Report: The Business Case for Coverage of Tobacco Cessation

2012 Update

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Prepared by Leif Associates, Inc.

Leif Associates, Inc., a healthcare actuarial consulting firm, performed this study. The purpose of the study was to establish whether smoking cessation programs result in sufficient healthcare cost savings to provide a return on investment to the health insurers. The actuarial calculations in this report are based on national average statistics as well as Leif Associates, Inc. proprietary actuarial models and may vary based on population demographics and carrier provider reimbursement arrangements. This report was developed in collaboration with Pfizer, Inc. The project was managed by Collaborative Health Solutions.

Health Insurance and the Cost of Smoking

The Impact of Smoking on Health

The fact that the use of tobacco products has detrimental effects on the health of those who use them has been known for almost fifty years. In 1964, the U.S. Department of Health Education, and Welfare issued its first report on the impact of smoking on health.[1] Based on scientific evidence gathered from numerous sources, the Surgeon General's report cited the following items as its principal findings:[2]

- Cigarette smoking is associated with a 70% increase in the age-specific death rates of males.[2]
- Cigarette smoking is causally related to lung cancer in men; the magnitude of the effect of cigarette smoking far outweighs all other factors. The data for women, though less extensive, point in the same direction. The risk of lung cancer attributable to cigarette smoking is 90% for men and 79% for women.[2]
- Cigarette smoking is the most prevalent cause of chronic bronchitis in the United States, and increases the risk of dying from chronic bronchitis and emphysema.2
- Male cigarette smokers have a higher death rate from coronary artery disease than non-smoking males.[2]
- Cigarette smoking is a significant causal factor in cancer of the larynx. The risk attributable to cigarette smoking is 81% for males and 87% for females.[2]
- The evidence also supports an association between tobacco use and cancer of the esophagus. The risk attributable to cigarette smoking is 78% for males and 75% for females.[2]

The conclusion of this report was that cigarette smoking is a health hazard of sufficient importance in the United States to warrant appropriate remedial action. The evidence proved that cigarette smoking contributes substantially to mortality from certain diseases and to the overall U.S. death rate. In the 47 years since this report was published, hundreds more studies have been released building upon and re-confirming the original findings. The main conclusion of these studies is that tobacco and tobacco products are dangerous to smokers and persons who are subject to secondhand smoke.

Because of the overwhelming evidence of the harmful effects of smoking and most recently because of the emphasis healthcare reform (also known as the Patient Protection and Affordable Care Act of 2010, or PPACA) has placed on coverage of tobacco cessation methods, there are many sources that encourage smokers to quit. Over the last fifty years, the prevalence of smoking has declined and attitudes about smoking have changed. Yet tobacco use remains the number one cause of preventable disease and death in the United States.[3] In addition to the traditional tobacco forms (cigarettes, chewing tobacco, cigars), tobacco companies have found creative ways to market and dispense their products, including dissolvable tobacco that looks and sometimes tastes like candy,[4] electronic cigarettes that look and feel like real cigarettes, USB ports and pens.[5]

Smoking Statistics

In 1965, one year after the 1964 Surgeon General's report *Smoking and Health* was published, 42% of adult American's aged 18 and older smoked cigarettes[6] and forty-five years later, in 2009, 20.6% of adult American's aged 18 and older were current smokers.[7]

While much progress has been made, efforts to reduce the prevalence of smoking continue. The Healthy People 2020 goal for the number of adults in the U.S. who smoke cigarettes in 2020 is 12%.[8] While 12% may seem like an unreasonable target, when one considers that 70% of current U.S. adult smokers want to completely quit smoking, the number seems more attainable.[9] Consider also that with the introduction of PPACA and the promise that some sort of tobacco cessation coverage will be offered, those smokers who complained that the cost of quitting is too high will no longer have that excuse for not attempting to quit.

