

Appendix

Cost-Effectiveness Analysis of the First Federally Funded U.S. Antismoking Media Campaign

Appendix Table 1. Campaign-attributable premature deaths averted and quality adjusted life years gained: The 2012 Tips campaign

Gender and age group	Adult smoker population (pre-quits)	Campaign-attributable quits	Lower Bound Simulation		
			Discounted life-years gained	Discounted QALYs gained	Premature deaths averted
Men					
18–24	2,509,490	3,795	5,500	9,057	947
25–34	5,070,081	17,787	25,242	43,484	3,487
35–44	4,736,704	5,784	10,236	13,062	864
45–54	4,210,032	4,182	8,777	7,576	593
55–64	3,898,769	8,569	5,931	10,027	1,065
65 and up	2,133,245	1,590		—	—
Women					
18–24	2,817,237	23,444	16,265	33,300	3,751
25–34	4,299,064	17,389	9,978	23,867	2,193
35–44	3,598,394	5,927	7,362	7,435	363
45–54	4,964,808	2,729	5,731	2,955	159
55–64	3,839,302	5,254	3,653	3,620	215
65 and up	1,651,881	3,550		—	—
Total	43,729,007	100,000	98,676	154,382	13,638
Gender and age group	Adult smoker population (pre-quits)	Campaign-attributable quits	Randomized Simulation		
			Discounted life-years gained	Discounted QALYs gained	Premature deaths averted
Men					
18–24	2,509,490	3,795	5,802	9,276	1,053
25–34	5,070,081	17,787	27,820	48,499	4,057
35–44	4,736,704	5,784	13,840	15,252	1,151
45–54	4,210,032	4,182	11,755	11,162	686
55–64	3,898,769	8,569	7,979	10,047	1,293
65 and up	2,133,245	1,590		—	—
Women					
18–24	2,817,237	23,444	19,054	35,252	4,407

25–34	4,299,064	17,389	13,568	28,655	2,974
35–44	3,598,394	5,927	9,815	9,846	775
45–54	4,964,808	2,729	7,662	6,282	272
55–64	3,839,302	5,254	4,841	4,826	442
65 and up	1,651,881	3,550		—	—
Total	43,729,007	100,000	122,136	179,099	17,109
			Upper bound Simulation		
Gender and age group	Adult smoker population (pre-quits)	Campaign-attributable quits	Discounted life-years gained	Discounted QALYs gained	Premature deaths averted
Men					
18–24	2,509,490	3,795	6,105	9,495	1,158
25–34	5,070,081	17,787	30,399	53,522	4,626
35–44	4,736,704	5,784	17,448	17,448	1,436
45–54	4,210,032	4,182	14,728	14,728	780
55–64	3,898,769	8,569	10,027	10,068	1,520
65 and up	2,133,245	1,590		—	—
Women					
18–24	2,817,237	23,444	21,829	37,211	6,588
25–34	4,299,064	17,389	17,142	33,431	3,753
35–44	3,598,394	5,927	12,264	12,264	1,184
45–54	4,964,808	2,729	9,603	9,603	385
55–64	3,839,302	5,254	6,035	6,035	669
65 and up	1,651,881	3,550		—	—
Total	43,729,007	100,000	145,578	203,804	22,099

QALY, quality-adjusted life year

Note: Sum of individual categories may not equal the total due to rounding. These results show that women aged 18 to 24, women aged 25 to 34, and men aged 25 to 34 comprise more than half of all estimated quits (58.6%).

Appendix Table 2. Input parameters for the cost-effectiveness model of the 2012 *Tips* campaign

