Reducing Tobacco Use and Secondhand Smoke Exposure: Reducing Out-of-Pocket Costs for Evidence-Based Cessation Treatments

Summary Evidence Table – Economic Review

Study	Cessation Benefit Details	Comparison	Perspective	Population	Cost	Effect	Benefits	Outcome Measure
Bertram 2007	NRT patch (6-12 weeks); Bupropion (7 weeks); combined strategy	Do nothing (ongoing mass media campaign, taxation on cg)	Health System (includes gov't and patient contributions to drug costs and medical visits)	General population	NRT (based on 6 pharmacies): A$220 to A$890 w/midpoint of A$533 depending on length of treatment and strength of patch Bupropion: 7-week course $A238.95	Natural quit rate: 8.6% Use meta-analysis: Bupropion OR: 2.05; NRT OR: 1.77	Quitting smoking can increase life expectancy of current smokers by 1–7.6 years depending on age at cessation and sex.	Bupropion: A$7,900/DALY averted NRT: A$17,000/DALY averted

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Curry 1998	behavioral program and NRT Standard plan→ reduced, full, or flipped No coverage→ reduced	Serve as their own control (5 employer groups under same HMO)	Cost to health plan and user	Employees within HMO	cost of drug co-pay, personnel, and cost of behavioral program	Standard: 38% Reduced: 31% Flipped: 33% Full: 28% Full less motivated to quit compared to those who payed co-pay?	N/A	Average cost per quit: (health plan; user) Standard: $797; 130 Reduced: $801; 326 Flipped: $870; 166 Full: $1,171; 21 -w/5% background cessation rate, cost to health plan: Standard ($918) Reduced ($955) Flipped ($1,025) Full ($1,425)

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Halpern 2000	bupropion hydrochloride, NRT; no, low and high counseling	No benefit (modeled)	4 managed care scenarios: W, NE, MW, S 4 employer scenarios: W: professional and related services NE: finance, insurance, and real estate MW: public administration S: manufacturing	General population—MCO and employer Additional Cost Data - Price for Bupropion SR based on 1997 average wholesale price (AWP). Employers & managed care plans (non-Medicaid) receive 13% discount from the AWP; Bupropion SR requires two prescriptions, → 2 copays of $8; two dispensing fees (charged to the employer or managed care plan) of $2.50/each; Medicaid plans receive	*cost for counseling, nicotine patch, physician visits, missed work for physician visits, and cost for bupropion SR -see next column for costs - Coverage of smoking-cessation benefits by employers and health plans includes paying for bupropion SR, physician visits to receive a bupropion SR prescription, and time off from work for these physician visits. Smoking-cessation interventions are associated with one of three levels of counseling: none, low, and high. (Additional Cost data provided in Population column)	(non drug cost* ;%) No Counseling Bupropion SR Alone (0; 13.7) Bupropion SR+nic patch (161.22; 18.9) Nicotine patch alone (144.13; 7.7) No Aids (0;1.3) Low Counseling Bupropion SR (37.79; 15.4) Bupropion SR+nic patch (179.68; 20.6) Nicotine patch alone (162.59; 9.4) No aids (37.79; 3.2) High Counseling Bupropion SR (75.55; 23) Bupropion SR+nic patch	MCO: Among the 4 regions, at the end of 20 yrs an addt'l 1631-2034 people quit smoking, 316-398 COPD cases were avoided and 30-37 deaths were postponed. Employers: Among 4 scenarios of 20 yrs an addt'l 1953-3886 people quit smoking, 420-670 COPD cases were avoided, and 36-69 deaths postponed.	Managed care scenarios: overall decrease in health care costs over a 20-yr period ranged from $7.9 to $8.8 million; for every dollar spent covering smoking cessation, $4.10-$4.69 in health care costs was saved Employer-based scenarios: health care costs over 20 yrs decreased by $8.3 million to $14 million; smoking-related indirect costs decreased an addt'l $5.1 million to $7.7 million; for every dollar spent covering smoking cessation, $5.04-$6.48 was saved.

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Halpern 2007	Durations of therapy for varenicline and bupropion were 12 weeks; Duration of therapy for NRT was obtained from the Jorenby et al study, which included use of nicotine patches for 9 weeks. -all receive counseling session (10 min)	No benefit (modeled)	Hypothetical cohort of 10,000 workers; Popul characteristics based on 2005 US current popul survey;		$199k to $2.7 million (among 4 managed care scenarios: W, NE, MW, S); Quit attempt: $122	-Sustained cessation at 1 year after the cessation attempt -Cessation rates for NRT and minimal counseling 1.7% lower than rates for indiv receiving NRT and low to moderate counseling;	Total savings from benefit coverage (decreased healthcare and workplace costs) exceeded costs of the benefit within 4 years. -Total savings per smoker ranged from $350 to $582 at 10 years and $1152 to $1743 at 20 years. Total savings range from 40,758 to $7,398,368	

