Cost-effective Primary Care–Based Strategies to Improve Smoking Cessation

More Value for Money

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Background: Evidence from cost-effective smoking cessation programs is scarce. This study determined the cost-effectiveness of 3 smoking cessation strategies as provided by general practitioners (GPs) in Germany.

Methods: In a cluster-randomized smoking cessation trial, rates and intervention costs for 577 smoking patients of 82 GPs were followed up for 12 months. Three smoking cessation treatments were tested: (1) GP training plus GP remuneration for each abstinent patient, (2) GP training plus cost-free nicotine replacement medication and/or bupropion hydrochloride for the patient, and (3) a combination of both strategies. Smoking abstinence at 12 months was the primary outcome used to calculate incremental cost-effectiveness ratios and net monetary benefits.

Results: Intervention 1 was not effective compared with treatment as usual (TAU). Interventions 2 and 3 each proved to be cost-effective compared separately with TAU. When applying a 95% level of certainty of cost-effectiveness against TAU, €9.80 or €6.96, respectively, had to be paid for each additional 1% of patients abstinent at 12 months (maximum willingness to pay). That means that in intervention 2, €92.12 per patient in the program must be invested to gain 1 additional quitter (as opposed to €39.10 paid per patient during the trial). In intervention 2, the cost was €82.82, as opposed to €50.04. Neither of these 2 cost-effective treatments proved to be superior to the other. The cost-effectiveness of both treatments was stable against TAU in sensitivity analyses. (The exchange rate from October 1, 2003, was used; €1 = $1.17.)

Conclusions: Both treatments have a high potential to reduce smoking-related morbidity at a low cost. It is highly recommended that they be implemented as a routine service offered by GPs because in many countries, health insurance plans currently do not fund nicotine replacement therapy.

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GIVEN THE MORBIDITY, mortality, and financial burden caused by tobacco use, cost-effective smoking cessation programs are relevant to primary public health care. A variety of interventions to effectively curb smoking have been tested, including psychological interventions, behavioral programs, and drug-based nicotine replacement therapy (NRT). Although many studies have confirmed the efficacy of these interventions,[1-6] cost-effectiveness studies are scarcer and may yield conflicting results as to which intervention is preferable from a health-economic standpoint.[7-9]

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The cost of NRT seems to be generally low. A recent meta-analysis[10] identified average costs per quitter ranging from $260 to $2330. Consequently, the cost-effectiveness of NRT tends to be high, even if yielding only moderate quitter rates. Thus, it also seems to be better than that of many other accepted health care interventions.[6]

See Invited Commentary at end of article

As a consequence, the cost-effectiveness of NRT or other smoking cessation treatments is worth a more detailed analysis. We assessed the cost-effectiveness of several smoking cessation aids applied by general practitioners (GPs) alongside a cluster-randomized controlled trial in Germany. National health insurance plans in Germany currently do not cover NRT, although productivity losses resulting from smoking are estimated at €7.3 to €14.4 billion annually ($8.5-$16 billion).[11-13] Specifically, we aimed to discover whether synergistic economic effects result from

combined smoking cessation methods or programs offering NRT and the application of bupropion hydrochloride in primary care. (The exchange rate from October 1, 2003, was used in this study; €1 = $1.17.)

METHODS

DESIGN OVERVIEW, SETTING, AND PARTICIPANTS

From October 2002 through September 2004, a cluster-randomized trial among smoking patients of GPs was conducted in a southwestern region of Germany. Of 248 GPs who had participated in an earlier survey on the promotion of smoking cessation,[14] 174 who reported having conducted at least 390 general health screening examinations during the previous 3 months were selected and invited to participate in patient recruitment. Ninety-four GPs working in 82 office practices finally agreed to collaborate and were included in the sample.