Tobacco cessation should not be thought of simply as an adult issue. Research shows that 80% of all smokers have their first cigarette before they're 18, and 90% begin before age 20.[10] In 2009, 26% of adolescents in grades 9 through 12 reported current tobacco use and of those 19.5% were current cigarette smokers.[11] A little more than half (50.8%) of the 19.5% adolescents who smoke tried to quit smoking during the 12 months prior to the survey.[11] As more companies begin to introduce smoke-free policies and even in some cases refuse to hire smokers, it is increasingly important that adolescents avoid addiction to nicotine, since their future employment could depend on it.[12]

Insurance Coverage for Cessation Programs

Prior to the implementation of healthcare reform, insurance coverage for smoking cessation was not universal. According to a 2002 survey of 152 health plans covering more than 43.5 million people conducted by the American Association of Health Plans (AAHP), only 88.8% of health plans provided full coverage for at least one type of pharmacotherapy.[13] According to this study, full coverage for at least one type of behavioral intervention used for tobacco cessation was reported by the vast majority of health plans. Telephone counseling was the most commonly covered behavioral intervention, followed by face-to-face counseling and self-help materials.[13]

With the introduction of the federal Patient Protection and Affordable Care Act (PPACA), the question of "What preventive services will my insurance cover?" has been answered. Under PPACA the following services are required:[14]

- A- and B-rated services recommended by the U.S. Preventive Services Task Force (USPSTF), such as screenings for high blood pressure, diabetes, high cholesterol, many types of cancer, HIV; counseling services related to weight loss, tobacco cessation and alcohol misuse; and screenings for depression.[14]
- Routine immunizations for children, adolescents and adults for diseases such as hepatitis, measles, polio, meningitis and influenza.[14]
- Recommended well-baby/well-child visits for newborns and children through age 21, including autism, hypothyroidism, and vision and hearing screenings.[14]
- Screenings and vaccinations and counseling services for pregnant women.[14]

Tobacco cessation is now universally included as a covered benefit under this legislation, but at this point the Task Force has not described how an actual insurance benefit should be designed to provide a level of care consistent with the recommendation. Each private insurer can decide what is covered and how many units of each method will be covered.[15] Grandfathered plans are generally excluded from complying with the above provision by virtue of being granted grandfathered status.[14] These provisions were effective for plan years beginning on or after September 23, 2010 for both fully insured and self-insured plans. Calendar–year plans that have not retained their grandfathered status were required to comply by January 1, 2011.[14] However, the choice of cessation methods covered is left to the insurer.

Quantifying the Actuarial Impact

Methodology

Ideally, the actuarial impact of smoking cessation programs could be determined by compiling healthcare utilization and cost data for a large number of tobacco users who subsequently participate in a smoking cessation program. Unfortunately, most insurers have not historically gathered data regarding the smoking status of their insured members. As a result, the data to perform such an actuarial study is not generally available.

This analysis presents an actuarial assessment of the benefits derived from smoking cessation programs as compared to their cost. Since the actuarial impact of smoking cessation programs will be different for each insurer, based on the unique distribution of its members, program features, and corporate practices, an estimated actuarial impact was developed based on average assumptions for a population with employer-based insurance coverage (see Table 1).

Utilizing existing research studies, methods included the following steps:

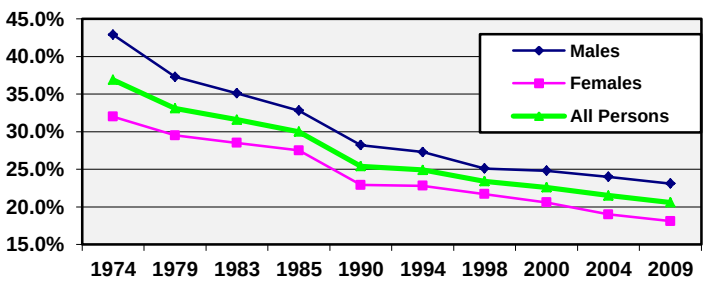
1. Estimate the smoking prevalence in a typical insured population.
2. Estimate the average monthly medical cost for population categories of smokers and non-smokers.
3. Estimate the expected cost of smoking cessation approaches and the likely participation and success rates of each.
4. Estimate the improvement in health when smoking ceases.
5. Estimate the cost savings that will be realized by implementing smoking cessation programs.

Each of these steps is discussed in the following sections of the report.