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Halpin 2006	Zyban and NRT patch, inhaler, and nasal spray $15 copay + free counseling; prior did not provide coverage for any smoking cessation benefits; 12 week course of treatment	3 arms (RCT) Drugs only Drugs + counseling Drugs if counseling	CA PPO	Subset-employees in CA PPO	Self-help kit ($27) Zyban ($205) NRT patch ($295) NRT nasal spray/inhaler ($427) Proactive counseling ($185)	Drugs only (n=126) Quit attempt during study n=69; 55% Quit during study n=46; 37% Prevalent abstinence n=24; 19% Drugs +Counseling (n=140) Quit attempt during study n=60; 43% Quit during study n=37; 26% Prevalent abstinence n=18; 13% Drugs if counseling (n=122) Quit attempt during study n=57; 47% Quit during study n=38; 31% Prevalent abstinence n=22; 18%	NA	Group with drug coverage only had lowest costs per participant ($85) and all study outcomes

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Hughes 1991	NRT (+brief (10 min) counseling) Arm1: Free Arm 2: $6/box	Arm 3: $20/box	Insurance plan; HMO	Rural family practice; low-income	Physician time: $150/hr, nicotine gum at $24/box, cessation booklets $2.50 each, patient time $10/hr.	Free: 19% $6/box: 6% $20/box: 8%	cost/benefits accruing from avoidance of lung cancer, CHD, COPD;	Savings/subject enrolled: Free: $1120 $6/box: $280 $20/box: $413 results suggest that smokers might be given free gum for the recommended 3-4 month period and charged for the gum thereafter

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Jackson 2007 (Gonzalez 2006)	Bupropion (2) and Varenicline Each group received 12 wks of treatment; attended weekly visits to the clinic, where smoking status, medication compliance, and safety were assessed; counseling; Full coverage by employer	N/A	Employer	Subset	Total cost per treatment: $639.80 Varenicline $598 Bupropion (g) $717 Bupropion (b) $371 placebo -The total cost of treatment was assumed to include the costs of the drug, an initial physician visit, and subsequent visits for counseling	Primary endpoint: (weeks 9 to 12 of 12-week period) Varenicline: 44% Bupropion: 29.5% Placebo: 17.7% Secondary endpoint: (weeks 9 to 52) Varenicline: 21.9% Bupropion: 16.1% Placebo: 8.4%	Non-health insurance related costs (eg, relate to worker's compensation, and accidental injury and fire insurance), since smoking is still possible at the worksite in approved areas; lost work time (time spent on smoking breaks and time spent seeking health care) eg, repiratory-related disease); cost of morbidity and early mortality estimate annual cost from discounted lost earnings from the future were excluded since this study evaluates 1 yr time period.	Varenicline provides the greatest net benefit to the employer. For every 12 months estimated cost savings: Varenicline: $540.60 Bupropion (g): $269.80 Bupropion (b): $150.8 Placebo: $81.80

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Javitz 2004 (benefits derived from Warner)	Compared 2 bupropion regimens (150 mg and 300 mg/day, each administered for up to 8 weeks) with two different counseling approaches (proactive telephone counseling, tailored mailing)	N/A	Group Health Cooperative (insurance plan)	Subset-employees within HMO	personnel time involved, local wage rates and overhead benefits, facilities costs, time spent on indirect tasks related to an ongoing smoking cessation behavioral intervention program (departmental meetings, quality control activities, etc.), telephone costs, management costs, printing, and postage	12-mth cessation rate (incremental): 150 mg/PTC 31.4% (20.4) 300mg/PTC 33.2% (22.2) 150mg/TM 23.6% (12.6) 300mg/TM 25.7% (14.7)	-Benefits were 24.8% from reduced medical expenditures 18.9% from reduced absenteeism (i.e., a reduction of 3.9 illness days for men and 2.1 illness days for women, prorated by years after cessation), and 52.9% from on-the-job productivity gains - a 5-year benefit of $3744 per 12-month quitter	Net benefit: 300-mg/PTC and the150-mg/PTC approx equally preferred

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Joyce 2008	Provider Counseling Provider counseling + meds ($5 copay) Quitline + optional meds	Usual care	US gov't-Medicare	Subset-Medicare population	Cost of developing and operating the enrollment center→$4,027,946 (22%were development costs incurred before the start of enrollment and 78% were operational expenses) Some development costs were applicable to the demonstration itself and would not be incurred if any of the services were to become a part of a Medicare benefit (e.g., survey instruments, some data collection).	Additional Cost Information Other development costs were one-time expenses that comprised a small fraction of total program costs (e.g., developing data systems)-excluded from analysis; remaining development costs were apportioned equally across the three active interventions (not Usual Care).	N/A	Additional cost to Medicare per quitter (relative to Usual Care) ranged from $463 to $6,450, with the average cost per quitter increasing with the intensity of resource use—Results not shown in paper (only in narrative form)