RANDOMIZATION AND INTERVENTIONS

The practices were randomly allocated to 4 intervention arms in a 2×2 factorial design crossing 2 interventions.[15] Patients aged 36 to 75 years who smoked at least 10 cigarettes per day and who visited GP practices for a general health examination (which in Germany is offered biannually to patients aged ≥36 years and is free for all persons covered by compulsory health insurance funds) were eligible for the trial. According to the "systemic" nature of interventions, which may operate by increasing the willingness to attempt quitting as well as the success rate of attempts to quit, patients could participate irrespective of their intention to quit smoking. Written informed consent was obtained in each case. The ethics committees of the University of Heidelberg and the Medical Association of the Federal State of Baden-Wuerttemberg approved the study. Two interventions were provided to the GPs:

- *Training and incentive (TI) intervention* included the provision of a 2-hour cost-free group tutorial for GPs in methods of smoking cessation promotion. In addition, GPs were guaranteed, for each study participant who was proven abstinent at the 12-month follow-up, a financial remuneration of €130 on study completion.
- *Training and medication (TM) intervention* included the provision of the same group tutorial. In addition, GPs were given the opportunity to prescribe medication (ie, NRT and/or bupropion, cost-free to participants). Patients' expenses were reimbursed up to a maximum of €130 (representing the estimated typical cost of the recommended treatment schemes).

Of the 82 practices, 20, 21, 21, and 20 were randomized to treatment as usual (TAU), TI intervention, TM intervention, or a combined intervention of TI and TM (TI/TM), respectively. Sampling, randomization procedures, and clinical results (point prevalence of abstinence after 1 year) are described elsewhere in more detail.[15] Owing to missing data, 10 of the 587 patients from the original sample were excluded from the economic analyses.

The health economic analyses adopted a health insurance perspective. Identification of productivity losses or societal cost was not intended. 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. From a methodological point of view, this design is complex because cost-effectiveness studies usually compare 2 treatments with each other, whereas in our study at least 6 treatment alternatives had to be analyzed (the TI, TM, and TI/TM arms each individually against TAU, as well as against each other, should more than 1 treatment prove to be more cost-effective than TAU).

STATISTICAL ANALYSES

Costing Procedures

In the first step, unit costs for each element of the treatments were summed to overall treatment costs for each arm. All costs were calculated in euros and related to prices in 2003, the year of the trial. Because no analysis of long-term benefits was intended, costs and outcomes were not discounted.

The costs for each group tutorial session were calculated at €1000, including all expenditures and fees for the tutor. Group tutorial sessions were free for GPs. To generate patient-level costs, the total tutorial costs were divided by the caseload (number of patients in the trial per GP who attended the tutorial sessions). The tutorial for GPs covered issues such as the stages-of-change model, approaches to smoking cessation counseling in general practice, or the potential of pharmacological support. The GPs themselves determined how to implement this knowledge into care for individual patients. In most cases, smoking cessation counseling was combined with consultations for other conditions, which made it impossible to measure the actual number of sessions related to smoking cessation. Thus, in the treatment arms (TI, TM, and TI/TM), 1 GP contact per patient was estimated for counseling the patients or providing prescriptions. No extra GP visits were scheduled for study purposes. The cost of a GP counseling contact (€7.50) was obtained from the official German scale of fees for health services ("Gebührenordnung für Ärzte"). For the costs of NRT and/or bupropion in the TM arm and TI/TM arm, the actual reimbursements to the patients after the follow-up were summed up to a maximum of €130 each. Expenditures exceeding the upper limit of €130 (which were reported in 25 cases only and were below €165 in all but 4 cases; maximum, €186) or expenditures that were made but not claimed were not considered. Remuneration costs were calculated at €130 per patient abstinent at 12 months after recruitment.

Outcomes and Effectiveness

Treatment costs were related to the major clinical outcomes of the original trial. These were defined as the percentage of patients in each arm abstinent at 12 months after recruitment (point prevalence). Only those participants reporting themselves smoke-free and with serum cotinine levels lower than 15 ng/mL were considered abstinent. All remaining participants were classified as smokers (intention-to-treat approach). Cotinine levels were measured to ensure the validity of the results but would not be part of any routine implementation of the intervention. The costs were therefore not considered in this analysis.

