

# Enhancing the Use of Mammography: Effectiveness and Cost

Researchers have studied many strategies to increase use of mammography,<sup>1-9</sup> but few have provided cost analyses. In this issue of *ecp*, Fishman and colleagues<sup>10</sup> report a cost-effectiveness analysis based on a randomized trial of three strategies at Group Health Cooperative.

## Effectiveness Data

The Group Health Cooperative trial<sup>9</sup> showed that telephone interventions were more effective than reminder cards in encouraging mammography among women older than 50 years of age. About 50% of women who received calls had mammography compared with about 35% of those who received the reminder card. As shown in **Table 1**, these results are consistent with those of other randomized trials involving telephone counseling. Like other studies,<sup>7, 8</sup> the trial found the greatest benefit among lapsed users as opposed to never-users. With the increasing use of mammography, overcoming lapses among women who have had previous mammograms is likely to be the most common challenge.

The Group Health trial is particularly noteworthy for investigating telephone strategies with and without a motivational component.<sup>9</sup> Although research has shown brief telephone counseling to be effective, it is important to know whether the mechanism is the reminder function or some motivational aspect of the call, such as its potential to overcome a woman's barriers.<sup>4</sup> Since the difference between the two telephone strategies was not statistically significant, the reminder function appears to be primarily responsible for the overall phone effect. Research that examines the constituent parts of an intervention is essential and should be done more often. The fact that the reminder call required less than half the time of the motivational call and used less costly personnel obviously has important cost implications.

## Cost-Effectiveness Analysis

After a thorough accounting of costs, Fishman and colleagues concluded that "a simple reminder card is the most cost-effective approach to increase mammography." Cost-effectiveness analyses are fundamentally simple (*see Primer*), yet they raise many complex issues.

Overall, the authors clearly discuss the data and methods used to calculate the costs of interventions. But more detail about the elements of the telephone interventions, including the type of personnel, level of training, and actual costs incurred for different intervention elements, would have been desirable. It is not clear to what extent the costs might have been reduced by use of less expensive personnel, including volunteers (such as peer counselors<sup>6</sup>).

It is somewhat surprising that Fishman and colleagues regard an incremental cost-effectiveness ratio of the reminder call (under \$100) as "high," notwithstanding that the perspective is that of a managed care organization. Certainly, the cost of the reminder calls would compare favorably with that of other preventive interventions<sup>11</sup> and especially to that of the screening itself. The issue of whether a given cost-

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TABLE 1

## Selected Randomized Trials of Strategies To Enhance Mammography Use

YEAR OF PUBLICATION	SETTING	POPULATION	STRATEGY	EFFECTIVENESS*
1994 <sup>4</sup>	U.S. Healthcare Pennsylvania and New Jersey	Women off schedule	Reminder letter	28%
			Telephone counseling	14%
1997 <sup>5</sup>	Philadelphia HMO	Women off schedule	Mailed reminder	9%
			Birthday cards	15%
			Telephone counseling	28%
1997 <sup>6</sup>	Michigan	Women > 65 years of age off schedule	Control	16%
			Telephone counseling	38%
2000 <sup>7</sup>	Two Massachusetts HMOs	Women off schedule	Reminder, control	42%
			Telephone counseling <sup>†</sup>	44%
2000 <sup>8</sup>	Kaiser Foundation Health Plan North Carolina	Women both on and off schedule	Usual care	61%
			Tailored brochure	67%
			Telephone counseling	71%
		Women off schedule in the previous year	Usual care	41%
2000 <sup>9</sup>	Group Health Cooperative of Puget Sound, Seattle, Washington	Women who did not schedule mammography after invitation	Postcard	35%
			Reminder call	52%
			Motivational call	50%
		Women with no previous mammography	Postcard	11%
			Reminder call	26%
			Motivational call	24%

\*Proportion of women who underwent mammography within a defined period. All studies except reference 7 showed significant differences between groups.

<sup>†</sup>In most cases, women in the counseling group also received reminder letters.

effectiveness ratio here is “high” or “low” immediately raises the question, “Compared with what?”

In drawing conclusions about cost-effectiveness, Fishman and colleagues appear to be invoking the algorithm for choosing among mutually exclusive interventions, as described by Kamlet,<sup>12</sup> Phelps and Mushlin,<sup>13</sup> and Weinstein.<sup>14</sup> If so, it does not follow that one always chooses the intervention with the smallest incremental cost-effectiveness ratio. Rather, after rank-ordering the programs in terms of cost-effectiveness ratios as done in Fishman and colleagues' Table 3 (and with the dominated program duly removed from consideration), one chooses the intervention with the *largest* incremental cost-effectiveness ratio, which nonetheless lies below the decision maker's designated threshold incremental cost-effectiveness ratio. The latter is not calculated from the data at hand but instead reflects the decision maker's judgment about where to draw the line among competing interventions. In cost-utility analyses involving dol-

lars and quality-adjusted life-years (QALYs), \$50,000 per QALY is sometimes regarded as a reasonable threshold. The larger point is that for cost-effectiveness analysis to be used for resource allocation within this framework, the decision maker's “shadow value” per unit of effectiveness gained needs to be addressed.

This holds too when one moves from QALYs to some intermediate end point, such as the probability that an at-risk woman is screened for cancer. In the “All Women” case in Fishman and colleagues' Table 3, if the threshold ratio is less than \$21.88, neither the postcard nor the reminder phone call should be used. If the threshold is \$21.88 to \$92.12, only the postcard option would be used. If the threshold is greater than \$92.12, the reminder phone call should be used, since it yields the greatest increase in probability of screening (subject to the constraint of passing the threshold value test).

Given this knowledge, how can one rationalize the investigators' conclusion that “A simple reminder

postcard is the most cost-effective approach to increase use of mammography”? In fact, it can be shown, on the basis of Fishman and colleagues’ Table 3, that if Group Health Cooperative’s goal was simply to select the option that produces “effectiveness” most efficiently—that is, the cost-minimizing way to achieve a given increment in the probability of a woman being screened—the postcard is the preferred option. That said, if Group Health Cooperative were willing to pay (in the “All Women” case, for example) at least \$92.12 per screening achieved, the reminder phone call is the optimal choice. Although the postcard obviously meets this cost-effectiveness threshold test as well, the reminder phone call yields the greater total gain in effectiveness.

But in the absence of clear benchmarks for such intermediate-outcome threshold values, might one more soundly judge strategies to increase mammography use by examining their impact on the overall cost-effectiveness of mammography screening itself, in which effectiveness is gauged in terms of improvement in *final* end points (e.g., life-years gained or QALYs)? Indeed, if the cost-effectiveness of these three “reminder” interventions had been analyzed in such a complete context, would they have emerged in the same rank order seen in Table 3?

Another issue is that the trial examined each intervention as a single option. But should they in reality be regarded as mutually exclusive? In fact, meta-analyses have concluded that in mammography, as in many other areas, multiple interventions are stronger than single-intervention strategies.<sup>1-3</sup>

### Other Reflections

There may be benefits to the reminder call that could not be computed in the cost-effectiveness analysis, such as longer-term adherence to mammography or increased satisfaction with the health care system. Several investigators<sup>4,6</sup> have used telephone counseling only after women have not responded to less costly interventions. Such approaches conserve resources by implementing more expensive interventions only for the people who most need them. Certainly, telephone counseling would not be appropriate for all women.

Finally, interventions like reminder letters and telephone counseling are much more practicable within the context of managed care organizations in which the denominator of women is known and their mammogra-

phy status can be determined. One of the challenges is to learn what is needed to apply stepped approaches, using evidence-based interventions, to community practices in which these data are not available.

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