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Kaper 2006	Reimbursement for NRT, bupropion, and behavioral counseling for 6 months	Usual Care	Netherlands (north)- random sample of inhabitants of Friesland.	societal	-overhead cost, cost of treatment, consultation by general practitioner, nurse, comm. health worker	Abstinence from smoking at 6 months Control group (2.8%): 18 people Intervention group (5.5%): 35 quit smoking.	Cost of lost productivity—mean days of sickness	Cost/additional quitter: €1148; €1802 per QALY. Not sure if we should use this: if society is willing to pay €1000 for a QALY there is a 43% to 46% probability that the intervention will be cost-effective for relapse rates between 20% and 50%. If society is willing to spend €10000, this probability rises to 86% for a relapse rate of 50% and to 91% for a relapse rate of 20%

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Levy 2006	Behavioral therapy, NRT (gum, patch, lozenge), Bupropion	No benefit (modeled)	-Insurer and employer perspective	Subgroups defined as “white collar workers,” “blue collar workers,” “service workers,” and “farm workers.”—results in Table 5 (based on 1997-2002 National Health Interview Surveys)	Group or individual therapy; in-person or phone-improves quit rates by 56%, cost $120/quit attempt NRT- patch, gum, or lozenge ($300/successful quit) or inhaler or nasal spray (cost/quit estimates unavail), improve quit rates by 66% (gum) to 135% (nasal spray) Burpropion improves quit rates by 106% and costs $250/successful quit	low to high effectiveness 5.9% to 28.6%	-Insurer calculates medical expenditures; Employer models, marginal savings from reducing productivity losses and absenteeism Additional Conclusions For employers, the model predicts that adding smoking cessation benefits can achieve reductions in total expenditures relative to not covering smoking cessation treatments within 3 to 8 years.	Insurer: saving achieved year 8; benefit-cost ratio .56 to 1.67 PMPM: $-.22 to .43 Employer: Savings achieved year 3; benefit-cost ratio 1.88 to 5.58 PMP M: -$1.23 to -$.15 From the insurer’s perspective, the model predicts that the costs of providing a smoking cessation benefit either do not outweigh the reductions in medical expenditures or take too long to support a business case argument, as it is put forth here.

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Nielsen 2000	Nicotine patch and bupropion HC1	Placebo	-Employer	-costs, quit rates, and expected benefits were taken from meta-analyses and a national survey of nicotine patch users who received a smoking-cessation consultation from a pharmacist.	Bupropion: $163.49; NTP: $245.24;	Abstinent if no smoking since preceding clinic visit and had expired carbon monoxide concentration of 10 ppm or less at clinic visits during 12-month study Quit Rates: Placebo (15.6%) NTP (16.4%) Bupropion (30.3%) Bupropion/NTP (35.5%)	potential benefit to employer assumed to be $1,654 (1998 dollars) in the 1st year; savings from reduced absenteeism, medical care and worker's compensation cost, & lost productivity	Net Benefit: $338 Bupropion $258 Placebo $178 Bupropion /NTP $26 NTP -all provide net benefit but bupropion is most cost-beneficial

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Richard 2012	Copayment ranging from $1 to $3 per month for a nicotine patch, gum or lozenge, bupropion (e.g., Zyban) or varenicline (Chantix). -Also offered up to five sessions of free telephone counseling for the state's quit line (although this was not required to get medications).	Pre-post (serve as their own control)	Massachusetts state gov't-Medicaid	Medicaid	Cost of pharmacotherapy, counseling, and program outreach and promotion for fiscal years 2007, 2008, and 2009	~ a 37% use rate; successful in contributing to a 10% reduction in the rate of smoking	Examine changes in hospitalization trends among 21,656 Medicaid beneficiaries before and after the use of the tobacco cessation benefit, adjusting for demographics, comorbidities, seasonality, and other factors. Administrative data indicated that program costs including pharmacotherapy, counseling and outreach costs about $183 per program participant.	ROI-$2.12 return for every $1 spent

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Salize 2009	21 GP practices; 140 patients Patient expenses reimbursed up to 130€ (representing the estimated typical cost of the recommended treatment schemes) + provision of a 2-hour cost-free group tutorial for GPs in methods of smoking cessation promotion.	Usual care (TAU)	Germany—GP office	Health insurance perspective From this perspective, the study design addresses the question of whether financial incentives should be directed to physicians or to patients or whether instead both parties should be rewarded in order to increase abstinence	The costs for each group tutorial session were calculated at €1000, including all expenditures and fees for the tutor (free for GPs) ICs (Mean intervention costs) per patient and arm Counseling of patient: 7.50€ Training of GPs: 1.97€ NRT and/or Bupropion Hydrochloride: 29.63€ Total ICs per Treated patient: 39.10€ Total ICs: 5,474€ TM (GP training+med) vs TAU (treatment as usual): 4.14	12 months TAU: 2.7% TM: 12.1%	N/A	TM (GP training+med) vs TAU (treatment as usual): 4.14

