## Reducing Tobacco Use and Secondhand Smoke Exposure: Quitline Interventions

## Summary Evidence Table - Economic Evidence

Offering Counseling and Cessation Information through Quitlines

Study	Study and Population Characteristics	Intervention Description	Effect Size	Program Costs	Health Care Cost Averted/ Productivity Losses Averted	Full Economic Summary Measure* (\$2010)
Author (year): Ayadi et al. (2006)  Study Design: Modeling  Economic Method: Cost-Benefit	Cost data collected from August 2002 to September 2003.  Pregnant women  Arm 1: quitline n=408	National pregnant smokers telephone quitline—7 participating states (n=408)8counseling sessions with a trained counselor, a pregnancy-specific educational booklet, and a video on pregnancy and smoking cessation.  After the initial call to the quit line, the woman received her first counseling session, set a quit date, and scheduled a second session, usually for one—two days before the quit date. The third counseling session was conducted on the scheduled quit date, and the fourth through sixth sessions were scheduled from about four days to one month after the quit date.	Study assumes 25% of estimated maternal smokers in the U.S. are reached for intervention through counseling, and the demonstrated 30% to 70% increase in the quit rate is achieved over a baseline quit rate of 14%* 5,460 additional women would quit smoking during pregnancy. *Melvin 2009, Martin 2003, DHHS Healthy People 2010.	ine and not require additional capacity.  -Development costs ("sunk" or nonrecoverable) and	(\$1996) or \$881 in (\$2002); excess neonatal costs per	Quitline average cost: \$30 (\$36)/pregnant women; potential net savings (\$390,287 to \$1,690,375) based on upper and lower bound cost of \$29 and \$41/pregnant woman caller
Author (year):	Kansas; Rural clinics (n=50);	1. Pharmacotherapy management alone:	7-day abstinence at 12 months:	Assumed \$2007 Pharmacotherapy cost:	More intensive counseling time	\$2,955 per additional quit

Ellerbeck et al. (2009)  attending rural primary care clinics in Kansas; Patients >= 18 years of age; attending one of the 50 Effectiveness (calculated by CG)  ECONOMIC Method: Cost-Effectiveness (calculated by Sease management: counseling calls every 6 mothors (belance) (calculated by Sease management: counseling calls every 6 mothors (belance) (calculated by Sease management: counseling calls every 6 mothors (belance) (calculated by Sease management: counseling calculated by	Study	Study and Population Characteristics	Intervention Description	Effect Size	Program Costs	Health Care Cost Averted/ Productivity Losses Averted	Full Economic Summary Measure* (\$2010)
	(2009)  Study Design: RCT  Economic Method: Cost- Effectiveness (calculated by	attending rural primary care clinics in Kansas; Patients >= 18 years of age; attending one of the 50 rural clinics in Kansas participating in KanQuit study; smoke >10 cigarettes/day, smoked > 1 year, smoked at least 25 of past 30 days; regardless of intention to quit; no pregnant women;  Number recruited: High-inten = 251/750 = 33.5% Mode-inten = 249/750 = 33.2% Med alone = 250/750 = 33.3% Total = 750  Completion at	education at baseline with self-help info;  2. Moderate-intensity disease management: medication + 1-2 counseling calls every 6 months + feedback reports to patient's physician;  3. High-intensity disease management: medication + up to 6 counseling calls every 6 months + feedback reports to patient's physician; All participants received mailed offer for free medicine (either 6 week course of 21mg/day nicotine patch or 7-week course of bupropion SR, 150mg, 2x daily) at 0, 6, 12, and 18 months; Both intensity disease management: educational support, telephone counseling to promote cessation and stay abstinent, periodic progress reports with counseling suggestions faxed to their physician; tailored KanQuit newsletter every 6 months with quitting tips; counseling	Mod-intensity: 49/244 = 20.1%  7-day abstinence at 24 months:  High-intensity: 68/244 = 27.9%  Mod-intensity: 56/238 = 23.5%  Med alone: 56/244 = 23.0%  Partially validated at months 12 and 24 by mailed salivary cotinine analysis; Validation through partner at month 24 for quitters who did not return a salivary  Cotinine ascertained abstinence at 12 months:  High-intensity: 28/248 = 11.3%  Mod-intensity: 24/244	(\$237)/participant  Mod-intensity: \$209 (\$220)/participant  Med alone: \$209 (\$220)/participant  No significant difference  Time spent per participant:  High-intensity: 7.7 hours  Mod-intensity: 3.8 hours  Med alone: 0.5 hours  Overall intervention cost (cost/participant):  High-intensity: \$460 ± 289  Mod-intensity: \$348 ± 236  Med alone: \$231 ± 222  Statistically significant differences between	let to greater costs.  Cost/participant: High-intensity: \$460 (\$484)  Mod-intensity: \$348 (\$366)  Med alone: \$231 (\$243)  CG calculated: 118/.042= \$2,809 (2,955)/addt'l quit (more intensive compared to less intensive	(\$2010)

