not the only variance that must be considered when assessing a set of studies. The true effect of treatment, $\boldsymbol{Y_i^*}$, can also vary based on many factors, such as the dosage size of treatment, the demographics of the population receiving the treatment, the study's methodology, and/or protocol that impacts the treatment's effect. All of these true treatment effects vary by study and must be accounted for in order to understand the true treatment effect on the total population. Thus, equation (1) must be transformed to account for intra-study variance, thus

- $Y_i = \mu^* + \delta_i + \varepsilon_i$

Where μ^* is the true treatment's effect on a given population independent of the studies and δ_i is the difference in study ***i***'s observed effect from the true treatment's effect on a given population, or intra-study error.

Thus, the goal is to provide an estimate of μ^*, by controlling for δ_I and ε_I, which is done through a weighting process where the weights are functions of the variance in inter-study error (ε_I), defined as s_i^2, and the variance in intra-study error (δ_I), defined as τ^2. In other words, each study's observed treatment effect is adjusted using the following equation:

- $X = (\Sigma_i w_i * Y_i) / \Sigma_i w_i$
- $w_i = (s_i^2 + \tau^2)^{1/2}$

Where ***X*** is the deduced treatment effect that is used in the cost-saving calculations and $\mathbf{w_i}$ is the variance weight applied to each study to control for inter-study and intra-study variance in the observed treatment effect of each study **i**.

Various approaches to calculating s_i^2 and τ^2 which are sufficiently outlined by many prior studies, including the work of DerSimonian and Kacker (2007); however, for the purposes of this study, the two-step DerSimonian and Laird was adopted to calculate s_i^2, τ^2, and ***X***.

<u>Center for Evidence Based Medicine (CEBM) Approach—Estimated Number needed to be Treated Function Calculation</u>

In cases where the use of the random effects model is not appropriate, such as the case when the number of qualified studies is small or when the relationship between the supplement intervention's effect and the utilization of costly treatment services is indirect, a much simpler, though less accurate, estimation function that determines the number needed to be treated was used. In these cases, all that is needed for the function is an average relative risk reduction or the odds ratio and the current disease incidence rate (Center for Evidence Based Medicine, 2012).

As stated, the number needed to treat (NNT) is the total number of people that would have to undergo a treatment intervention to realize one avoided undesired event. For example, if it was found that a given dietary supplement had a NNT of 100, this would mean that 100 people would have to be treated in order to avoid one undesired event from occurring in the same population. In order to calculate an estimate of the NNT from just knowing the current incidence rate and the expected odds ratio and/or relative risk reduction metric, the following function should be calculated:

- $NNT = (1-(ER*(1-RRR))) / ((1-ER)*(ER)*(1-RRR))$

Where ER is the event or disease event incident rate among the high-risk population and the RRR is the estimated relative risk reduction and/or the odds ratio.

List of Common Variables and Equations Health Economics Research

- Total sample size per study = **N**
- Number of events occurring in the treatment group per study = **EE**
- Number of events occurring in the control group per study = **CE**
- Observed event rate (observed disease prevalence in the target population) = **ER**
- Treatment group event rate—**TER = EE / N**
- Control group event rate—**CER = CE / N**
- Relative risk—**RR = TER/CER**
- Absolute risk reduction—**ARR = CER – TER**
- Relative risk reduction—**RRR = ARR/CER**
- Number needed to treat—**NNT = 1/ARR = CER/RRR**
- Number needed to treat using the CEBM approach (only requires the use of the observed event rate and the deduced relative risk reduction) = **(1-(ER*(1-RRR))) / ((1-ER)*(ER)*(1-RRR))**

List of Abbreviations

AMD	Age-related macular degeneration
AOA	American Optometric Association
ARED	Age-related eye disease
B	billion
B12	Vitamin B - cyanocobalamin
B6	Vitamin B - pyridoxine
B9	Vitamin B - folate
BMD	Bone mineral density
CBA	Cost-benefit analysis
CDC	Center of Disease Control and Prevention
CHD	Coronary heart disease
CI	Confidence interval
CTT	Cholesterol Treatment Trialists
DHA	Docosahexaenoic acid
DPA	Dual photon absorptiometry
DSHEA	Dietary Supplement Health and Education Act
DXA	Dual energy X-ray absorptiometry
EPA	Eicosapentaenoic acid
ER	Event or disease event incident rate among the high-risk population
FNB	Food and Nutrition Board
FRAX	Fracture Risk Assessment Tool
g	gram
HbA1c	Glycated hemoglobin
IOM	The Institute of Medicine
IU	International unit
LDL	Low-density lipoprotein
M	million
mcg	microgram
MEPS	Medical Expenditure Panel Survey
mg	milligram
mg/dL	milligrams per deciliter
MI	Myocardial infarction
mmol/L	millimoles per liter
NAS	National Academy of Sciences
NCEP	National Cholesterol Education Program
NNT	Number needed to treat
OR	Odds ratio
PUFA	Polyunsaturated fatty acids
RCT	Randomized controlled trials
RRR	Relative risk reduction
UL	Tolerable Upper Intake Level

Detailed Figures

Omega-3 and CHD Analysis

Figure 8.1—Omega-3 and Coronary Heart Disease Cost Analysis for All U.S. Adults over the Age of 55, 2013–2020

Year	Number of adults over the age of 55 with CHD (people)	Expected number of adults over the age of 55 with CHD who will experience a new CHD-related hospitalization event (people)	Mean CHD expenditure per person experiencing a CHD event ($)	Total CHD event expenditure among all U.S. adults over the age of 55* ($)	Total CHD event expenditure among all U.S. adults over the age of 55 given omega-3 intervention at preventive daily intake levels* ($)	Change in CHD expenditure among all U.S. adults over the age of 55 given omega-3 intervention at preventive daily intake levels (avoided costs = benefits)* ($)
2013	17,256,590	4,899,840	$13,982.49	$68,511,963,964	$66,702,608,126	**$1,809,355,838**
2014	17,515,439	4,973,338	$14,681.61	$70,889,927,762	$69,017,771,467	**$1,872,156,295**
2015	17,789,118	5,051,046	$15,415.69	$73,395,594,202	$71,457,264,906	**$1,938,329,296**
2016	18,089,309	5,136,283	$16,186.48	$76,083,351,550	$74,074,040,353	**$2,009,311,197**
2017	18,405,872	5,226,168	$16,995.80	$78,918,010,400	$76,833,837,731	**$2,084,172,669**
2018	18,739,479	5,320,892	$17,845.59	$81,908,562,433	$79,745,411,254	**$2,163,151,179**
2019	19,102,556	5,423,984	$18,737.87	$85,116,813,467	$82,868,934,492	**$2,247,878,975**
2020	19,484,607	5,532,464	$19,674.77	$88,504,958,469	$86,167,600,816	**$2,337,357,653**
Cumulative, 2013–2020	--	--	--	$623,329,182,248	$606,867,469,145	**$16,461,713,103**
Average, 2013–2020	**18,297,871**	**5,195,502**	**$16,690**	**$77,916,147,781**	**$75,858,433,643**	**$2,057,714,138**