Gender and age group	Probability of attempt to quit, campaign	Probability of attempt to quit, no campaign (counterfactual)	Probability of quit, contingent on attempt	Premature deaths averted per quit			Discounted LYs saved per quit			Discounted QALYs gained per quit		
	All Simulations	All Simulations	All Simulations	Randomized Simulation	Fixed benefit Simulation		Randomized Simulation	Fixed benefit Simulation		Randomized Simulation	Fixed benefit Simulation	
	Mean	Mean	Mean	Mean	Lower bound	Upper bound	Mean	Lower bound	Upper bound	Mean	Lower bound	Upper bound
	(95% central range)			(95% central range)			(95% central range)			(95% central range)		
Male												
Age												
18–24	0.3485 (0.3474–0.3495)	0.3110 (0.3100–0.3120)	0.0404 (0.0385–0.0420)	0.2774 (0.2509–0.3036)	0.2550 (—)	0.3050 (—)	1.5289 (1.4532–1.6048)	1.4492 (—)	1.6086 (—)	2.4443 (2.3894–2.4991)	2.3865 (—)	2.5019 (—)
25–35	0.3485 (0.3478–0.3492)	0.3110 (0.3103–0.3117)	0.0936 (0.0918–0.0954)	0.2281 (0.1977–0.2585)	0.1961 (—)	0.2601 (—)	1.5640 (1.4263–1.7020)	1.4191 (—)	1.7091 (—)	2.7267 (2.4585–2.9949)	2.4447 (—)	3.0091 (—)
35–44	0.3485 (0.3477–0.3492)	0.3110 (0.3103–0.3117)	0.0326 (0.0315–0.0338)	0.1989 (0.1519–0.2460)	0.1495 (—)	0.2483 (—)	2.3927 (1.8005–2.9855)	1.7696 (—)	3.0164 (—)	2.6369 (2.2766–2.9977)	2.2581 (—)	3.0164 (—)
45–54	0.3485 (0.3477–0.3493)	0.3110 (0.3102–0.3118)	0.0265 (0.0254–0.0276)	0.1641 (0.1429–0.1853)	0.1418 (—)	0.1865 (—)	2.8106 (2.1338–3.4861)	2.0988 (—)	3.5218 (—)	2.6691 (1.8552–3.4797)	1.8116 (—)	3.5218 (—)
55–64	0.3485 (0.3477–0.3493)	0.3110 (0.3102–0.3118)	0.0586 (0.0569–0.0602)	0.1509 (0.1257–0.1760)	0.1243 (—)	0.1773 (—)	0.9311 (0.7037–1.1583)	0.6922 (—)	1.1701 (—)	1.1725 (1.1702–1.1748)	1.1701 (—)	1.1749 (—)
65+	0.3485 (0.3474–0.3496)	0.3110 (0.3099–0.3121)	0.0199 (0.0186–0.0212)	— (—)	— (—)	— (—)	— (—)	— (—)	— (—)	— (—)	— (—)	— (—)
Female												
Age												
18–24	0.3485 (0.3475–0.3494)	0.3110 (0.3100–0.3119)	0.2220 (0.2186–0.2254)	0.1880 (0.1614–0.2144)	0.1600 (—)	0.2810 (—)	0.8128 (0.6996–0.9254)	0.6938 (—)	0.9311 (—)	1.5037 (1.4245–1.5831)	1.4204 (—)	1.5872 (—)
25–35	0.3485 (0.3475–0.3494)	0.3110 (0.3100–0.3119)	0.2220 (0.2186–0.2254)	0.1710 (0.1284–0.2136)	0.1261 (—)	0.2158 (—)	0.7803 (0.5842–0.9759)	0.5738 (—)	0.9858 (—)	1.6478 (1.3861–1.9088)	1.3725 (—)	1.9225 (—)
35–44	0.3485 (0.3477–0.3493)	0.3110 (0.3102–0.3117)	0.1079 (0.1053–0.1100)	0.1308 (0.0648–0.1963)	0.0613 (—)	0.1997 (—)	1.6560 (1.2634–2.0488)	1.2422 (—)	2.0693 (—)	1.6612 (1.2753–2.0489)	1.2544 (—)	2.0693 (—)
45–54	0.3485 (0.3476–0.3493)	0.3110 (0.3102–0.3118)	0.0439 (0.0423–0.0455)	0.0996 (0.0603–0.1390)	0.0582 (—)	0.1412 (—)	2.8073 (2.1360–3.4819)	2.0999 (—)	3.5187 (—)	2.3015 (1.1454–3.4564)	1.0826 (—)	3.5187 (—)
55–64	0.3485 (0.3478–0.3492)	0.3110 (0.3103–0.3117)	0.0147 (0.0140–0.0154)	0.0842 (0.0431–0.1252)	0.0409 (—)	0.1274 (—)	0.9214 (0.7064–1.1372)	0.6952 (—)	1.1485 (—)	0.9186 (0.7004–1.1368)	0.6890 (—)	1.1485 (—)
65+	0.3485 (0.3477–0.3493)	0.3110 (0.3102–0.3118)	0.0365 (0.0353–0.0379)	— (—)	— (—)	— (—)	— (—)	— (—)	— (—)	— (—)	— (—)	— (—)

LY, life year; QALY, quality-adjusted life year

^aIn Monte Carlo simulation, expected values of these inputs that follow beta distributions are derived from the findings of the *Tips* impact analysis.²⁶

^bThe per-quit benefit values for premature deaths averted, undiscounted LYs saved, and discounted QALYs gained are obtained from two recently published estimates on life expectancy by smoking status^{23,24} and adjusted for the quality of life estimates.³⁰ In addition, the ranges of the per-quit benefits that follow uniform distributions are used for the randomized simulation (Tables 1, 2, and 3), and lower and upper bound values are used for the lower-bound and upper-bound simulations, respectively.