Step One -- The Prevalence of Smoking in a Typical Insured Population

In spite of all that is known about the serious health consequences of smoking, the prevalence is still quite high. Cigarette smoking declined quite rapidly after the 1964 Surgeon General's Report, but in recent years the decline has slowed. The 2009 statistics indicate that 20.6% of adult Americans aged 18 and older were current smokers[7] including, 23.1% of adult (18 and over) men and 18.1% of adult women.[16]

The following table depicts the prevalence of smoking in the United States over the last 35 years, as reported by the Centers for Disease Control and Prevention.[17]



Other pertinent smoking prevalence statistics include the following:

- Among mothers with a live birth, the percent reporting smoking during pregnancy has declined. In 2005 however, 19% of female teens aged 18-19 and women in their early twenties smoked during pregnancy. Approximately 11% of women smoked during pregnancy.[18]
- Children who smoke may create lifelong habits that can be hard to break. It is estimated that approximately 1,000 additional children and adolescents become regular users of tobacco each day.[19]
- In 2009, 26% of adolescents in grades 9 through 12 reported current tobacco use and of those 19.5% were current cigarette smokers.[11]

The following table shows an estimated distribution by gender and smoking status in a typical under age 65 insured population: This age/gender distribution was based on national statistics available from the Kaiser Foundation State Health Facts.[19]

Table 1 – Population Distribution in Commercial Insurance

Population Category	*Population Distribution*
Male Non-Smokers	27.4%
Male Smokers	8.4%
Female Non-Pregnant Non-Smokers	29.4%
Female Non-Pregnant Smokers	6.4%
Female Pregnant Non-Smokers	1.2%
Female Pregnant Smokers	0.3%
Children Non-Smokers	25.5%
Children Smokers	1.5%
Total	100.0%

The characteristics of the population are as follows: 49% male and 51% female, 27% children under age 18 and 3.9% of the adult females are pregnant. Distributions will vary from carrier to carrier and from state to state.[19]

This table shows that for a typical insured population approximately 16.6% of the members are smokers.[i]

Step Two – How Smoking Affects Medical Costs

Smoking has been shown to have an adverse impact on medical costs. In 2005, tobacco smoking was responsible for an estimated 467,000 deaths, or approximately 1 in 5 deaths for adults.[3] Tobacco use is the number one cause of preventable death in the United States.[3] Smoking affects just about every system in the body and cost an average of $97 billion in lost productivity and $96 billion in smoking-attributable health-care expenditures annually during 2001-2004.[20]

In 1987 lung cancer became the most common cause of cancer death in women, overtaking breast cancer.[21] This switch is accompanied by a more than 600% increase in lung cancer deaths in women since 1950.[21] Today there are more new cases of breast cancer reported in women in

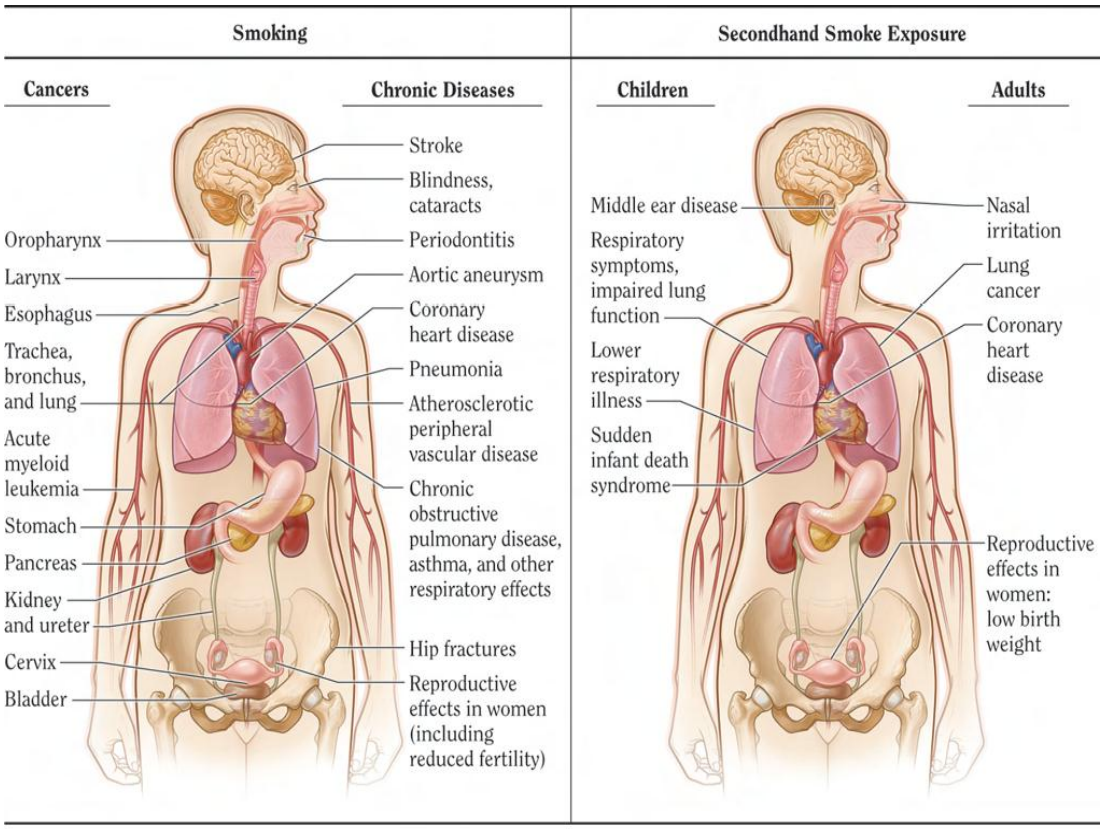
[i] This number (16.6) is found by adding the population distribution percentage of male smokers, female non-pregnant smokers, female pregnant smokers and children smokers.