* Discounted at a 3% rate to show present value

Source: Summary Health Statistics for U.S. Adults: National Health Interview Survey 2011, Centers for Disease Control and Prevention and Frost & Sullivan

Figure 8.2—Omega-3 and Coronary Heart Disease, Number of Avoided CHD Events Given Use of Omega-3 for All U.S. Adults over the Age of 55, 2013–2020

Year	Number of avoided events (events)
2013	129,402
2014	131,343
2015	133,395
2016	135,646
2017	138,020
2018	140,521
2019	143,244
2020	146,109
Cumulative, 2013–2020	**1,097,678**
Average, 2013–2020	**137,210**

Source: Summary Health Statistics for U.S. Adults: National Health Interview Survey 2011, Centers for Disease Control and Prevention and Frost & Sullivan

Figure 8.3—Omega-3 Retail Prices of Best-selling Brands, 2013

Best-selling brands	Number of caps per daily intake (1000 mg of EPA + DHA)	Price per daily dose ($)	Annual cost of supplement utilization per person ($)
GNC Triple Strength Fish Oil 1500	1	$0.38	$139.95
Now Foods, Omega-3, Cardiovascular Support, 200 Softgel	2	$0.08	$30.24
Natural Factors, RxOmega-3 Factors, EPA 400 mg/DHA 200 mg, 240 Softgels	2	$0.25	$91.22
Madre Labs, Omega-3 Premium Fish Oil, 180 mg EPA/120 mg DHA, 100 Softgels	2	$0.10	$36.16
Carlson Labs, Super Omega·3 Gems, Fish Oil Concentrate, 1000 mg, 100 Soft Gels + 30 Free Soft Gels	2	$0.27	$100.30
Nordic Naturals, Ultimate Omega, Lemon Flavor, 1000 mg, 180 Soft Gels	2	$0.66	$241.31
Puritan's Pride - Double Strength Omega-3 Fish Oil 1200mg	2	$0.17	$60.83
Vitamin Shoppe - Omega 3 Fish Oil 600 EPA / 240 DHA	1	$0.09	$33.47
Carlson Laboratories - Super Omega-3 Fish Oil	3	$0.12	$43.79
Carlson Laboratories - The Very Finest Fish Oil Lemon Flavor	2	$0.47	$170.33
Nordic Naturals - Ultimate Omega	1	$0.17	$60.81
the Vitamin Shoppe - Omega 3 Fish Oil 300 EPA / 200 DHA	2	$0.36	$130.39
Barlean's Organic Oils - Fish Oil	1	$0.34	$124.15
Country Life - Omega-3 Fish Body Oils	1	$0.33	$120.65
Twinlab - Mega Twin EPA	2	$0.32	$116.81
Vitacost Mega EFA® Omega-3 EPA & DHA Fish Oil -- 2,126 mg per serving - 240 Softgels	2	$0.17	$62.79
Omega-3 Fish Oil 1000 mg., 250 Softgels	3	$0.22	$82.13
Triple Strength Omega-3 Fish Oil 1360 mg, 180 Softgels	1	$0.26	$94.30
Nature Made Ultra Omega-3 Mini Fish Oil 500 mg Liquid Softgels	3	$0.25	$93.08
Windmill Natural Omega 3 EPA+DHA Fish Oil Concentrate 1000mg Dietary Supplement Softgels	1	$0.16	$59.84
GNC Triple Strength Fish Oil 1500	1	$0.38	$139.95
	Median Price	$0.25	$92.15

Note: All figures are rounded. Source: Frost & Sullivan

Figure 8.4—Omega-3 and Coronary Heart Disease Cost Analysis for All U.S. Adults over the Age of 55, 2013–2020

Year	Change in CHD expenditure among all U.S. adults over the age of 55 given omega-3 intervention at preventive daily intake levels (avoided costs = benefits)* ($)	Expected per person cost of omega-3 at preventive annual intake levels ($)	Expected cost of dietary supplementation of among all U.S. adults over the age of 55 with CHD at preventive daily intake levels* (supplement utilization costs) ($)	Net cost savings derived from avoided CHD events given required omega-3 dietary supplement expenditures among all U.S. adults over the age of 55, 2013–2020 ($)
2013	$1,809,355,838	$92.15	$1,590,186,704	**$219,169,133**
2014	$1,872,156,295	$93.07	$1,582,698,932	**$289,457,364**
2015	$1,938,329,296	$94.00	$1,576,216,397	**$362,112,899**
2016	$2,009,311,197	$94.94	$1,571,692,426	**$437,618,771**
2017	$2,084,172,669	$95.89	$1,568,144,674	**$516,027,996**
2018	$2,163,151,179	$96.85	$1,565,565,989	**$597,585,190**
2019	$2,247,878,975	$97.82	$1,564,910,503	**$682,968,472**
2020	$2,337,357,653	$98.80	$1,565,214,370	**$772,143,283**
Cumulative, 2013–2020	$16,461,713,103	--	$12,584,629,995	**$3,877,083,108**
Average, 2013–2020	$2,057,714,138	--	$1,573,078,749	**$484,635,389**

* Discounted at a 3% rate to show present value

Source: Summary Health Statistics for U.S. Adults: National Health Interview Survey 2011—Centers for Disease Control and Prevention, Center for Financing, Access and Cost Trends—Agency for Healthcare Research and Quality; Medical Expenditure Panel Survey, 2010 and Frost & Sullivan

B vitamins and CHD Analysis

Figure 8.5—B Vitamins and Coronary Heart Disease Cost Analysis for All U.S. Adults over the Age of 55, 2013–2020

Year	Number of adults over the age of 55 with CHD (people)	Expected number of adults over the age of 55 with CHD who will experience a new CHD-related hospitalization event (people)	Mean CHD expenditure per person experiencing a CHD event ($)	Total CHD event expenditure among all U.S. adults over the age of 55* ($)	Total CHD event expenditure among all U.S. adults over the age of 55 given B vitamin intervention at preventive daily intake levels* ($)	Change in CHD event expenditure among all U.S. adults over the age of 55 given B vitamin intervention at preventive daily intake levels (avoided costs = benefits)* ($)
2013	17,256,590	4,899,840	$13,982.49	$68,511,963,964	$67,179,727,997	**$1,332,235,968**
2014	17,515,439	4,973,338	$14,681.61	$70,889,927,762	$69,511,451,565	**$1,378,476,197**
2015	17,789,118	5,051,046	$15,415.69	$73,395,594,202	$71,968,394,559	**$1,427,199,643**
2016	18,089,309	5,136,283	$16,186.48	$76,083,351,550	$74,603,887,649	**$1,479,463,901**
2017	18,405,872	5,226,168	$16,995.80	$78,918,010,400	$77,383,425,696	**$1,534,584,704**
2018	18,739,479	5,320,892	$17,845.59	$81,908,562,433	$80,315,825,535	**$1,592,736,898**
2019	19,102,556	5,423,984	$18,737.87	$85,116,813,467	$83,461,691,153	**$1,655,122,315**
2020	19,484,607	5,532,464	$19,674.77	$88,504,958,469	$86,783,952,645	**$1,721,005,824**
Cumulative, 2013–2020	--	--	--	$623,329,182,248	$611,208,356,798	**$12,120,825,450**
Average, 2013–2020	18,297,871	5,195,502	$16,690	$77,916,147,781	$76,401,044,600	**$1,515,103,181**