Appendix Table 3. Regression models testing sensitivity of simulation results: The 2012 Tips campaign

Gender and age groups	Log-log coefficient estimates			
	Net quits	QALYs gained	Premature deaths averted	Potential life-years saved
Women				
Campaign 18–24	2.44***	1.76***	1.42***	2.14***
Campaign 25–34	1.49***	1.40***	1.00***	1.65***
Campaign 35–44	0.30**	0.59***	0.69***	0.55***
Campaign 45–54	0.20	0.28**	0.63***	0.32***
Campaign 55–64	0.26**	0.30***	0.67***	0.53***
Campaign 65 or older	0.00	-0.02	0.00	0.31***
Status quo 18–24	-2.19***	-1.80***	-1.58***	-2.03***
Status quo 25–34	-1.53***	-1.31***	-0.91***	-1.46***
Status quo 35–44	-0.64***	-0.45***	-0.70***	-0.49***
Status quo 45–54	-0.40***	-0.44***	-0.58***	-0.30***
Status quo 55–64	-0.31***	-0.34***	-0.37***	-0.47***
Status quo 65 or older	-0.04	0.05	0.02	-0.24***
Men				
Campaign 18–24	0.76***	0.53***	0.38***	0.45***
Campaign 25–34	2.37***	2.46***	1.95***	1.65***
Campaign 35–44	0.64***	0.76***	0.87***	0.48***
Campaign 45–54	0.43***	0.62***	0.90***	0.45***
Campaign 55–64	0.79***	0.69***	0.65***	0.88***
Campaign 65 or older	-0.14	0.04	-0.10	0.08*
Status quo 18–24	-0.47***	-0.32***	-0.38***	-0.30***
Status quo 25–34	-1.99***	-2.15***	-1.84***	-1.42***
Status quo 35–44	-0.68***	-0.78***	-1.02***	-0.55***
Status quo 45–54	-0.37***	-0.52***	-0.76***	-0.34***
Status quo 55–64	-0.54***	-0.57***	-0.60***	-0.75***
Status quo 65 or older	-0.03	0.05	0.02	-0.17***
Constant	3.91	0.02	5.39	-3.10

QALY, quality-adjusted life year

Note: * Significant at 10% level; ** Significant at 5% level; *** Significant at 1% level. In identifying the sensitivity of the simulation to the age and gender composition of the population of quit attempters, regression models were run on the simulation output for the dependent variables of interest (campaign-attributable quits and the simulation estimates of deaths averted, discounted LYs saved and total discounted QALYs gained). Specifically, the outcomes are most sensitive to the proportion of quit attempters who are women aged 18 to 24, women aged 25 to 34, and men aged 25 to 34.

Appendix Table 4. Sensitivity analysis by reducing the *Tips* impact by half: Campaign-attributable sustained quits, premature deaths averted, life years saved, and quality-adjusted life years gained

Outcome measures	50,000 Campaign-Attributable Quits		
	Lower-bound simulation (95% CI)	Randomized simulation (95% CI)	Upper-bound simulation (95% CI)
Campaign-attributable quits	50,000 (47,796–52,204)	50,000 (47,796–52,204)	50,000 (47,796–52,204)
Additional premature deaths averted	6,819 (6,494–7,145)	8,555 (7,706–9,403)	11,049 (10,541–11,558)
Additional LYs saved	49,338 (46,852–51,824)	61,068 (55,560–66,575)	72,789 (69,058–76,520)
Additional QALYs gained	77,191 (73,507–80,875)	89,549 (82,718–96,381)	101,902 (96,996–106,807)
QALYs per induced quit	1.54 (1.52–1.57)	1.79 (1.68–1.90)	2.04 (2.00–2.08)

LY, life year; QALY, quality-adjusted life year

Appendix Table 5. Sensitivity analysis by reducing the *Tips* impact by half: Costs per unit of health benefit gained

Outcome measures	50,000 Campaign-Attributable Quits		
	Lower-bound Simulation (95% CI)	Randomized Simulation (95% CI)	Upper-bound Simulation (95% CI)
Cost per quit	\$960 (\$920–\$1,000)	\$960 (\$920–\$1,000)	\$960 (\$920–\$1,000)
Cost per premature death averted	\$7,030 (\$6,700–\$7,370)	\$5,620 (\$5,060–\$6,180)	\$4,340 (\$4,140–\$4,540)
Cost per LY saved	\$970 (\$920–\$1,020)	\$790 (\$720–\$860)	\$660 (\$630–\$690)
Cost per QALY gained	\$620 (\$590–\$650)	\$540 (\$500–\$580)	\$470 (\$450–\$490)

LY, life year; QALY, quality-adjusted life year

Note: The numbers shown here are rounded to the nearest \$10.