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Schauffler 2001	Self-help kit + fully covered OTC NRT gum and patch + group counseling w/n no cost sharing	Self-help kit (video + pamphlet)	HMO-CIGNA's or Blue Cross of California's HMO	Health Insurance	Average costs per quitter were US$1495; costs per additional quitter for full coverage compared with no coverage were US$1247; Control group costs amounted to US$29 per participant, for the self-help kit (reported from Cochrane review)	No smoking 7 days within 12 month period Interv 18% Control 13%	N/A	Average costs per quitter: $1495 costs per additional quitter: $1247 $0.73/HMO member per month

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Tremblay 2009	Assess costs of reimbursing meds between Oct 2000-Dec 2004 In Oct 2000 the nicotine patch (7,14, 21mg), nicotine gum (2,4 mg) and Bupropion (150mg) added to the general list of meds reimbursed under Quebec's public drug insurance plan (RPAMQ). "RPAMQ" reimburses the cost of smoking cessation medication for 12 consecutive weeks, once a year, when prescribed by a health professional.	N/A	Canadian gov't; Users of Quebec's public drug insurance plan	Canadian gov't	Costs to the RPAMQ included medication costs and pharmacists' service costs. They did not include the contributions of insured persons	Study can't be used to evaluate the specific contribution of the reimbursement provision in reducing the smoking prevalence in Quebec from 30% in 2000-2001 to 25% in 2005 because other cessation interventions were also introduced, such as quitlines	N/A	Average cost/user/year: $67 – $159 depending on medication

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Vemer 2010 (Kaper 2005)	6 month reimbursement - NRT, bupropion and behavioral counseling; leaflet with a description of the type of smoking cessation support (SCS) 2 groups—trial based scenario and lit-based scenario Trial- based on empirical data Lit-based- trial + cessation rates from international meta-analyses (modeled)	Control group	Dutch region of Friesland; health care perspective		Costs of SCS: control (€3.14) interv (€14.06) *Overhead costs* Application for reimb: control (0) interv (€1.20)*;* Identifying smokers and informing them about the reimb policy: control (0) interv (€7.32); Total costs/smoker in the trial-based reimb scenario: control (€3.87) interv (€22.58)	12 month assessment; abstinent for at least 6 months: 2.8% (control) 5.5% (intervention)	Comparison to reference scenario; Trial-based reimb scenario raised the # of QALYs w/a maximum of 2400/yr in 2036; at this point, the largest proportion of the smokers who quit during the intervention were reaching an age where they would have developed one of the smoking related disease in the CDM; In the lit-based reimb scenario, health benefits were lower than in the trial-based reimb scenario; the # of QALYS gained reached a peak in 2036 at 1000 QALYs/yr.	20 years: Trial-based: 6100/QALY gained (interv costs) 3930/QALY gained (total costs) Lit-based: 20,530/QALY gained (interv costs) 18,360/QALY gained (total costs)

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Warner 1996	Medication and counseling	No benefit offered (modeled)	Employer	Blue collar manuf work force of 10,000 employees	Assume cost to be $150/participant (represents a group rate for intervention w/multiple session and behavioral counseling techniques; cost includes program planning, recruiting participants, securing space, etc)	"Background quit rate": 2.5%; assume 4.5% quit rate in intervention	Calculated reductions in health care costs, absenteeism costs, on-the-job productivity losses, and life insurance costs.	Benefit to cost ratio: 8.75 (year 50) Savings>costs between years 3 (.97) and 5 (1.74).
Warner 2004	Medication and counseling	No benefit offered (modeled)	Employer	Size of initial cohort: 450,000 #current smokers: 71,538	Assume cost of $350 per participant in smoking cessation treatment (figure drawn from lit and from discussion with program managers at MCO); cost reflects continuing per participant cost of a smoking cessation program and not one-time start-up costs of a program	Estimate conservatively 15% of participants quit smoking permanently due to program (Fiore 2000, Amer Assoc of Health Plans 2001)	1st 5 yrs of coverage, 54,488 members will utilize coverage of cessation benefit→ 4,892 more members quit smoking 30 yrs→ 337,010 member use service→ 19,881 quit as result of coverage Lifetime→ coverage induced quitters gain 7.1 yrs of life	At 5 yrs, coverage of cessation services costs MCO $.61 per member per month; over 30 years, net cost is $.41 per member per month; quitters gain an average of 7.1 LY with a direct coverage cost of $3,417/LYS ; with lifetime medical costs: $4,730/LYS