Incremental Cost-effectiveness

Incremental cost-effectiveness ratios (ICERs) were calculated in the next step; these are defined as the difference of cost means (cost per treated patient under new treatment minus cost per treated patient under TAU) divided by the difference of mean effects (percentage of abstinent patients after new treatment minus percentage of abstinent patients after TAU). Thus, ICERs indicate the additional cost for each additional unit of outcomes.[16] Three ICERs had to be calculated initially (TI vs TAU, TM vs TAU, and TI/TM vs TAU). Owing to the nonnormal distribution of the ICERs, we applied nonparametric bootstrap-

Table. Clinical Outcomes and Mean Intervention Costs (ICs) per Patient and Treatment Arm

Treatment Arm	GP Practices, No.	Patients, No.	PPA at 12 mo, No. (%)	ICs per Patient, Mean (€)[a]					
				Counseling of Patient	Training of GPs[b]	NRT and/or Bupropion Hydrochloride	Remuneration of GPs	Total ICs per Treated Patient	Total ICs
TAU	20	74	2 (2.7)	0	0	0	0	0	0
TI	21	144	5 (3.5)	7.50	2.14	0	4.51	14.16	2039.05
TM	21	140	17 (12.1)	7.50	1.97	29.63	0	39.10	5474.00
TI/TM	20	219	32 (14.6)	7.50	1.89	21.65	18.99	50.04	10 958.76

Abbreviations: GP, general practitioner; NRT, nicotine replacement therapy; PPA, point prevalence of abstinence; TAU, treatment as usual; TI, training and incentive; TM, training and medication.

[a] The exchange rate from October 1, 2003, was used; €1 = $1.17.

[b] Tutorial sessions.

ping techniques in order to estimate their variability because bootstrapping does not assume parametric distribution.

Net Monetary Benefit

Because bootstrap confidence limits are considered problematic when the denominator in ratio statistics like the ICER approaches zero,[17] we chose the net monetary benefit transformation as an alternative approach and combined it with the acceptability criterion for cost-effectiveness. This acceptability criterion is based on the probability that an estimated ICER will fall below a specified acceptable upper limit λ ($\Delta C/\Delta E < \lambda$), where C indicates costs and E indicates effectiveness. This upper limit is referred to as the *ceiling ratio* or *maximum willingness to pay*. The probability is calculated as the proportion of bootstrap replicates falling on the "acceptable" side of a line representing λ. To construct so-called cost-effectiveness acceptability curves (CEACs), the proportion of bootstrap replicates (ΔC, ΔE) on the acceptable side (ie, where the intervention is cost-effective) is usually plotted as a function of λ.[18] This leads in a natural way to the net monetary benefit approach on rearrangement of the decision rule of the acceptability criterion $\Delta C/\Delta E < \lambda$ to $\Delta C < \lambda\ \Delta E$ and $\lambda\ \Delta E - \Delta C > 0$, where the left-hand side of the latter expression defines a monetary net benefit measure NB. If $NB(\lambda) > 0$, then the new treatment is considered to be cost-effective and is recommended to replace TAU. Therefore, any proportion of bootstrap replicates with ICERs lower than λ is equivalent to the proportion of a positive NB.[17,19,20]

Sensitivity Analyses

We performed several multiway sensitivity analyses by varying the outcome criteria (point prevalence of quitters at 12 months) or by conducting the analyses with varied intervention costs (cost-free advice by GPs and reduction of the tutor costs from €1000 to €300). All analyses were performed with SAS statistical software (version 9.1; SAS Inc, Cary, North Carolina).

RESULTS

OUTCOMES AND INTERVENTION COSTS

The **Table** shows the mean costs of the various intervention elements, as well as the total intervention costs per patient in each study arm (base-case analyses). The Table also shows the outcomes for each treatment arm. Because all treatments in the intervention arms were more costly than TAU, only those interventions that yielded significantly better outcomes were eligible for further cost-effectiveness analyses (because it does not make sense to opt for a more expensive treatment if it does not yield better results). According to the results of the original trial, the point prevalence of abstinence at 12 months in the TM arm and TI/TM arm differed significantly from that of TAU ($P = .05$ or $P = .02$, respectively), whereas in the TI arm it did not ($P = .75$, for mixed logistic regression).[15] Therefore, the TI arm (remuneration) was dropped from further cost-effective calculations, whereas the TM arm (reimbursement) and TI/TM arm (remuneration and reimbursement combined) remained in the analyses.