* Discounted at a 3% rate to show present value

Source: Summary Health Statistics for U.S. Adults: National Health Interview Survey 2011, Centers for Disease Control and Prevention and Frost & Sullivan

Figure 8.6—B Vitamins and Coronary Heart Disease, Number of Avoided CHD Events Given Use of B Vitamins for All U.S. Adults over the Age of 55, 2013–2020

Year	Number of avoided events (events)
2013	95,279
2014	96,708
2015	98,219
2016	99,877
2017	101,624
2018	103,466
2019	105,471
2020	107,580
Cumulative, 2013–2020	**808,225**
Average, 2013–2020	**101,028**

Source: Summary Health Statistics for U.S. Adults: National Health Interview Survey 2011, Centers for Disease Control and Prevention and Frost & Sullivan

Figure 8.7—B Vitamins Retail Prices of Best-selling Brands, 2013

Best-selling brand	Price per daily dose ($)	Annual cost of supplement utilization per person ($)
Source Naturals, Homocysteine Defense, 120 Tablets	$0.17	$61.30
Nutricology, Homocysteine, 90 Veggie Caps	$0.14	$50.45
Superior Source - Vitamin B12 1,000 mcg with Vitamin B6 2 mg & Folic Acid 400 mcg Microlingual	$0.17	$60.81
Carlson Laboratories - Tri-B	$0.07	$24.32
The Vitamin Shoppe - Homocysteine Blocker	$0.07	$26.46
Solgar - Homocysteine Modulators	$0.16	$58.32
Country Life - Homocysteine Shield	$0.22	$79.08
KAL - B6 B12 Folic Acid Lozenge Berry	$0.12	$44.38
Source Naturals - Homocysteine Defense	$0.13	$46.54
Source Naturals Homocysteine Defense™	$0.33	$119.32
Mason Natural Folic Acid B6 & B12 Tablets	$0.04	$15.38
Median price	$0.14	$50.45

Note: All figures are rounded. Source: Frost & Sullivan

Figure 8.8—B Vitamins and Coronary Heart Disease Cost Analysis for All U.S. Adults over the Age of 55, 2013–2020

Year	Change in CHD event expenditure among all U.S. adults over the age of 55 given B vitamin intervention at preventive daily intake levels (avoided costs = benefits)* ($)	Expected per person cost of B vitamin at preventive annual intake levels ($)	Expected cost of B vitamin supplementation of people with CHD at preventive daily intake levels among all U.S. adults over the age of 55* (supplement utilization costs) ($)	Net cost savings derived from avoided CHD events given required B vitamin supplement expenditures among all U.S. adults over the age of 55, 2013–2020 ($)
2013	$1,332,235,968	$50.45	$870,510,134	**$461,725,834**
2014	$1,378,476,197	$46.98	$866,411,130	**$512,065,067**
2015	$1,427,199,643	$47.45	$862,862,419	**$564,337,223**
2016	$1,479,463,901	$47.93	$860,385,879	**$619,078,023**
2017	$1,534,584,704	$48.40	$858,443,745	**$676,140,959**
2018	$1,592,736,898	$48.89	$857,032,106	**$735,704,792**
2019	$1,655,122,315	$49.38	$856,673,275	**$798,449,039**
2020	$1,721,005,824	$49.87	$856,839,620	**$864,166,205**
Cumulative, 2013–2020	$12,120,825,450	--	$6,889,158,308	**$5,231,667,142**
Average, 2013–2020	$1,515,103,181	--	$861,144,789	**$653,958,393**

* Discounted at a 3% rate to show present value

Source: Summary Health Statistics for U.S. Adults: National Health Interview Survey 2011—Centers for Disease Control and Prevention, Center for Financing, Access and Cost Trends—Agency for Healthcare Research and Quality; Medical Expenditure Panel Survey, 2010 and Frost & Sullivan

Phytosterols and CHD Analysis

Figure 8.9—Phytosterols and Coronary Heart Disease Cost Analysis for All U.S. Adults over the Age of 55, 2013–2020

Year	Number of adults over the age of 55 with CHD (people)	Expected number of adults over the age of 55 with CHD who will experience a new CHD-related hospitalization event (people)	Mean CHD expenditure per person experiencing a CHD event ($)	Total CHD event expenditure among all U.S. adults over the age of 55* ($)	Total CHD event expenditure among all U.S. adults over the age of 55 given phytosterol intervention at preventive daily intake levels* ($)	Change in CHD event expenditure among all U.S. adults over the age of 55 given phytosterol intervention at preventive daily intake levels (avoided costs = benefits)* ($)
2013	17,256,590	4,899,840	$13,982.49	$68,511,963,964	$64,774,976,543	**$3,736,987,421**
2014	17,515,439	4,973,338	$14,681.61	$70,889,927,762	$67,023,234,224	**$3,866,693,538**
2015	17,789,118	5,051,046	$15,415.69	$73,395,594,202	$69,392,229,002	**$4,003,365,200**
2016	18,089,309	5,136,283	$16,186.48	$76,083,351,550	$71,933,382,534	**$4,149,969,016**
2017	18,405,872	5,226,168	$16,995.80	$78,918,010,400	$74,613,424,820	**$4,304,585,580**
2018	18,739,479	5,320,892	$17,845.59	$81,908,562,433	$77,440,857,089	**$4,467,705,343**
2019	19,102,556	5,423,984	$18,737.87	$85,116,813,467	$80,474,113,961	**$4,642,699,506**
2020	19,484,607	5,532,464	$19,674.77	$88,504,958,469	$83,677,452,478	**$4,827,505,991**
Cumulative, 2013–2020	--	--	--	$623,329,182,248	$589,329,670,652	**$33,999,511,596**
Average, 2013–2020	18,297,871	5,195,502	$16,690	$77,916,147,781	$73,666,208,832	**$4,249,938,949**

* Discounted at a 3% rate to show present value

Source: Summary Health Statistics for U.S. Adults: National Health Interview Survey 2011, Centers for Disease Control and Prevention and Frost & Sullivan

Figure 8.10—Phytosterols and Coronary Heart Disease, Number of Avoided CHD Events Given Use of Phytosterols for All U.S. Adults over the Age of 55, 2013–2020