the U.S. (28%) than new lung cancer cases (14%), but 26% of women with lung cancer die each year compared to 15% of women with breast cancer.[22]

This is also true with lung and prostate cancers in men. There are more new cases of prostate cancer reported (28%) than lung cancer (15%), but 29% of men with lung cancer die each year and only 11% will die from prostate cancer.[22] The survival rate of lung cancer is so low because most people with lung cancer don't realize they have it. It is difficult to detect and once symptoms begin to show, the cancer is often in an advanced stage. Breast cancer and prostate cancer are detected through regular check-ups, but there is no test to reliably detect lung cancer in early stages. And, since 87% to 90% of lung cancer deaths are related to smoking, the best way to decrease the high death rate from lung cancer is to help smokers quit.[23]

Figure 1, below, reproduced from the CDC with permission, shows all of the systems in the body that tobacco smoke affects, both to the smoker and to someone who ingests secondhand smoke.

Figure 1: The health consequences causally linked to smoking and exposure to secondhand smoke[24]



Smoking during pregnancy is associated with adverse outcomes, including spontaneous abortion, intrauterine growth retardation, sudden infant death, and long-term behavioral and psychiatric disorders in offspring. Women who smoke during pregnancy have a 24%, 23%, and 28% greater risk for very preterm (gestation less than 33 weeks), spontaneous, and medically indicated preterm birth, respectively, than nonsmokers.[25]

In addition, the U.S. Environmental Protection Agency (EPA) has concluded that exposure to environmental tobacco smoke presents a serious and substantial public health impact.[26] Their findings include the following:

- Environmental tobacco smoke is a human lung carcinogen, responsible for approximately 3,000 lung cancer deaths annually in U.S. nonsmokers.[26]
- In children, secondhand smoke exposure is causally associated with an increased risk of lower respiratory tract infections such as bronchitis and pneumonia, increased prevalence of fluid in the middle ear, additional episodes and increased severity of symptoms in children with asthma, and is a risk factor for new cases of asthma in children who have not previously displayed symptoms.[26]

In addition to the health related costs of cigarette smoking, there are also non-healthcare costs of reduced productivity resulting in economic losses to society. In 2008, the Centers for Disease Control (CDC) reported the annual estimates of the impact of smoking in the United States during 2000-2004.[20] CDC's report calculates the national estimates of Years of Potential Life Lost (YPLL) and productivity costs for adults. Smoking attributable YPLL and productivity costs are estimated by multiplying age- and sex-specific Smoking Attributable Mortality (SAM) by remaining life expectancy and lifetime earnings data, respectively. The annual estimates reported by CDC on productivity losses are conservative because they do not include the value of lost work time from smoking-related disability, absenteeism, excess work breaks, and secondhand smoke-related disease morbidity and mortality. Highlights of the CDC report include:

- On average, smoking accounted for an estimated 3.1 million years of potential life lost for males and approximately 2.0 million years of potential life lost for females annually.[20]
- The average annual mortality-related productivity losses attributable to smoking for adults were $97 billion.[21]