INCREMENTAL COST-EFFECTIVENESS RATIOS

The ICERs of these 2 remaining alternatives were 4.14 (TM vs TAU) and 4.21 (TI/TM vs TAU). The positive ICERs of both remaining new interventions suggest that each is more costly, but also more effective, than TAU. To overcome the statistical uncertainty of the 2 ICERs, we performed 2000 bootstrap replications each of the observed cost and outcome data. To demonstrate the results, the scatterplot of the bootstrapped ICER of the reimbursement strategy (the TM arm) vs TAU is shown in **Figure 1**. The scatterplot of the ICER of the TI/TM arm vs TAU looked rather similar. The plotted line in the cost-effectiveness plane suggests a specific ceiling ratio (λ) and separates 95% of all bootstrap replicates to its right side. The slope of this line in this case is 9.80. The proportion on the right side of the line is equivalent to the proportion of a positive NB.

According to this method, the bootstrap replicates of both empirical ICERs were then transformed to CEACs. Results are shown in **Figure 2**. As described, CEACs represent the proportion of bootstrapped ICERs that are considered cost-effective for a range of values of λ. The horizontal axis of Figure 2 represents the range of values of λ as derived by bootstrapping. The vertical axis represents the probability at a given λ that the new treatment will be cost-effective against TAU by the proportion of bootstrap replicates with a positive NB. Figure 2 shows the acceptability curves for the 2 treatment alternatives still in question as a cost-effective smoking cessation strategy (TM vs TAU, TI/TM vs TAU).

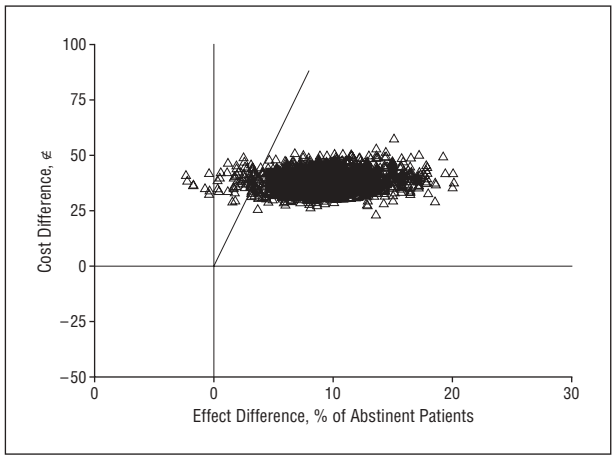

Figure 1. Bootstrapped scatterplot of the incremental cost-effectiveness ratio (ICER) for the training and medication arm vs the treatment-as-usual arm in the northeast quadrant of the cost-effectiveness plane. The plotted line (slope = 9.80) separates 95% of all bootstrapped ICERs to the right.

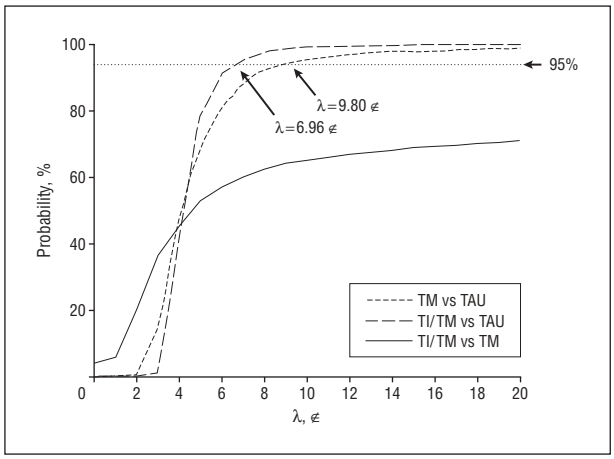

Figure 2. Cost-effectiveness acceptability curves as a function of λ (ceiling criterion or willingness to pay) for the training and medication (TM) arm vs the treatment-as-usual (TAU) arm, training and incentive plus medication (TI/TM) arm vs the TAU arm, and the TM arm vs the TI/TM arm.