Year	Number of avoided events (events)
2013	267,262
2014	271,271
2015	275,509
2016	280,159
2017	285,061
2018	290,228
2019	295,851
2020	301,768
Cumulative, 2013–2020	**2,267,111**
Average, 2013–2020	**283,389**

Source: Summary Health Statistics for U.S. Adults: National Health Interview Survey 2011, Centers for Disease Control and Prevention and Frost & Sullivan

Figure 8.11—Phytosterol Retail Prices of Best-selling Brands, 2013

Best-selling brand		Price per daily dose ($)	Annual cost of supplement utilization per person ($)
Source Naturals Mega Strength Beta Sitosterol		$0.20	$74.6
Source Naturals, Phytosterol Complex, with Beta-Sitosterol, 113 mg, 180 Tablets		$0.15	$54.5
Phytosterol Complex 1000 mg (Per Serving)		$0.14	$51.1
Phytosterol Complex (650 MG) (60 Tablets , $0.20/serving)		$0.20	$73.0
Vitacost Phytosterol Complex with Beta-sitosterol -- 240 Tablets		$0.08	$28.4
Phytosterol Complex 1000mg w/ Beta Sitosterol, 100 Softgels		$0.12	$43.8
Nature Made CholestOff Complete Dietary Supplement Softgels		$0.70	$255.6
	Median Price	$0.15	$54.48

Note: All figures are rounded. Source: Frost & Sullivan

Figure 8.12—Phytosterols and Coronary Heart Disease Cost Analysis for All U.S. Adults over the Age of 55, 2013–2020

Year	Change in CHD event expenditure among all U.S. adults over the age of 55 given phytosterol intervention at preventive daily intake levels (avoided costs = benefits)* ($)	Expected per person cost of phytosterol at preventive annual intake levels ($)	Expected cost of phytosterol supplementation of people with CHD at preventive daily intake levels among all U.S. adults over the age of 55* (supplement utilization costs) ($)	Net cost savings derived from avoided CHD events given required phytosterol supplement expenditures among all U.S. adults over the age of 55, 2013–2020 ($)
2013	$3,736,987,421	$54.48	$882,156,894	**$2,796,794,456**
2014	$3,866,693,538	$51.63	$877,982,643	**$2,930,927,695**
2015	$4,003,365,200	$52.15	$874,448,578	**$3,071,432,136**
2016	$4,149,969,016	$52.67	$871,913,952	**$3,220,710,736**
2017	$4,304,585,580	$53.20	$869,999,763	**$3,377,424,898**
2018	$4,467,705,343	$53.73	$868,536,790	**$3,542,069,300**
2019	$4,642,699,506	$54.27	$868,216,338	**$3,717,451,017**
2020	$4,827,505,991	$54.81	$868,342,148	**$3,902,077,842**
Cumulative, 2013–2020	$33,999,511,596	--	$6,981,597,105	**$26,558,888,081**
Average, 2013–2020	$4,249,938,949	--	$872,699,638	**$3,319,861,010**

* Discounted at a 3% rate to show present value

Source: Summary Health Statistics for U.S. Adults: National Health Interview Survey 2011—Centers for Disease Control and Prevention, Center for Financing, Access and Cost Trends—Agency for Healthcare Research and Quality; Medical Expenditure Panel Survey, 2010 and Frost & Sullivan

Psyllium Dietary Fiber and CHD Analysis

Figure 8.13—Psyllium Dietary Fiber and Coronary Heart Disease Cost Analysis for All U.S. Adults over the Age of 55, 2013–2020

Year	Number of adults over the age of 55 with CHD (people)	Expected number of adults over the age of 55 with CHD who will experience a new CHD-related hospitalization event (people)	Mean CHD expenditure per person experiencing a CHD event ($)	Total CHD event expenditure among all U.S. adults over the age of 55* ($)	Total CHD event expenditure among all U.S. adults over the age of 55 given psyllium dietary fiber intervention at preventive daily intake levels* ($)	Change in CHD event expenditure among all U.S. adults over the age of 55 given psyllium dietary fiber intervention at preventive daily intake levels (avoided costs = benefits)* ($)
2013	17,256,590	4,899,840	$13,982.49	$68,511,963,964	$64,659,250,924	**$3,852,713,041**
2014	17,515,439	4,973,338	$14,681.61	$70,889,927,762	$66,903,491,914	**$3,986,435,848**
2015	17,789,118	5,051,046	$15,415.69	$73,395,594,202	$69,268,254,295	**$4,127,339,906**
2016	18,089,309	5,136,283	$16,186.48	$76,083,351,550	$71,804,867,855	**$4,278,483,695**
2017	18,405,872	5,226,168	$16,995.80	$78,918,010,400	$74,480,122,034	**$4,437,888,366**
2018	18,739,479	5,320,892	$17,845.59	$81,908,562,433	$77,302,502,872	**$4,606,059,561**
2019	19,102,556	5,423,984	$18,737.87	$85,116,813,467	$80,330,340,591	**$4,786,472,877**
2020	19,484,607	5,532,464	$19,674.77	$88,504,958,469	$83,527,956,090	**$4,977,002,379**
Cumulative, 2013–2020	--	--	--	$623,329,182,248	$588,276,786,575	**$35,052,395,672**
Average, 2013–2020	18,297,871	5,195,502	$16,690	$77,916,147,781	$73,534,598,322	**$4,381,549,459**

* Discounted at a 3% rate to show present value

Source: Summary Health Statistics for U.S. Adults: National Health Interview Survey 2011, Centers for Disease Control and Prevention and Frost & Sullivan

Figure 8.14—Psyllium Dietary Fiber and Coronary Heart Disease, Number of Avoided CHD Events Given Use of Dietary fibers for All U.S. Adults over the Age of 55, 2013–2020

Year	Number of avoided events (events)
2013	275,538
2014	279,671
2015	284,041
2016	288,835
2017	293,889
2018	299,216
2019	305,013
2020	311,113
Cumulative, 2013–2020	**2,337,318**
Average, 2013–2020	**292,165**

Source: Summary Health Statistics for U.S. Adults: National Health Interview Survey 2011, Centers for Disease Control and Prevention and Frost & Sullivan

Figure 8.15—Psyllium Dietary Fiber Retail Prices of Best-selling Brands, 2013

Best-selling brand		Price per daily dose ($) (at 10 grams per day)	Annual cost of supplement utilization per person ($)
Health Plus Inc. THE ORIGINAL Colon Cleanse®		$0.19	$68.41
Psyllium Husk Seed 100% Natural		$0.44	$159.66
Organic India USA - Psyllium Organic Whole Husk		$0.36	$133.05
Yerba Prima Psyllium Husks Powder -- 12 oz		$0.21	$78.07
100% Natural Psyllium Husk Seed, 8 oz. Powder		$0.15	$53.19
Metamucil Fiber Supplement Smooth Texture, Orange, 114 doses		$0.47	$171.67
Now Foods, Psyllium Husk Fiber, Orange-Flavored, 12 oz (340 g)		$0.33	$119.53
Source Naturals Psyllium Husk Powder -- 12 oz		$0.18	$64.19
Psyllium Whole Husk		$0.33	$119.71
Equate Fiber Original Texture (NBE) to Metamucil Fiber Powder		$0.28	$103.08
	Median price	$0.30	$111.31