Research ties smoking to workplace absenteeism and productivity losses. Data indicate that nonsmokers are more productive, take fewer sick days per year, and use fewer healthcare resources than smokers.[27,28,29,31] These findings provide evidence that both productivity and employee health are enhanced through successful worksite smoking cessation. These studies conclude the following:

- Current smokers had significantly greater absenteeism than never smokers.[28]
- Among former smokers, absenteeism showed a significant decline with years following cessation.[29]
- Productivity among former smokers increases over time toward values seen in never smokers.[29]
- Former smokers' total productivity was greater than current smokers by 1 to 4 years following cessation.[29]
- Compared with never smokers, men and women who were current smokers had higher short-term rates of hospitalization and lost workdays for a broad range of conditions.[29]
- It is no surprise then that non-smokers miss an average of 3.86 work days each year, compared to 6.16 missed by their smoking colleagues.[30]

Many studies have been performed to quantify the medical costs of smoking in the United States. The estimated proportion of total medical expenditures attributable to smoking for the United States was determined in a 1993 study to be 11.8%, with a range across states from 6.6% to 14.1%.[31] The range was due to differences in smoking prevalence, health status, and other socioeconomic variables.[31]

A more recent study based on the same model projected 2001 costs attributable to smoking using revised information regarding smoking prevalence for each state. This study showed the estimated proportion of total medical expenditures attributable to smoking to be approximately 7%.[32]

Based on the sources referenced above and the work of Leif Associates, the estimated 2011 monthly medical costs for the population categories listed above was determined. The estimate is based on an average medical cost of $350.00 a month, which represents medical costs not reduced for member cost sharing. Insurers may have costs that are higher or lower based on a variety of factors such as contractual provider reimbursement arrangements, geographic cost differentials, and demographic distribution.

The sources quoted in the above paragraphs estimate that smoking adds approximately 7% to the total cost of healthcare[40] and in general 20.6% of the population smokes.[7] Based on these estimations, Leif Associates, Inc. calculated that smokers have healthcare costs that average 34% higher than non-smokers (.206 x Z + .794 x 1.00 = 1.07).[ii]

Based on this calculation and information from Table 1 on population distribution in commercial insurance, Leif Associates, Inc. estimated the average medical cost per member per month and the annual cost for 10,000 members. The following table shows these estimations in each of the insured population categories.[iii]

Table 2 – Average Medical Costs for Smokers and Non-Smokers

Population Category	*Distribution per 10,000 Members*[19]	*Average 2011 Monthly Medical Cost*	*Annual Cost for 10,000 Members*
Male Non-Smokers	2,750	$300.13	$9,906,944
Male Smokers	830	$402.18	$3,987,770
Female Non-Pregnant Non-Smokers	2,930	$436.69	$15,361,493
Female Non-Pregnant Smokers	650	$585.17	$4,549,178
Female Pregnant Non-Smokers	120	$555.56	$784,870
Female Pregnant Smokers	30	$744.44	$232,433
Children Non-Smokers	2, 550	$217.30	$6,637,680
Children Smokers	150	$291.18	$539,632
Average	10,000	$350.00	$42,000,000

Using a similar method as outlined above, the following table shows the expected cost if none of the members were smokers. This table demonstrates that savings of approximately $2.4 million per year could be achieved per 10,000 members if none of the members smoked.

[ii] This number (34%) is found by using this equation and solving for Z: .206 (the percentage of smokers in the U.S.) x Z (the average cost increase for a smoker) + .794 (the percentage of non-smokers in the U.S.) x 1.00 (the average cost increase for a non-smoker) = 1.07 (the percentage that smoking adds to the total cost of healthcare). Z is equal to 1.34, therefore this formula indicates an average 34% increase in healthcare costs for an individual who smokes.

[iii] The ratio of average monthly medical costs by gender and age is based on Leif Associates, Inc. proprietary actuarial models and may vary based on population demographics.