The specific λ at which the curves cross the 95% threshold represents the additional cost (in euros) of 1 additional health gain (an increase of 1% in abstinent patients). As suggested in Figure 2, the CEAC for TM vs TAU crossed the 95% line at the ceiling ratio λ = 9.80. Thus, in a program favoring the reimbursement to the patients of costs for NRT and/or bupropion (the TM arm), at least €9.80 for each patient participating in the program has to be invested to get an increase of 1% in nonsmokers after 12 months, at a probability of 95% that this program will be cost-effective against TAU. For the combination of remuneration and reimbursement (TI/TM arm), this λ was 6.96.

The cost-effectiveness of both of these interventions when analyzed individually against TAU raised the question of which one may be considered superior when evaluating them against each other. The empirical ICER when comparing the 2 intervention arms was 4.37. However, the outcomes of these 2 interventions in terms of the point prevalence of abstinent patients did not differ significantly (12.1% vs 14.6%; χ^2 for nonsignificant $P = .51$). Similarly, the ICER of these arms does not suggest that either of these strategies is more cost-effective than the other. This was confirmed by means of bootstrapping and the NB analyses, in which the CEAC of the TM arm vs the TI/TM arm never crossed the 95% line, no matter how great the willingness to pay might be (Figure 2).

SENSITIVITY ANALYSES

We performed multiway sensitivity analyses by varying several elements of the treatment costs and altering the outcome criteria from blank-point prevalence of abstinence after 12 months to the percentage of quitters at 12 months who had been nicotine-free for at least 6 months (in which case the prevalence of abstinence was TAU, 1.4%; TI, 1.4%; TM, 9.3%; TI/TM, 7.8%).

Setting the cost of counseling patients to zero and decreasing the GP training costs by approximately two-thirds (from €1000 to €300) did not lead to crucial changes of the base-case results. The changes would assume a scenario of cost-free smoking cessation advice given by GPs and represent the actual range of fees for a trainer in routine care conducting a tutorial session. Because these sessions were attended by numerous GPs, the difference will scale down when allocating the cost reduction to the GP or patient level. Nevertheless, the TM arm and the TI/TM arm still remained individually cost-effective against TAU, whereas the TI arm showed no difference compared with TAU in terms of outcomes. Likewise, no superiority of either the TM arm or the TI/TM arm could be confirmed when testing them against each other and applying a 95% acceptability criterion. The λ values of the cost-effective treatments were only slightly altered compared with those in the base-case scenario; under the 95% acceptability criterion, λ was 7.06 in the case of the TM arm vs TAU, and 5.32 in the case of the TI/TM arm vs TAU. Similar results were gained when the percentage of patients who were abstinent for at least 6 months were fed as outcome into the analyses. Then λ increased to 8.88 (TM arm vs TAU arm) and to 14.70 (TI/TM arm vs TAU arm), respectively.

COMMENT

Our study strongly suggests the cost-effectiveness of NRT provided by trained family physicians or GPs in Germany, both when patients' expenditures for NRT medication are reimbursed or when reimbursement is combined with remunerating trained GPs with €130 for each patient abstinent after 12 months.

If the findings from the NB analyses (the cost of a 1% increase in tobacco abstinence) are weighted afterward with the empirical smoking cessation rates from the trial to arrive at the more illustrative mean costs for 1 additional quitter (which health insurance plans must be willing to pay to gain a 95% likelihood that one of the new treatments will be cost-effective against TAU), the costs that would have to be paid for each patient enrolled in such a program would amount to €92.12 in the TM arm and €82.82 in the TI/TM arm.

These costs are 2.4 or 1.7 times higher, respectively, than the actual mean intervention costs per patient that

were spent during the clinical trial (€39.10 in the TM arm, €50.04 in the TI/TM arm [Table]). These higher costs could be considered the price of being on the safe side, allowing for their variability. Any lesser willingness to pay would reduce the certainty that the respective treatment is cost-effective.

Because the study interventions were applied (and as they are meant to be applied when implemented into routine care) during GP consultations for other health problems, the respective study intervention is not likely to identify additional health problems and will probably not induce any further health care costs. Quite the contrary: the intervention is likely to have considerable positive long-term health effects owing to reduced tobacco use. Immediate cost offsets might even be possible (eg, through the emergency department visits thereby avoided). However, analyses of short- or long-term cost savings were not performed.