Note: All figures are rounded. Source: Frost & Sullivan

Figure 8.16—Psyllium Dietary Fiber and Coronary Heart Disease Cost Analysis for All U.S. Adults over the Age of 55, 2013–2020

Year	Change in CHD event expenditure among all U.S. adults over the age of 55 given psyllium dietary fiber intervention at preventive daily intake levels (avoided costs = benefits)* ($)	Expected per person cost of psyllium dietary fiber at preventive annual intake levels ($)	Expected cost of psyllium dietary fiber supplementation of people with CHD at preventive daily intake levels among all U.S. adults over the age of 55* (supplement utilization costs) ($)	Net cost savings derived from avoided CHD events given required psyllium dietary fiber supplement expenditures among all U.S. adults over the age of 55, 2013–2020 ($)
2013	$3,852,713,041	$111.31	$1,920,822,260	$1,931,890,781
2014	$3,986,435,848	$112.42	$1,911,777,611	$2,074,658,236
2015	$4,127,339,906	$113.55	$1,903,947,212	$2,223,392,695
2016	$4,278,483,695	$114.68	$1,898,482,606	$2,380,001,089
2017	$4,437,888,366	$115.83	$1,894,197,196	$2,543,691,170
2018	$4,606,059,561	$116.99	$1,891,082,345	$2,714,977,216
2019	$4,786,472,877	$118.16	$1,890,290,569	$2,896,182,308
2020	$4,977,002,379	$119.34	$1,890,657,616	$3,086,344,764
Cumulative, 2013–2020	$35,052,395,672	--	$15,201,257,415	$19,851,138,258
Average, 2013–2020	$4,381,549,459	--	$1,900,157,177	$2,481,392,282

* Discounted at a 3% rate to show present value

Source: Summary Health Statistics for U.S. Adults: National Health Interview Survey 2011—Centers for Disease Control and Prevention, Center for Financing, Access and Cost Trends—Agency for Healthcare Research and Quality; Medical Expenditure Panel Survey, 2010 and Frost & Sullivan

Chromium Picolinate and Diabetes Analysis

Figure 8.17—Chromium Picolinate and Diabetes Cost Analysis for All Diabetic Adults over the Age of 55 Diagnosed with CHD, 2013–2020

Year	Number of diabetic adults over the age of 55 diagnosed with CHD (people)	Expected number of diabetic people with CHD who will experience a new CHD-related hospitalization event (people)	Mean CHD expenditure per person experiencing a CHD event ($)	Total CHD event expenditure among all diabetics over the age of 55* ($)	Total CHD event expenditure among all diabetics over the age of 55 given chromium picolinate intervention at preventive daily intake levels* ($)	Change in CHD event expenditure among all diabetics over the age of 55 given chromium picolinate intervention at preventive daily intake levels (avoided costs = benefits)* ($)
2013	7,254,786	2,059,926	$13,982.49	$28,802,888,195	$27,731,554,231	$1,071,333,964
2014	7,363,608	2,090,825	$14,681.61	$29,802,600,091	$28,694,081,478	$1,108,518,614
2015	7,478,664	2,123,494	$15,415.69	$30,855,999,033	$29,708,298,860	$1,147,700,173
2016	7,604,867	2,159,328	$16,186.48	$31,985,950,211	$30,796,221,091	$1,189,729,120
2017	7,737,952	2,197,116	$16,995.80	$33,177,659,764	$31,943,604,571	$1,234,055,193
2018	7,878,202	2,236,939	$17,845.59	$34,434,907,854	$33,154,088,858	$1,280,818,995
2019	8,030,842	2,280,279	$18,737.87	$35,783,678,061	$34,452,691,064	$1,330,986,997
2020	8,191,459	2,325,885	$19,674.77	$37,208,076,896	$35,824,108,864	$1,383,968,033
Cumulative, 2013–2020	--	--	--	$262,051,760,105	$252,304,649,017	$9,747,111,087
Average, 2013–2020	7,692,548	2,184,224	$16,690.00	$32,756,470,013	$31,538,081,127	$1,218,388,886

* Discounted at a 3% rate to show present value

Source: Summary Health Statistics for U.S. Adults: National Health Interview Survey 2011, Centers for Disease Control and Prevention and Frost & Sullivan

Figure 8.18—Chromium Picolinate and Diabetes, Number of Avoided Diabetes Events Given Use of Chromium Picolinate for All Diabetic Adults over the Age of 55 Diagnosed with CHD, 2013–2020

Year	Number of avoided events (events)
2013	76,620
2014	77,769
2015	78,984
2016	80,317
2017	81,723
2018	83,204
2019	84,816
2020	86,512
Cumulative, 2013–2020	649,944
Average, 2013–2020	81,243

Source: Summary Health Statistics for U.S. Adults: National Health Interview Survey 2011, Centers for Disease Control and Prevention and Frost & Sullivan

Figure 8.19—Chromium Picolinate Retail Prices of Best-selling Brands, 2013

Best-selling brand		Price per daily dose ($)	Annual cost of supplement utilization per person ($)
GNC Chromium Picolinate 200		$0.11	$40.5
Metagenics, Chromium Picolinate, 60 Tablets		$0.18	$65.4
Chromium Picolinate 500 mcg Yeast Free		$0.03	$10.9
Solgar - Chromium Picolinate		$0.09	$32.8
Vitacost Chromium Picolinate -- 500 mcg - 300 Capsules		$0.03	$12.2
Chromium Picolinate 500 mcg. Tablets, 250 Tablets		$0.08	$30.7
Nature's Bounty Ultra Chromium Picolinate 500 mcg Dietary Supplement Tablets		$0.10	$36.5
Finest Nutrition Chromium Picolinate 400 mcg Dietary Supplement Tablets		$0.10	$36.5
	Median Price	$0.09	$31.75

Note: All figures are rounded. Source: Frost & Sullivan

Figure 8.20–Chromium Picolinate and Diabetes Cost Analysis for All Diabetic Adults over the Age of 55 Diagnosed with CHD, 2013–2020