Table 3 – Average Medical Costs If All Were Non-Smokers

Population Category	*Distribution per 10,000 Members*[19]	*Average 2011 Monthly Medical Cost*	*Annual Cost for 10,000 Members*
Male Non-Smokers	3,580	$300.13	$12,882,891
Female Non-Pregnant Non-Smokers	3,580	$436.69	$18,756,402
Female Pregnant Non-Smokers	140	$555.56	$958,328
Children	2,700	$217.30	$7,040,390
Average	10,000	$330.32	$39,638,012

Step Three – Smoking Cessation Programs: Success Rates and Cost

Bloomberg Government released a report in November of 2010 called "Projected Business Impact of New Smoking-Cessation Mandates: Part 2-Private Health Insurers" that illustrates what savings might be realized when smoking cessation policies are implemented.[33] They chose the top five publicly traded health insurance companies and applied the benefit information created by Milliman Consultants and Actuaries in their 2006 report written for the American Legacy Foundation. The projected costs and savings over five years were compiled for UnitedHealth Group, WellPoint, Aetna, Humana, and Health Net. The report showed that for each of the companies the costs over the first five years were higher than the savings. For each company the costs outweigh the savings for the first three years and after that the savings outweigh the cost, so it follows that if that pattern were to continue after the initial five years, then the savings would continue to outweigh the cost and the plans would continue to save money.

The tobacco cessation policy in the Massachusetts healthcare network may be the best indicator of how tobacco cessation plans can truly work. A study done by the Massachusetts Tobacco Control Program assessing data about smoking prevalence in the Massachusetts Medicaid population from 1998 to 2008 found that the number of smokers on Medicaid dropped 26% from July 1, 2006 to December 31, 2008.[34] These dates are significant because the Massachusetts "Act Providing Access to Affordable, Quality, Accountable Healthcare" was implemented on July 1, 2006, so these numbers reflect how well the policy is working. The prevalence of smoking in the Medicaid population has always been higher than that of the general population, so this decrease in the Medicaid population is quite significant. Approximately 38.3% of MassHealth (Massachusetts Medicaid) members smoked from 1/1/2003-6/30/2006 and according to the data available at the time of this study, the number had decreased to 28.3% for the 2008 calendar year.[34]

Not all of the decreases in utilization can be correlated to the drop in the number of smokers on the program, but it is likely that the smoking cessation program has played a major part.

The percent of current smokers aged 18 years and older who tried to quit smoking in the past year is approximately 45% in 2008.[6] Data suggest that 70% of smokers in the U.S. want to quit smoking[20] and that between 4% and 7% of people are able to quit smoking on any given attempt without medication or other help.[35]

The U.S. Department of Health and Human Services Public Health Service, in conjunction with a consortium of experts, developed the Clinical Practice Guideline for treating tobacco use and dependence.[36] Much of the information included in the rest of this section is from the Guideline.

Tobacco cessation programs include a range of approaches, with varying costs and success rates. The following paragraphs list the ten key guideline recommendations from the Clinical Practice Guideline.[36]

- Smoking is a chronic disease that often requires repeated intervention and multiple attempts to quit. Effective treatments exist, however, that can significantly increase rates of long-term abstinence.[36]
- It is essential that clinicians and healthcare delivery systems consistently identify and document tobacco use status and treat every tobacco user seen in a healthcare setting.[36]
- Smoking cessation treatments are effective across a broad range of populations. Clinicians should encourage every patient willing to make a quit attempt to use the counseling treatments and medications recommended in the Guideline. [36]
- Brief tobacco dependence treatment is effective. Clinicians should offer every patient who uses tobacco at least the brief treatments shown to be effective. [36]
- Individual, group and telephone counseling are effective, and their effectiveness increases with treatment intensity.[36]
- Numerous effective medications are available for tobacco dependence, and clinicians should encourage their use by all patients attempting to quit smoking, except when medically contraindicated or with specific populations for which there is insufficient evidence of effectiveness.[36]
- Counseling and medication are effective when used by themselves for treating tobacco dependence. The combination of counseling and medication, however, is more effective than either alone.[36]
- Telephone quitline counseling is effective with diverse populations and has broad reach. Therefore, both clinicians and healthcare delivery systems should ensure patient access to quitlines and promote quitline use.[36]
- If a tobacco user currently is unwilling to make a quit attempt, clinicians should use the motivational treatments known to be effective in increasing future quit attempts.[36]
- Tobacco dependence treatments are both clinically effective and highly cost-effective relative to interventions for other clinical disorders. Providing coverage for these treatments increases quit rates. Insurers and purchasers should ensure that all insurance plans include the counseling and medication identified as effective as covered benefits.[36]