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	High inten = 204/244 = 83.6% Death: 7  Mod inten = 199/238 = 83.6% Death: 9; Incarcerate: 2  Med alone = 217/244 = 88.9% Death: 5; Incarcerate: 1  Participants recruited between June 04 and Oct 05; followed for 24 months with follow up completed in Dec 07	medicine if required by participants	Med alone: 13/247 = 5.3%  Cotinine ascertained abstinence at 24 months:  High-intensity: 36/244 = 14.8%  Mod-intensity: 35/238 = 14.7%  Med alone: 33/244 = 13.5%  CG calculated ITT to make results comparable: 7-day abstinence at 12 months:  High-intensity: 60/251 = 23.9 %  Mod-intensity: 49/249 = 19.7%			
Author (year): Feenstra et al. (2005)  Study Design: Modelling (based on RCT data)  Economic Method:	Netherlands 1 year; 10 year; 75-year implementation	Estimate the cost- effectiveness of 5 face-to- face smoking cessation interventions  Arm 5. <b>TC:</b> Telephone counseling; 1 intake call of 30 minutes and 6 follow-up calls, each lasting up to 15 minutes, based on a (computerized)	QALY and LYS- simulated changes in smoking prevalence rates and the resulting changes in incidence rates of smoking-related chronic diseases, using the Chronic Disease Model	Disease Model; discount rate 4%	Chronic disease model-dynamic population model; simulated the effects of increased smoking cessation rates on changes in smoking prevalence and	Costs/ addt'I quitter: 1640€ (\$2,334)  1 year: 2000€/LY (\$2,845) gained; 1500€/QALY

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Cost- Effectiveness		questionnaire completed by the potential quitters Current practice was defined as the mix of all current initiatives to stop smoking, including the above-mentioned five interventions, and will power alone. (includes some form of TC, MC, MC+NRT, IC+NRT, IC+Bupr)	-12 months abstinence rates; 7.6% abstinence rate 3.4% current practice cessation rate  Addt'l quitters: 42 (compared with 34 from current practice scenario)	Costs in the current practice scenario were calculated: number of smokers X proportion currently using the intervention X current practice costs per quit attempt  Intervention costs in TC were calculated: number of smokers X 25% of smokers that get the intervention X costs per quit attempt of the intervention.  Current practice: 35€/quit attempt; Interv: 70€/quit attempt  Assuming 1000 participants and an addt'1 42 quitters, addt'1 interv costs for TC: 69,000€ (compared with 1130€ for the current practice scenario)  Costs/ addt'1 quitter: 1640€ (\$2,334) (69,000/42)	the resulting changes in incidence, prevalence, mortality, and costs of 11 smoking-related diseases, i.e., coronary heart disease (myocardial infarction and other coronary heart disease), stroke, COPD, lung cancer, larynx cancer, oral cavity cancer, esophagus cancer, pancreas cancer, bladder cancer, and kidney cancer.	gained (\$2,134) 10 year: 1600€/LY gained (\$2,277); 1200€/QALY gained (\$1,707) 75-year: 1400€/LY gained (\$1,992); 1100€/QALY gained (\$1,565)
Author (year): Hollis et al. (2007)  Study Design: RCT (treated control)	Oregon (state) Age 18 or older, spoke English or Spanish, smoked 5 or more cig per day over the past 6	Oregon Tobacco Quit Line (OTQL)  -Callers randomly assigned to 1 of six interventions in a 3 (behavioral) X 2 (NRT) design that compared	30 days abstinence at 12 month follow-up; outcome relied on self -reported abstinence. Follow-up assessment: Data on tobacco use status	\$2004; state program perspective; CPI= 1.154 -Estimated total training costs and the differential delivery costs for each intervention, including all	N/A	Incremental cost/quit Brief counseling: NA Moderate counseling:

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Economic Method: Cost-Effectiveness	months; planning to quit within the next month (or had quit within the preceding 7 days).  - 60% female, middle aged and half had some college edu; Most were moderate to heavy smokers and nearly half had other smokers in the home;  By design, all participants were planning to quit within the next 30 days. Jan 2001 to Jan 2003. 6-month and 12-month follow-up assessments N=4614 Brief no NRT: n=872 Moderate no NRT: n=718; Intensive no NRT: n=720	brief, moderate and intensive telephone counseling, with or without an offer of free NRT patches  -Used mass media campaigns, direct mailings to select popul (for example, Medicaid) and encouragement to physicians and health plans to recruit tobacco users to the OTQL.  -Experienced telephone tobacco counselors provided the interv after receiving additional theoretical and practical training in motivational interviewing. Training focused on how to adhere closely to the different intervention protocols using computer driven scripting.  All callers mailed a "quit kit"- included a cessation booklet (Stop Smoking, Smoke-Free for Life) and, if applicable, other materials on stress management, smokeless tobacco, secondhand smoke, pharmacotherapy and social support.	were obtained for 67% of randomized participants at 6 months and 69% at 12 months. ITT: Brief no NRT (12%) Moderate no NRT (14%) Intensive no NRT (14%) One-year abstinence rates increased when quitline callers were offered: (1) free NRT patches shipped by mail; and/ or (2) more intensive counseling with follow-up calls. The reduced effect size between 6 months and 12 months also suggests that we need to study increasing booster sessions or repeating the intervention for those who relapse.	labor, facility space and supplies (for example, quit kits). Labor costs included salary and benefits for interventionists, supervisory staff (including medical oversight) and administrative staff. Interventionist time included the actual time spent with individual participants, off-line preparation, training and other administrative functions. Contact time w/participants included screening and enrollment, intervention delivery calls and ad hoc calls. Facility space, technical and administrative support and office supplies were estimated using the indirect cost rate  Incremental cost/quit Brief no NRT: NA Moderate no NRT: \$1912 Intensive no NRT: \$2640  Cost/participant: Brief no NRT: 67 (77) Moderate no NRT: 107 (123) Intensive no NRT: 132 (152)		\$1,912 (\$2,207) Intensive counseling: \$2,640 (\$3,047)

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		Brief counseling: 15- minute call; Moderate counseling: 40-min session + brief follow-up call one to two weeks later; Intensive counseling: 30- min to 40-min counseling session + up to four additional telephone support calls over a three- month period. Each follow-up call incorporated motivational interviewing techniques, stage assessment and relapse prevention, as needed.				
Author (year): Keller et al. (2007)  Study Design: Descriptive  Economic Method: Cost Analysis	Survey co- sponsored by the NAQC and the Association of State and Territorial Health Officials, and funded by the American Legacy Foundation	The North American Quitline Consortium (NAQC) surveyed the 50 states and the District of Columbia to obtain baseline information about the organization, financing, promotion, and cost of state quitlines in the United States;. The Tobacco Technical Assistance Consortium provided database and analytical support Data collection was completed in July 2004. All but one state responded to the survey (50/51, 98% response rate).  Adult smoking prevalence data from 2004 were used	N/A	Median cost per call was calculated using annual call volume data and operating cost data for 2003 for states that reported these data (2003 is the most recent year comparable data were available; data on promotion costs were not included in this calculation)	N/A	\$98.52/call (\$117/call)

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		in combination with census estimates and survey data to calculate per-smoker expenditures.  On May 31, 2004, 38 states reported that they provided quitline counseling services				
Author (year): McAlister et al. (2004)  Study Design: RCT  Economic Method: Cost- Effectiveness	Texas Department of Health in Houston and east Texas. Control: Mailed self-help booklets (n=463) Interv: Booklets + telephone counseling (n=551) -37% men (mean age 41.7years); 63% women (mean age 41.9); 71% "Anglo" or "white"; 20% African American; 5% Hispanic; 4% "other" ethnic Recruitment: June -Nov 2000; 1 year follow up	Recruited by mass media promotion for telephone counseling service established by the American Cancer Society in the summer of 2000 Five sessions were available and clients could "recycle" at least once if they failed to quit or to maintain cessation. Cases who reported that they were abstinent at the time of the call and who experienced no more than five single-day slips (brief relapses) were considered to have maintained cessation  To verify self-reports, 19 participants asked to provide saliva samples for nicotine testing and to confirm non-smoking status at a face-to-face interview; Among this group, 15 attended the interviews and all of them were found to be free of	463 (booklets only)→ 204 (45%) were followed -Causes of loss to follow up: refusal (19%); changes to unlisted or disconnected numbers (55%); and failure to answer (36%).  Quit rates (w/o lost to follow up)	Assume \$2001; \$30/caller (one session)—58% \$100/caller (2 or more sessions)- average cost— 42% \$60/caller( average cost per caller); Cost estimates include staffing, fulfillment, telephone, evaluation, overhead, and infrastructure costs; exclude recruitment costs for promotion of the service.  Cost of taking calls and mailing self-help books to smokers who want to quit, which was the current practice at the call center, was approximately \$15 for each smoker served. Estimated incremental effect on cessation rates, using the most conservative analysis in which non-respondents	N/A	~\$1300/addt'l quit (\$1601)