Year	Change in CHD event expenditure among all diabetics over the age of 55 given chromium picolinate intervention at preventive daily intake levels (avoided costs = benefits)* ($)	Expected per person cost of chromium picolinate at preventive annual intake levels ($)	Expected cost of chromium picolinate supplementation at preventive daily intake levels among diabetics over the age of 55* (supplement utilization costs) ($)	Net cost savings derived from avoided CHD events given required chromium picolinate supplement utilization among diabetics over the age of 55 ($)
2013	$1,071,333,964	$34.67	$251,489,108	**$819,844,856**
2014	$1,108,518,614	$35.01	$250,304,912	**$858,213,702**
2015	$1,147,700,173	$35.36	$249,279,694	**$898,420,478**
2016	$1,189,729,120	$35.72	$248,564,225	**$941,164,895**
2017	$1,234,055,193	$36.07	$248,003,146	**$986,052,047**
2018	$1,280,818,995	$36.43	$247,595,325	**$1,033,223,670**
2019	$1,330,986,997	$36.80	$247,491,660	**$1,083,495,337**
2020	$1,383,968,033	$37.17	$247,539,716	**$1,136,428,316**
Cumulative, 2013–2020	$9,747,111,087	--	$1,990,267,786	**$7,756,843,301**
Average, 2013–2020	$1,218,388,886	--	$248,783,473	**$969,605,413**

* Discounted at a 3% rate to show present value

Source: Summary Health Statistics for U.S. Adults: National Health Interview Survey 2011—Centers for Disease Control and Prevention, Center for Financing, Access and Cost Trends—Agency for Healthcare Research and Quality; Medical Expenditure Panel Survey, 2010 and Frost & Sullivan

<u>Lutein and Zeaxanthin and ARED Analysis</u>

Figure 8.21—Lutein and Zeaxanthin and Age-related Eye Disease Cost Analysis for All U.S. Adults over the Age of 55, 2013–2020

Year	Number of people with age-related macular degeneration (people)	Expected number of people with age-related macular degeneration that will experience a new event (people)	Number of people with cataracts (people)	Expected number of people with cataracts that will experience a new cataracts-related event (people)	Mean age-related eye disease expenditure per person ($)
2013	2,155,514	1,077,757	25,391,784	3,790,874	$3,712
2014	2,187,846	1,093,923	25,772,660	3,847,737	$3,898
2015	2,222,031	1,111,016	26,175,358	3,907,858	$4,093
2016	2,259,528	1,129,764	26,617,067	3,973,803	$4,297
2017	2,299,070	1,149,535	27,082,866	4,043,345	$4,512
2018	2,340,741	1,170,370	27,573,743	4,116,631	$4,738
2019	2,386,092	1,193,046	28,107,984	4,196,390	$4,975
2020	2,433,814	1,216,907	28,670,144	4,280,318	$5,223
Cumulative, 2013–2020	--	--	--	--	--
Average, 2013–2020	2,285,580	1,142,790	26,923,951	4,019,620	**$4,431**

* Discounted at a 3% rate to show present value

Source: Summary Health Statistics for U.S. Adults: National Health Interview Survey 2011, Centers for Disease Control and Prevention and Frost & Sullivan

Figure 8.22—Lutein and Zeaxanthin and Age-related Eye Disease Cost Analysis for All U.S. Adults over the Age of 55, 2013–2020 (continued)

Year	Total age-related macular degeneration event expenditure among all U.S. adults over the age of 55* ($)	Total age-related macular degeneration event expenditure given lutein and zeaxanthin supplement intervention at preventive daily intake levels among all U.S. adults over the age of 55* ($)	Change in age-related macular degeneration event expenditure given lutein and zeaxanthin supplement intervention at preventive daily intake levels among all U.S. adults over the age of 55 (avoided costs = benefits)* ($)	Total cataracts event expenditure among all U.S. adults over the age of 55* ($)	Total cataract event expenditure given lutein and zeaxanthin supplement intervention at preventive daily intake levels among all U.S. adults over the age of 55* ($)	Change in cataract event expenditure given lutein and zeaxanthin supplement intervention at preventive daily intake levels among all U.S. adults over the age of 55 (avoided costs = benefits)* ($)
2013	$4,000,760,135	$3,950,326,584	**$50,433,551**	$14,072,171,747	$10,720,724,847	**$3,351,446,900**
2014	$4,139,621,469	$4,087,437,434	**$52,184,036**	$14,560,599,068	$11,092,827,675	**$3,467,771,392**
2015	$4,285,940,007	$4,231,911,481	**$54,028,526**	$15,075,256,165	$11,484,913,362	**$3,590,342,802**
2016	$4,442,891,755	$4,386,884,696	**$56,007,058**	$15,627,314,241	$11,905,492,562	**$3,721,821,679**
2017	$4,608,421,824	$4,550,328,094	**$58,093,729**	$16,209,545,487	$12,349,058,851	**$3,860,486,637**
2018	$4,783,055,284	$4,722,760,127	**$60,295,157**	$16,823,796,771	$12,817,019,242	**$4,006,777,529**
2019	$4,970,401,290	$4,907,744,451	**$62,656,839**	$17,482,762,840	$13,319,045,087	**$4,163,717,753**
2020	$5,168,252,216	$5,103,101,269	**$65,150,947**	$18,178,678,643	$13,849,220,668	**$4,329,457,974**
Cumulative, 2013–2020	$36,399,343,979	$35,940,494,136	**$458,849,843**	$128,030,124,962	$97,538,302,295	**$30,491,822,667**
Average, 2013–2020	$4,549,917,997	$4,492,561,767	**$57,356,230**	$16,003,765,620	$12,192,287,787	**$3,811,477,833**

* Discounted at a 3% rate to show present value

Source: Summary Health Statistics for U.S. Adults: National Health Interview Survey 2011, Centers for Disease Control and Prevention and Frost & Sullivan

Figure 8.23—Lutein and Zeaxanthin and Age-related Eye Disease, Number of Avoided Age-related Eye Disease Events Given Use of Lutein and Zeaxanthin for All U.S. Adults over the Age of 55, 2013–2020

Year	Number of avoided age-related macular disease events	Number of avoided cataract events
2013	13,586	902,840
2014	13,790	916,382
2015	14,005	930,701
2016	14,242	946,406
2017	14,491	962,968
2018	14,754	980,422
2019	15,040	999,418
2020	15,340	1,019,406
Cumulative, 2013–2020	**115,248**	**7,658,543**
Average, 2013–2020	**14,406**	**957,318**

Source: Summary Health Statistics for U.S. Adults: National Health Interview Survey 2011, Centers for Disease Control and Prevention and Frost & Sullivan

Figure 8.24—Lutein and Zeaxanthin Retail Prices of Best-selling Brands, 2013

Best-selling brands		Price per daily dose ($)	Annual cost of supplement utilization per person ($)
Nature Made Lutein 20 mg Dietary Supplement Liquid Softgels		$0.57	$206.85
Source Naturals® Zeaxanthin With Lutein		$0.38	$136.97
Jarrow Formulas, Lutein, 20 mg, 60 Softgels		$0.19	$71.04
Source Naturals, Lutein, 20 mg, 60 Capsules		$0.30	$110.79
Puritan's Pride Lutein 20 mg		$0.11	$38.78
Jarrow's Formula - Lutein + ZEAXANTHIN		$0.28	$102.21
	Median Price	$0.29	$106.50