Counseling and Behavioral Therapies

Two types of counseling and behavioral therapies result in higher abstinence rates: (1) providing smokers with practical counseling (problem solving skill/skills training) and (2) providing support and encouragement as part of treatment.[36] The Clinical Guideline recommends including counseling elements in smoking cessation interventions.[36] Proactive telephone counseling, quitlines, group counseling, and individual counseling formats are effective and should be used in smoking cessation interventions.[36]

Based on delivery mode, the success rate of counseling therapies alone (without medication) is estimated at 14.6%.[36] As discussed below, the estimated abstinence rate with medication and counseling is 27.6%.[36]

Combining Counseling and Medication

The Clinical Guideline recommends that, whenever feasible and appropriate, both counseling and medication should be provided to patients trying to quit smoking. [36] The combination of counseling and medication is more effective for smoking cessation than either medication or counseling alone.[36] Also, there is a strong relation between the number of sessions of counseling, when it is combined with medication, and the likelihood of successful smoking cessation.[36]

The average success rate of medication alone is estimated at 21.7%, but that is increased to 27.6% when medication is combined with counseling.[36] The success rate also varies with the number of counseling sessions, with a potential success rate over 30% with more than 8 counseling sessions.[36] A combination of medication plus 4 to 8 sessions is estimated to have a success rate of 26.9%.[36]

The Cost of Cessation Treatment

Assuming a 12-week course of treatment with a combination of 6 counseling sessions plus medication, a success rate in the range of 24% to 30% can be achieved.[36] The treatment cost would vary with the number of counseling sessions and the medications used. Based on medication costs quoted in the Clinical Guideline[36]and assuming a cost range of $60 to $70 per counseling session, Leif Associates Inc. estimated the cost of cessation treatment is likely to be in the range of $600 to $1,000.[iv]

Step Four – Health Improvement When Smoking Ceases

When a smoker quits, the improvements to his or her health are almost immediate. Short-term health improvements include the following:[35]

- Twenty minutes after quitting, a smoker's heart rate and blood pressure drop.[35]
- After twelve hours the carbon monoxide level in the blood returns to normal.[35]
- Two weeks to three months after quitting, lung function and circulation begin to improve. [35]
- In the months that follow a successful quit attempt, coughing and shortness of breath decrease, and the cilia in the lungs begin to function as they were meant to.[35]
- One year after quitting, a smoker's excess risk of coronary heart disease is half that of continuing smoker's.[35]
- Five years after quitting the risk of developing throat, mouth, and esophagus cancer is cut in half. Cervical cancer risk falls to that of a non-smoker and stroke risk can fall to that of a non-smoker. [35]
- Pregnant women who quit smoking reduce the risk of adverse fetal outcomes, including stillbirths, spontaneous abortions, decreased fetal growth, premature births, low birth weight, placental abruption and sudden infant death syndrome.[36]Clinical trials of women who stop smoking during pregnancy resulted in a benefit/cost ratio of 2.8 to 1.[37]
- Hospitalized patients who quit smoking promote their recovery. Among cardiac patients, second heart attacks are more common in those who continue to smoke. Lung, head, and neck cancer patients who are successfully treated, but who continue to smoke, are at elevated risk for a second cancer. Smoking also negatively affects bone and wound healing.[36]
- Men who quit at age 35 increase their life expectancy by 7 to 9 years. Women who quit at age 35 increase their life expectancy by 6 to 8 years. Quitting at age 45 increases life expectancy by 6 to 7 years. Quitting at age 55 increases life expectancy by 3 to 6 years. Quitting at age 65 increases life expectancy by 1.4 to 4 years.[38]

The health benefits of quitting in the long term (for more than five years) include the following:

- The risk of total mortality among former smokers approaches the level of never-smokers 10 to 14 years after cessation.[39]

[iv] Cost range of counseling sessions based on Leif Associates, Inc. proprietary actuarial models and may vary based on carrier provider reimbursement arrangements.

While it is difficult to accurately predict the year-by-year cost reductions associated with quitting smoking, the evidence supports a conclusion that over time, the health risk of a former smoker returns to the non-smoking level. If there is a gradual improvement over that time, it can be assumed that during the first three years (the typical amount of time a person stays in the same health insurance plan), a former smoker's healthcare costs will be at least 10% less than if they had continued smoking. This is based on the calculation illustrated above that assumes that smoking adds approximately 34% to the cost of healthcare per smoker per year.

