Increasing Physicians' Antismoking Influence By Applying an Inexpensive Feedback Technique

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Abstract—Continuing medical education that ignores motivational and environmental determinants of continued skill use will have little impact. Physicians who were trained to give antismoking advice to patients did so effectively soon after training, but their performance deteriorated during the next nine months. A subsequent study showed that antismoking effectiveness is maintained for extended periods if advice-giving rates are monitored monthly and physicians receive immediate corrective feedback whenever their performance declines.

Evidence that continuing medical education (CME) efforts merit their considerable cost is limited and inconclusive (1, 2). Few studies show that a CME program actually improved patient care, and critics have noted that methodological problems or small sample sizes make most of this research hard to interpret (1). There may be yet another reason why benefits of CME are not more apparent. It can be argued that researchers have emphasized too exclusively the task of imparting new knowledge while virtually ignoring the more difficult problem of ensuring that physicians apply what they are taught. Typically evaluated in CME studies are programs that present information without addressing the environmental and subjective factors that determine how extensively this training is used. Conveying knowledge and translating it into routine medical practice are two distinct educational challenges that demand different training procedures; better research methodologies and larger samples will not compensate for continued failure to study both aspects of the CME task.

Previous Studies

The above conclusion that conveying knowledge and translating it into practice are separate training tasks was supported by two unpublished studies conducted between 1980 and 1982 by Li and colleagues of the Johns Hopkins University. In both studies, general practice physicians were taught at simulated CME workshops to deliver a brief "quit-smoking" message to patients, and the effect of these messages on patient smoking behavior was measured.
ured. It had been reported previously that a simple warning from a general practitioner significantly increased the number of patients who quit smoking (3), and the goal of the Johns Hopkins investigators was to enlarge this effect by having the physician supplement the warning with an additional three to five minutes of specific advice on how to break the smoking habit.

In the first of the studies by Li and associates, four physicians working for the Naval Shipyard at Charleston, South Carolina, were trained to advise asbestos-exposed workers either by (a) warning them to stop smoking or (b) warning them to stop and providing up to five minutes of individually focused counseling on how to stop. The 871 workers who smoked were then randomly assigned to the experimental conditions to permit a controlled comparison of the two advice interventions. In the second study, quit-smoking messages were given to 1,179 low-income women attending family planning clinics in Baltimore, Maryland; this controlled design compared the effects on patient smoking of (a) an educational film or (b) (five-minute) cessation counseling by a physician.

In both studies, one-year cessation rates of patients whom physicians counseled briefly were 100 percent greater than those of patients whom the physician simply warned or who viewed the film. It was estimated by the investigators that if such counseling were extended to all smokers who visit American physicians in the course of 12 months, over 3 million persons could achieve prolonged smoking cessation, whereas 1.5 million would if merely warned. It was clear that physicians could contribute significantly to the widespread abatement of a major disease risk factor.

But Li and colleagues also noted a potential problem facing any large scale effort to have physicians counsel patients not to smoke. The shipyard data showed that individual physicians differed greatly in their effectiveness. While the physicians were trained together in the same workshops, some achieved much higher success rates than others. The success rate was the proportion of a physician's patients who became nonsmokers within three months of counseling. The range of physician success rates (6 percent to 14 percent) closely resembled those reported in earlier studies (3, 4). This discovery prompted the present authors to examine the shipyard data for clues that might explain why similarly trained physicians achieved such different results.

**Further Analyses**

Using the shipyard data gathered by Li and colleagues, the present authors tried to determine whether the different success rates reflected differences in the types of patients assigned to each physician or whether they resulted from possible differences in the physicians' skill, personal characteristics, or motivation.

Characteristics of patients assigned to the different shipyard physicians were compared to determine whether patient differences accounted for the widely varying success rates. In addition to medical symptoms and demographic and physiologic characteristics, this analysis examined possible baseline differences in behavioral variables known to predict smoking cessation, such as number of cigarettes smoked daily, motivation to quit, and length of past nonsmoking periods. Chi-square values for all comparisons were nonsignificant, reducing the likelihood that the differences in physicians' success were attributable to the types of patients they had counseled.

If variable success rates were not explained by patient differences, did they reflect basic differences in physicians' personal characteristics or response to train-
ing? Following the training, could some physicians have mastered the counseling procedure more rapidly than others, or did some perform well at first but subsequently lose interest? To examine the possible role of personal skill, learning, or motivational effects, a further check was made to see whether each physician's success rate was stable or whether it fluctuated over time.