Certain limitations may affect generalization of these results. For reasons of confidentiality, it was impossible to obtain the number of patients who were eligible for the study and were actually approached for recruitment by GPs. The initial response rate is thus unknown. In addition, the base-case analyses used a flexible quit date because an intention to quit was not mandatory for inclusion. Thus, the point prevalence of abstinence at 12 months after inclusion was chosen as a comparatively broad primary clinical outcome. However, sensitivity analyses applied a more stringent outcome criterion. Finally, it was not known whether patients in the control modality (TAU) were advised as to smoking cessation. If so, counseling of patients would also have incurred some minor costs in the TAU arm, too. From a methodological perspective, the sensitivity of the approach to ignoring the cluster structure of the original trial is beyond the scope of this study and may be a subject for further research. However, this probably will not reduce the overall relevance of the results.

CONCLUSIONS

From an economic perspective, training GPs to give adequate advice on smoking cessation and reimbursing the patients for their expenditures for NRT or combining this offer with a financial incentive for GPs each constitutes a viable option. Both strategies bear a high potential to decrease the prevalence of nicotine abuse in the general population.[15] This is even more the case when taking into account that an intention to quit smoking was not a mandatory criterion for participation in the study. The strategies would probably be even more efficient if interventions were restricted to subgroups actively willing to quit.

The mean costs in this trial were low compared with results of recent international meta-analyses,[10,21] which tend to rank GP training or counseling above bupropion or NRT as highly cost-effective interventions.[22] Smith et al[23] found in a computer-based smoking cessation intervention in primary care an annualized incremental cost per smoker of $40.83 (€35.20). The incremental cost of a Swiss GP counseling program was $2.58 (€2.22) per consultation per smoker.[24] However, neither program included NRT or pharmacologic costs, as did the current study. The cost of reimbursement in a more comprehensive smoking cessation treatment program in the Netherlands was €322 per participant in the intervention group vs €291 per person among controls, who were not reimbursed. This cost is still more than 3 times higher than the costs of this trial.[25] Therefore, the value for money of the treatments analyzed herein may be considered to be much higher than those of many other accepted smoking cessation interventions.[6]

It cannot be decided on a statistical basis which of the 2 treatments identified as being cost-effective is the more preferred for implementation into routine care. This decision must be left instead to health policies or other decision-making processes. However, the estimates of the NB may serve as a good planning tool for this purpose. No additional infrastructure would be required to implement the treatments evaluated herein into German routine health care. Either cost-effective therapy may easily be applied by the existing network of GPs in office practice, which fully covers primary care for the German population. This is different from other cost-effective smoking cessation programs, such as the smoking-treatment services in England, which require a separate system of highly specialized services with high operating costs.[26]

Currently, German health insurance policies do not reimburse patients' expenditures for bupropion, nicotine patches, or nicotine chewing gum. Likewise, the German health care funding system does not foresee remuneration mechanisms or financial incentives for GPs to enhance treatment success. German funding schemes are currently in a state of major transition owing to an urgent need for cost containment. In this very situation, the chances of implementing innovative and cost-effective programs, which are likely to increase public health and to considerably reduce the smoking-related financial burden on society, deserve particular attention.

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Author Contributions: All authors had full access to all of the data in the study, and Dr Salize takes responsibility for the integrity of the data and the accuracy of the data analysis. *Study concept and design:* Salize, Mann, and Brenner. *Acquisition of data:* Salize, Twardella, and Brenner. *Analysis and interpretation of data:* Salize, Merkel, Reinhard, and Brenner. *Drafting of the manuscript:* Salize and Reinhard. *Critical revision of the manuscript for important intellectual content:* Salize, Merkel, Twardella, Mann, and Brenner. *Statistical analysis:* Salize, Merkel, Reinhard, and Brenner. *Obtained funding:* Salize, Mann, and Brenner. *Administrative, technical, and material support:* Salize, Mann, and Brenner. *Study supervision:* Salize and Brenner.
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INVITED COMMENTARY

Cost-effectiveness is getting more attention these days, and the burgeoning number of publications on this subject as well as the increased attention to medical accountability in terms of effectiveness and cost make it important that we all understand how to interpret cost-effectiveness analyses. This is easier said than done because reading the literature on cost-effectiveness is like navigating through the Tower of Babel.