Step Five – Cost/Benefit Analysis

Here is a summary of the first four steps:

- Approximately 16.6% of a typical insured commercial population smokes (see Table 1).
- Although approximately 42% of smokers try to quit smoking each year,6 only between 4% and 7% of people are able to quit smoking on any given attempt without medication or other help.[35]
- Smoking cessation initiatives have successful quit rates ranging from 10% to 30%.[38]
- Calculations by Leif Associates, Inc. estimate that:
    - Smokers' healthcare costs are approximately 34% higher per year than non-smokers.
    - Smoking cessation programs can cost as much as $1,000 per person, but significant quit rates can be attained with an expenditure of $600, as suggested in Step Three.
    - During the first three years after ceasing smoking, healthcare costs could decrease by 10% as suggested in Table 4 below.

For a hypothetical insured population of 10,000 members, based on the assumptions noted above, the following range of results could be expected within the first three years after smoking has ceased:

Table 4 – Savings from Smoking Cessation

	Low	*Medium*	*High*
Number of smokers	1,660	1,660	1,660
Annual cost of healthcare per smoker	$4,800	$5,600	$8,900
Average annual cost of healthcare	$7,968,000	$9,296,000	$14,774,000
Three year healthcare costs	$23,904,000	$27,888,000	$44,322,000
Percent of smokers attempting to quit	2.4%	7%	10%
Number of smokers attempting to quit	40	116	166
Success rate	10%	20%	30%
New non-smokers	4	23	50
Healthcare annual cost savings per success	$480	$560	$890
Total 3 year annual healthcare cost savings	$5,760	$38,640	$133,500
Break even smoking cessation cost per attempt	$144	$333	$804

Research shows that the savings potential is greater for pregnant women and persons with coronary heart disease, as described below:

- If just 1% of pregnant women quit smoking, it would prevent 1,300 low birth weight babies and save approximately $21 million in associated medical costs during that year.[40]

- A 1997 study published by the American Heart Association[41] analyzed the short-term cost savings due to a decline in risk of acute myocardial infarction and stroke after smoking cessation. The study concluded that because the excess risk of a myocardial infarction or stroke falls by nearly 50% within the first 2 years after stopping smoking, a reduction in the prevalence of smoking produces substantial short-run savings, both in terms of events avoided and dollars saved. In 1997 dollars, the study concluded that creating a new nonsmoker would reduce anticipated medical costs associated with myocardial infarction and stroke by $47 in the first year, with a discounted present value of $853 during a 7-year period.[41]

Conclusion

This analysis indicates that over a three-year period, expenditures for smoking cessation programs in the range of $144 to $804 per smoker attempting to quit should be fully offset by healthcare cost savings in a typical commercial population. Greater cost savings will likely occur within special populations such as pregnant women and persons with cardiac conditions. Greater cost savings will also likely occur for persons who remain in the health plan longer than the average of three years assumed in this study***. In summary, the research indicates that an investment in programs designed to reduce adult smoking will lead to improved health outcomes, resulting in lower healthcare costs and more affordable health insurance premiums.***

Potential Modifications to the Savings Calculations

The actuarial calculations in this report are based on national average statistics. If the reader would like to modify the calculations to fit a particular population, we offer the following suggestions:

- The population distribution in Table 1 is based on national average statistics regarding individuals covered in employer-provided coverage. It could be modified to reflect a particular carrier or state population.
- The percent of the population that smokes (20.6%) is available by state from the New America Foundation's website at statehealth.newamerica.net/node/87.
- The distribution per 10,000 members in Table 2 is based on the percentages in Table 1.
- The average monthly medical cost of $350 was estimated as the average cost of employer-based insurance coverage in 2011. It is not based on a particular carrier or state. The amount can be modified by using average monthly medical costs available from a particular insurance carrier or group of carriers in a particular geographic area.
- Likewise, the medical cost relationships between males, females, and children are based on a proprietary database for a typical insured population in employer-based coverage. The differentials may vary based on the age distribution and provider reimbursement arrangements of a particular carrier.
- The average monthly medical cost in the Table 3 comes directly from Table 2, picking up only the non-smoking costs and grouping the member counts to eliminate the smoker categories.
- The range of per smoker annual cost of healthcare in Table 4 is based on the cost per member in Table 2.

Endnotes

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