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		nicotine: 9 (of 12) in the counselling group and 6 (of 7) in the self-help group.		are assumed not to have quit, was 4.5%.		
Author (year): Parker et al. (2007)  Study Design: Observational  Economic Method: Cost Analysis	22 urban prenatal care clinics in Rhode Island, Connecticut, and Massachusetts; low income, pregnant smokers, urban setting N=1065 6 month follow up	Women received quit kit, the Q&W program, and up to three MI telephone calls (n=358)  Each woman was sent a brief "introductory" video to introduce the counselor prior to receiving the first telephone call.  If counselor unable to reach participant by five attempts, a handwritten "help letter" was sent to the participant asking her to call the toll-free number and to inform how best to get in touch; study found handwritten letter or note was more effective than a form letter. About one-third of the women responded to the handwritten note within 72 hr of receiving it.	Urinary cotinine was analyzed to confirm self-reported smoking status using an 80-ng/ml cutoff by the enzyme-linked immunoassay  -intent-to-treat policy for all analyses: women lost to follow-up were counted as smokers.  -86% (306/358) of the women received at least one counseling call, 60% (214/358) received at least two phone calls, and 46% (165/358) received all three calls Quit Rate % (n) No calls: 9.6% (5) One call: 13% (12) Two calls: 16.3% (8) Three calls: 23% (38) Total: 18% (63)	-Assumed \$2006; Clinic Perspective -quit kit development cost and patient cost and time not included in cost estimatescosts of the MI counseling included instructor, MI training preparation, training of the MI staff, MI staff meetings, staff materials, direct services (completed and attempted MI calls), and MI supervisory costs.  The rates used to calculate the costs: (a) cost of the development of the MI training program by the instructor (32 hr X \$50/hr=\$1,600) (b) instructor cost to deliver the 16-hr training program (16 hr X \$50/hr=\$800) (c) bimonthly MI staff inservice instructor costs (15 hr/year X \$50/hr=\$750/year). The total cost for the MI training program was approximately \$3,150.	N/A	\$85/quit (\$92)

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				-The cost of training of MI staff was approximately \$775 (31 hr=16 hr training+15 hr bimonthly meetings X \$25/hr) and materials cost (\$50). Thus the total staff cost (four MI counselors) to participate in training was about \$3,300 (4 X \$825). The sum of all training costs was approximately \$6,450.  Assuming that each MI counselor would provide counseling to at least 100		
				pregnant smokers per year for a total of 500 pregnant smokers, the per-patient cost of a trained counselor was approx \$13 (\$6,450/500). The admin time and cost to supervise the MI counseling service was estimated to be approximately 100 hr (2 hr/week) at \$40/hr (salary and fringe), or \$4,000/year. Assuming four part-time MI staff and at least 500 patients counseled per year, the supervision cost would be \$8 per patient. Thus the total MI program training		