Note: All figures are rounded. Source: Frost & Sullivan

Figure 8.25—Lutein and Zeaxanthin and Age-related Eye Disease Cost Analysis for All U.S. Adults over the Age of 55, 2013–2020

Year	Total change in ARED event expenditure given lutein and zeaxanthin supplement intervention at preventive daily intake levels among all U.S. adults over the age of 55 (avoided costs = benefits)* ($)	Expected per person cost of lutein and zeaxanthin at preventive annual intake levels ($)	Expected cost of lutein and zeaxanthin supplementation among people with age-related eye disease at preventive daily intake levels among all U.S. adults over the age of 55* (supplement utilization costs) ($)	Net total cost savings derived from avoided ARED events given required lutein and zeaxanthin supplement expenditures ($)
2013	$3,401,880,451	$106.50	$2,933,809,533	**$468,070,918**
2014	$3,519,955,428	$107.57	$2,919,994,993	**$599,960,435**
2015	$3,644,371,328	$108.64	$2,908,035,062	**$736,336,266**
2016	$3,777,828,737	$109.73	$2,899,688,578	$878,140,159
2017	$3,918,580,366	$110.83	$2,893,143,164	$1,025,437,202
2018	$4,067,072,686	$111.93	$2,888,385,629	$1,178,687,057
2019	$4,226,374,593	$113.05	$2,887,176,293	$1,339,198,300
2020	$4,394,608,921	$114.18	$2,887,736,910	$1,506,872,011
Cumulative, 2013–2020	$30,950,672,510	--	$23,217,970,163	$7,732,702,347
Average, 2013–2020	$3,868,834,064	--	$2,902,246,270	$966,587,794

* Discounted at a 3% rate to show present value

Source: Summary Health Statistics for U.S. Adults: National Health Interview Survey 2011—Centers for Disease Control and Prevention, Center for Financing, Access and Cost Trends—Agency for Healthcare Research and Quality; Medical Expenditure Panel Survey, 2010 and Frost & Sullivan

Calcium and Vitamin D and Osteoporosis Analysis

Figure 8.26—Calcium and Vitamin D and Osteoporosis Cost Analysis for All U.S. Women over the Age of 55, 2013–2020

Year	Number of women over the age of 55 with osteoporosis (people)	Expected number of women with osteoporosis that will experience a new osteoporosis-attributed fracture (people)	Mean osteoporosis expenditure per person experiencing a osteoporosis-attributed fracture ($)	Total expenditure on osteoporosis-attributed fracture treatment for all U.S. women over the age of 55* ($)	Total osteoporosis-attributed fracture expenditure given calcium and vitamin D supplement intervention at preventive daily intake levels among all U.S. women over the age of 55* ($)	Change in expenditure on osteoporosis-attributed fracture treatment for all U.S. women over the age of 55 given calcium and vitamin D supplement intervention at preventive daily intake levels (avoided costs = benefits)* ($)
2013	8,322,446	1,289,979	$11,571.62	$14,927,148,160	$13,278,693,236	$1,648,454,924
2014	8,447,283	1,309,329	$12,150.20	$15,445,250,633	$13,739,579,918	$1,705,670,714
2015	8,579,272	1,329,787	$12,757.71	$15,991,176,512	$14,225,217,376	$1,765,959,136
2016	8,724,047	1,352,227	$13,395.60	$16,576,775,725	$14,746,146,908	$1,830,628,817
2017	8,876,718	1,375,891	$14,065.38	$17,194,381,325	$15,295,548,255	$1,898,833,070
2018	9,037,608	1,400,829	$14,768.64	$17,845,952,389	$15,875,164,146	$1,970,788,243
2019	9,212,712	1,427,970	$15,507.08	$18,544,954,954	$16,496,973,519	$2,047,981,436
2020	9,396,966	1,456,530	$16,282.43	$19,283,152,190	$17,153,649,163	$2,129,503,027
Cumulative, 2013–2020	--	--	--	$135,808,791,888	$120,810,972,521	$14,997,819,367
Average, 2013–2020	8,824,632	1,367,818	$13,812.00	$16,976,098,986	$15,101,371,565	$1,874,727,421

* Discounted at a 3% rate to show present value

Source: Summary Health Statistics for U.S. Adults: National Health Interview Survey 2011, Centers for Disease Control and Prevention and Frost & Sullivan

Figure 8.27—Calcium and Vitamin D and Osteoporosis, Number of Avoided Osteoporosis Events Given Use of Calcium and Vitamin D for All U.S. Women over the Age of 55, 2013–2020

Year	Number of avoided osteoporosis-attributed fractures (events)
2013	142,457
2014	144,594
2015	146,853
2016	149,331
2017	151,944
2018	154,698
2019	157,696
2020	160,849
Cumulative, 2013–2020	1,208,422
Average, 2013–2020	151,053

Source: Summary Health Statistics for U.S. Adults: National Health Interview Survey 2011, Centers for Disease Control and Prevention and Frost & Sullivan

Figure 8.28—Calcium and Vitamin D Retail Prices of Best-selling Brands, 2013

Best-selling brand		Price per daily dose ($)	Annual cost of supplement utilization per person ($)
GNC Calcium 600 with Vitamin D-3		$0.06	$21.3
Twinlab, Calcium 1000 Tabs, with Vitamin D3, 120 Tablets		$0.12	$43.2
Puritan's Pride - Calcium 600 + Vitamin D3, 250 Servings		$0.07	$26.3
Puritan's Pride - Calcium 600 + Vitamin D3, 500 Servings		$0.07	$24.8
Calcium Citrate + Vitamin D		$0.28	$103.4
Schiff Super Calcium Magnesium With Vitamin D		$0.20	$72.9
Calcium 600 mg + Vitamin D3, 500 Caplet		$0.07	$24.1
Nature Made Calcium 600 mg with Vitamin D Dietary Supplement Liquid Softgels		$0.32	$116.8
Nature's Bounty Coral Calcium 1000 mg Plus Vitamin D & Magnesium Capsules		$0.23	$85.2
	Median Price	$0.16	$57.55

Note: All figures are rounded. Source: Frost & Sullivan

Figure 8.29—Calcium and Vitamin D and Osteoporosis Cost Analysis for All U.S. Women over the Age of 55, 2013–2020