Figure 1 shows the success rate that the four shipyard physicians achieved with patients they counseled during the first three months following the training in cessation counseling, during months four through six following the training, and during months seven through nine following the training. The physician saw each patient only once. A physician's success rate in each period is the proportion of the patients the physician counseled during the period who had quit smoking by the time investigators interviewed the patients three months after the patients had been advised to stop smoking. While physician success rates differed in the first period, much larger differences developed as the study progressed. All physicians became less effective as time passed, but two deteriorated much faster than their colleagues. Perhaps this could be explained by a tendency for more heavily tobacco-dependent smokers to resist entry into the screening program. Or perhaps a relatively greater proportion of such smokers was assigned to the "less effective" appearing physicians. Although the study randomization methods made this unlikely, smokers were compared on all subject variables mentioned above to examine this possibility. Comparisons over physicians and time periods proved "non-significant." Furthermore, the physicians saw equivalent numbers of patients from one period to the next, and so population changes would not explain the variations in success.

Figure 1 suggested that physician motivation might account for the differences in success. All four appeared to counsel patients effectively in the first few months following the CME program; the drop in effectiveness would thus seem more attributable to decreasing effort rather than declining skill. This called for examining how extensively physicians had counseled patients in each study period. The five-minute counseling protocol required the physician to ask the patient to select a target date on which to quit smoking, following the interview, the patient and the physician had been asked separately in exit questionnaires whether this had been done. The proportion of a physician's patients who reported agreeing on a date to quit was now treated as an indirect measure or "marker" of how much the physician had tried to comply with the counseling protocol in a given study period.

This analysis showed that declining success rates paralleled changes in physician effort. The two physicians whose effectiveness dropped the most (physicians 1 and 2) had succeeded in assigning quit dates to
percent of patients they counseled in the first study period and had achieved a combined success rate of 15 percent. In the last period they assigned target dates to 3 percent of their patients and had a success rate of less than 2 percent. Combined rates of target date-setting and success for the more consistently successful physicians (3 and 4) were 57 percent and 15 percent in the first period and 49 percent and 9 percent in the last. These comparisons supported the impression that the CME program had successfully trained the physicians to perform the counseling procedure but had not ensured that they would continue to apply what they had learned.

As the physicians gradually counseled patients less often, was there a concomitant tendency to counsel only a certain type of patient? Could they have applied the procedure only to patients who smoked heavily and thus appeared to be at greatest risk or just to those lighter smokers who seemed most likely to stop smoking? To examine this, all 871 smokers in the study were categorized on baseline smoking level as either “heavier” smokers (smoke > 20 cigarettes per day) or “lighter” smokers (≤ 20 cigarettes), and the proportions in each category who received target dates during the first half and the second half of the study period were computed (using the three periods described above would have restricted too severely the number of patients in each category). This made it possible to compare rates of target data reporting by lighter versus heavier smokers seen by “compliant” physicians (3 and 4) with those seen by “noncompliant” physicians (1 and 2) early and late in the study.

These comparisons showed that the two less compliant physicians had indeed become more selective, shifting their efforts away from lighter smokers as time passed. The percentage of their lighter smokers reporting a target date was 26 percent in the first half of the study year versus 5 percent in the second half. Target date reporting among their heavier smokers was 17 percent and 13 percent respectively in each period. Comparable changes for physicians 3 and 4 were from 65 percent to 56 percent among the lighter smokers and from 47 percent to 49 percent among heavy smokers. Ironically, in restricting their efforts to patients perceived to be at highest risk, physicians 1 and 2 were applying the advice model mostly to patients who were least apt to respond to it. It seemed that the training was insufficient to maintain a desired level and focus of counseling by these two individuals.

In the family planning clinic study, Li and associates introduced an intervention explicitly designed to curtail any prolonged drop in physician counseling efforts. Research in organizational and industrial settings has shown that regular performance feedback helps maintain task motivation and competence (5). To test the efficacy of this procedure in the clinic, the investigators tallied on a daily basis the number of patients who, after the exit interview, reported they had been counseled against continued smoking, and the proportion of patients counseled was computed separately for each physician every month. Whenever a declining trend in the percentage of patients counseled was noted, these data were shared with the physician in a private personal communication.

The present authors sought to determine whether this intervention had achieved the desired effects. Figure 2 shows performance data for the two full-time physicians who participated in the project (physician B was on leave from the clinic after the sixth month of the study). Both physicians were trained at the same time, but physician B was away from the clinic during the first four weeks following training and did not start counseling patients until the study was entering its second month. By the end
changes that can develop over time. This is best achieved by collecting continuous time series data that can disclose individual and group performance trends requiring remedial attention. The present authors surveyed all studies cited under the CME sections of the Cumulated Index Medicus from 1960 to 1982 and could find no reports in which such data were presented. While the need to maintain high quality medical practice is widely acknowledged and models for doing this have been described (6), controlled studies of how such interventions affect performance over time are lacking. A variety of experimental designs using time series data have been developed for educational research (7), and statistical procedures and programs are available to analyze studies in which a treatment such as performance feedback is repeatedly introduced and withdrawn or is applied successively to different physicians or groups (8). These designs can show how environmental influences such as feedback interact with physician personality, skill, or medical knowledge to affect performance, a problem the studies reported here were not originally meant to address. It is hoped that these findings will encourage more attention to such questions.

References