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				cost would be approximately \$20/hr per patient.		
Author (year): Shearer et al. (2006)  Study Design: RCT  Economic Method: Cost- Effectiveness (calculated by CG)	Meta-analyses, systematic review, and RCT studies N=100; 6 month follow up	Effectiveness data were obtained from a review of the international literature. Results were then limited to RCT, systematic reviews, meta-analyses or economic evaluations published in peer-reviewed journals in English Costs and effects of telephone smoking cessation interventions were estimated. Treatment costs and effects were modeled using incremental cost-effectiveness ratios; Proactive telephone counseling involves telephone counselors actively calling clients using individually tailored call-back schedules that match clients' personal circumstances and identified peak relapse risk periods.  Counselor contact time is ~39 minutes (pro-active counselor time is ~47 minutes—more relevant in NRT+counseling)	-Estimated six-month natural quit rate of 4%* -self-reported or biologically validated -Quit rate estimates were sourced from the previously referenced meta-analyses. Meta-analysis was not available for bupropion plus telephone counseling, NRT plus telephone counseling and bupropion plus NRT, and quit rate estimates for these are based on the cited studies.  Quit rate (minus 4%) Telephone counseling: 5% Telephone + NRT: 13% Proactive telephone + NRT: 23% *based on a comprehensive review of relapse among smokers who tried to quit without	-Australian government perspective; 2003 Australian dollars (PPP=1.41)  -Addition of pharmacotherapies to telephone counseling increased the number of successful quitters but at a relatively high cost; Adding proactive counseling to pharmacotherapy appeared to improve outcomes at a small cost and therefore appeared to be highly cost effective.  -The hourly cost of telephone counseling has been based on initial consultation fee for social workers paid by the Australian Federal Government. This estimate, which is recommended for submissions to the Pharmaceutical Benefits Advisory Committee (PBAC), includes salaries, benefits and infrastructure costs, thus increasing the	N/A	CG calculated C/E ratio: 25.46/.05= \$509.20/ additional quit

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			treatment and Cochrane meta- analysis of brief physician advice.	comparability to government-paid medical consultation fees  -Multi-way sensitivity analysis was used to examine the impact of uncertainty on resource use, prices and outcomes on the costs of treatments.  -Bupropion is listed for public subsidy on the Australian		
Author (year): Swartz et al. (2005)  Study Design: Pre-Post  Economic Method: Average Cost	Maine (statewide) -Compared to smokers statewide, callers were more likely to be aged 45 to 64, female, or uninsured. N=1067 (random sample n=600) January 2003 to December 2004	specialists focus on relapse prevention. Specialists	Abstinence measures based on self-report and included 7-day point prevalence, 30-day point prevalence, and continuous abstinence.  Intent-to-treat quit rates at 6 months: 6.1% (self-help) 12.3% (counseling) 22.5% (counseling + NRT)	-Assumed \$2004 HelpLine costs included direct costs for administration, counseling, self-help materials, and telephone. Promotion and evaluation cost not included. Costs per quitter estimated using the intent-to-treat quit rates at 6 months (30-day point prevalence) from the quit survey, applied to the delivery of services provided in 2003–2004. The mean cost of providing HelpLine services was \$201 per tobacco user.	N/A	\$201/tobacco user (\$232)

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		survey goal was to interview 600 randomly selected smokers from this time interval.				
Author (year): Tomson et al. (2004)  Study Design: Observational  Economic Method: Average Cost	-Swedish population; n=1131; see Table 1 for details on characteristics -majority of callers were women (80 percent).  22 month study period; Feb 2000-Nov 2001	Assess costs of the Swedish quitline over 22 months in relation to the number of quitters during the same time and to available data about life years saved for those who quit smoking	-12 month abstinence; Abstinence was defined as not a single puff of smoke 7 days before follow-up by self-report.  -After 1 year, 354 (31%) smokers reported abstinence; a more conservative approach also taken into account—assumed 274 (24 %) abstinent after 1 year—take into consideration the spontaneous quitters (7%), those who already had stopped before first call (23%), those relapsing (70%), and those who will be helped (45%).	-SEK to USD, used an average exchange bank rate for 2002 of 9.721; CPI= 1.212  -Costs discounted at 3% and 5% over the 22-month period;  -Dominant cost item of the quitline: salary including social overheads (see Table 2); second largest cost item summarized as "cost of services" includes rent of office premises, equipment, information technology services, printing, advertising, telephone, fax, travel, cleaning, and cost of consultants. Cost of material includes office supplies, library service, forms, stationary, and miscellaneous costs.  - The cost per quitter for the Swedish quitline was between 1,052 and 1,360 USD (assuming 31% or 354 smokers; 24% quit rate)	N/A	1,052-1,360 (1,275-1,648) USD/per quitter

Tobacco Use: Quitline Interventions – Economic Evidence Table, Counseling and Cessation

## <u>Abbreviations</u>

CPI, consumer price index PPP, purchasing power parity

SEK, Swedish krona USD, U.S. dollar