Cost-effectiveness boils down to value for money. Some interventions may be very expensive but well worth it (eg, bypass grafting in patients with 3-vessel obstructive coronary artery disease and depressed left ventricle function), whereas others may be cheap but wasteful because they simply do not work (eg, taking vitamin E for the prevention of coronary artery disease). In mathematical terms, the key quotient is the incremental cost per incremental clinical benefit (Δ cost/Δ life expectancy or preferably quality-adjusted life expectancy; ie, comparing 2 alternative treatment strategies modeled out to a typical lifetime from a societal perspective). But how do we determine which interventions are truly worth the cost? The most basic conventional litmus test of this in the United States is what payers such as Centers for Medical and Medicaid Services or other financers of health care (such as Blue Cross Blue Shield) are willing to pay, and this is in the range of $50 000 to $100 000 additional cost per additional quality-adjusted life-year (QALY). Even this willingness-to-pay threshold is affected by many other (including political) factors. From a global perspective, it depends on a nation's wealth, which directly affects willingness to pay. A poor nation, for example, may only be able to afford cost-saving interventions such as vaccination programs or water treatment interventions, whereas certain sectors of the United States are even willing to pay for expensive screening programs that, using conservative assumptions, likely cost over $1 million per additional life-year saved, or possibly even infinite costs in situations in which the marginal benefit is unknown and possibly nil.

Salize et al elegantly demonstrate that training German generalists on effective smoking cessation practices, as well as decreasing economic barriers to medications known to help quitters, resulted in a statistically significant increase in the proportion of 12-month quitters, at a cost of roughly €92 (US $150) per quitter, from an insurer's perspective. How do we interpret this? The key will be in comparing their findings with other studies that demonstrate the value of smoking cessation interventions and buying the assumptions that one can validly extrapolate the translation of quitting to quality-adjusted life improvement and that favorable costs for an insurer will translate to favorable costs for society (in this case, they usually do). For example, ample evidence indicates that NRT costs about $30 000 per QALY, and a *Cochrane Database Systematic Review*[1] of the topic, indicated that costs of €250 per quitter are "favorable." This study[1] showed a marginal cost of €92 per quitter associated with their program. Thus, the program is likely to be cost-effective by conventional standards, but it takes a fair amount of indirect reasoning to arrive at this conclusion. If only it could have been explained more simply and in common terms.

Problems with cost-effectiveness analyses include insufficient standardization of reporting, thereby leaving readers at a loss in interpreting the meaning of the information. The standard way to understand cost-effectiveness is from a societal perspective, whereby one determines the marginal cost per marginal change in quality-adjusted survival. Thus, the marginal cost per quitter will depend on the sustainability of the quit, survival, and net quality of life associated with such behavioral change. Salize et al failed to translate their data into such terms and therefore make it difficult to understand what this means to a health care system that may be considering implementing such a program, especially in the context of other competing interventions deemed to be worthwhile. This is too bad, because if this program were to be favorable relative to other interventions (eg, usual care), then a worthwhile investment may be less likely to be implemented. If the program is unfavorable, yet implemented nonetheless, then it will increase the opportunity costs of payers who are implementing such a program based on the assumption that any cost per quitter is acceptable. That would be wasteful, or at the very least divert resources away from other more cost-effective interventions (eg, advocating for proven highly effective societal strategies, like public smoking bans or tax-based initiatives).

Any efforts to improve smoking cessation efforts should be applauded, but reports that fail to speak the language of cost-effectiveness effectively might actually hinder the efforts rather than bolster the cause. Economic arguments are important, but only if they are framed in terms that allow comparative analysis using comparable terminology and metrics. Having said all that, it seems likely that aggressive efforts at optimizing primary care physicians' knowledge, skills, and attitudes about effective smoking cessation interventions, as well as making it economically easier for patients to get these interventions, are worth it. It may be that such important messages are getting lost in the reports.

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1. Stead LF, Perera R, Bullem C, Mant D, Lancaster T. Nicotine replacement therapy for smoking cessation. *Cochrane Database Syst Rev*. 2008;(1):CD000146.