Year	Change in expenditure on osteoporosis-attributed fracture treatment for all U.S. women over the age of 55 given calcium and vitamin D supplement intervention at preventive daily intake levels (avoided costs = benefits)* ($)	Expected per person cost of calcium and vitamin D at preventive annual intake levels ($)	Expected cost of calcium and vitamin D among people with osteoporosis at preventive daily intake levels among all U.S. women over the age of 55* (supplement utilization costs) ($)	Net cost savings derived from avoided osteoporosis-attributed fractures given required calcium and vitamin D dietary supplement expenditures among all U.S. women over the age of 55, 2013–2020
2013	$1,648,454,924	$43.22	$359,706,531	$1,288,748,393
2014	$1,705,670,714	$43.65	$358,012,768	$1,347,657,947
2015	$1,765,959,136	$44.09	$356,546,392	$1,409,412,744
2016	$1,830,628,817	$44.53	$355,523,052	$1,475,105,764
2017	$1,898,833,070	$44.98	$354,720,537	$1,544,112,533
2018	$1,970,788,243	$45.43	$354,137,228	$1,616,651,015
2019	$2,047,981,436	$45.88	$353,988,955	$1,693,992,481
2020	$2,129,503,027	$46.34	$354,057,690	$1,775,445,336
Cumulative, 2013–2020	$14,997,819,367	--	$2,846,693,154	$12,151,126,213
Average, 2013–2020	$1,874,727,421	--	$355,836,644	$1,518,890,777

* Discounted at a 3% rate to show present value

Source: Summary Health Statistics for U.S. Adults: National Health Interview Survey 2011—Centers for Disease Control and Prevention, Center for Financing, Access and Cost Trends—Agency for Healthcare Research and Quality; Medical Expenditure Panel Survey, 2010 and Frost & Sullivan

<u>Magnesium and Osteoporosis Analysis</u>

Figure 8.30—Magnesium and Osteoporosis Cost Analysis for All U.S. Women over the Age of 55, 2013–2020

Year	Number of women over the age of 55 with osteoporosis (people)	Expected number of women with osteoporosis that will experience a new osteoporosis-attributed fracture (people)	Mean osteoporosis expenditure per person experiencing a osteoporosis-attributed fracture ($)	Total expenditure on osteoporosis-attributed fracture treatment for all U.S. women over the age of 55* ($)	Total osteoporosis-attributed fracture expenditure given magnesium supplement intervention at preventive daily intake levels among all U.S. women over the age of 55* ($)	Change in expenditure on osteoporosis-attributed fracture treatment for all U.S. women over the age of 55 given magnesium supplement intervention at preventive daily intake levels (avoided costs = benefits)* ($)
2013	8,322,446	1,289,979	$11,571.62	$14,927,148,160	$14,179,212,251	$747,935,909
2014	8,447,283	1,309,329	$12,150.20	$15,445,250,633	$14,671,354,812	$773,895,820
2015	8,579,272	1,329,787	$12,757.71	$15,991,176,512	$15,189,926,668	$801,249,844
2016	8,724,047	1,352,227	$13,395.60	$16,576,775,725	$15,746,183,994	$830,591,730
2017	8,876,718	1,375,891	$14,065.38	$17,194,381,325	$16,332,844,005	$861,537,320
2018	9,037,608	1,400,829	$14,768.64	$17,845,952,389	$16,951,767,614	$894,184,775
2019	9,212,712	1,427,970	$15,507.08	$18,544,954,954	$17,615,746,133	$929,208,821
2020	9,396,966	1,456,530	$16,282.43	$19,283,152,190	$18,316,955,445	$966,196,745
Cumulative, 2013–2020	--	--	--	$135,808,791,888	$129,003,990,923	$6,804,800,966
Average, 2013–2020	8,824,632	1,367,818	$13,812.00	$16,976,098,986	$16,125,498,865	$850,600,121

* Discounted at a 3% rate to show present value

Source: Summary Health Statistics for U.S. Adults: National Health Interview Survey 2011, Centers for Disease Control and Prevention and Frost & Sullivan

Figure 8.31—Magnesium and Osteoporosis, Number of Avoided Osteoporosis Events Given Use of Magnesium for All U.S. Women over the Age of 55, 2013–2020

Year	Number of avoided events (events)
2013	64,635
2014	65,605
2015	66,630
2016	67,754
2017	68,940
2018	70,190
2019	71,550
2020	72,981
Cumulative, 2013–2020	548,284
Average, 2013–2020	68,536

Source: Summary Health Statistics for U.S. Adults: National Health Interview Survey 2011, Centers for Disease Control and Prevention and Frost & Sullivan

Figure 8.32—Magnesium Retail Prices of Best-selling Brands, 2013

Best-selling brand		Price per daily dose ($)	Annual cost of supplement utilization per person ($)
GNC Super Magnesium		$0.33	$121.67
Solaray, Magnesium Asporotate, 120 Capsules		$0.18	$66.60
Solgar, Chelated Magnesium, 250 Tablets		$0.34	$122.42
Magnesium 250 mg		$0.02	$8.93
TwinLab Magnesium Caps		$0.04	$14.59
Vitacost Magnesium -- 400 mg - 200 Capsules		$0.03	$11.85
Nature Made Magnesium 250 mg Dietary Supplement Tablets		$0.08	$29.18
Nature's Bounty Magnesium 500 mg Dietary Supplement Tablets		$0.09	$32.84
	Median Price	$0.09	$31.01

Note: All figures are rounded. Source: Frost & Sullivan

Figure 8.33—Magnesium and Osteoporosis Cost Analysis for All U.S. Women over the Age of 55, 2013–2020

Year	Change in expenditure on osteoporosis-attributed fracture treatment for all U.S. women over the age of 55 given magnesium intervention at preventive daily intake levels (avoided costs = benefits)* ($)	Expected per person cost of magnesium at preventive annual intake levels ($)	Expected cost of magnesium among people with osteoporosis at preventive daily intake levels among all U.S. women over the age of 55* (supplement utilization costs) ($)	Net cost savings derived from avoided osteoporosis-attributed fractures given required magnesium dietary supplement expenditures among all U.S. women over the age of 55, 2013–2020
2013	$747,935,909	$31.01	$258,076,771	$489,859,138
2014	$773,895,820	$31.32	$256,861,555	$517,034,266
2015	$801,249,844	$31.63	$255,809,482	$545,440,362
2016	$830,591,730	$31.95	$255,075,272	$575,516,459
2017	$861,537,320	$32.27	$254,499,495	$607,037,825
2018	$894,184,775	$32.59	$254,080,992	$640,103,784
2019	$929,208,821	$32.92	$253,974,611	$675,234,210
2020	$966,196,745	$33.25	$254,023,926	$712,172,819
Cumulative, 2013–2020	$6,804,800,966	--	$2,042,402,102	$4,762,398,863
Average, 2013–2020	$850,600,121	--	$255,300,263	$595,299,858

* Discounted at a 3% rate to show present value

Source: Summary Health Statistics for U.S. Adults: National Health Interview Survey 2011—Centers for Disease Control and Prevention, Center for Financing, Access and Cost Trends—Agency for Healthcare Research and Quality; Medical Expenditure Panel Survey, 2010 and Frost & Sullivan

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