North American perspectives

Changing physician behavior: half-empty or half-full?

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Abstract

Physicians can significantly impact both the quality and the cost of health care. Thus, it is not surprising that there is great interest in modifying physician behavior. There have been three main methods used to alter physician behavior: education, motivation, and facilitation. This article reviews the success of these methods.

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Introduction

Physicians have the power to administer or withhold a wide variety of medical modalities. As a result, there are many parties interested in modifying physician behavior. Regulators and payers want physicians to behave in a cost-effective fashion. Specialty societies and task forces may desire physicians to adhere to recommended guidelines. Advocacy groups encourage physicians to concentrate on selected diseases or conditions. The physician is often besieged with information, regulations, and suggestions; yet it is not clear that any of these interested parties can claim success in changing physician behavior.

We argue that behavior change in physicians is akin to behavior change in patients. The key elements affecting change are education, motivation, and facilitation (Figure 1). The goal of this article is to review evidence regarding the effectiveness of methods of changing physician behavior.

Educating physicians to change behavior

Passive education

Traditional continuing medical education (CME), which generally includes lectures and other passive means of education, has been disappointing in its ability to change physician behavior (Davis *et al.*, 1999). Therefore in recent years there has been great interest in elucidating more effective methods of using education to change behavior.

The simplest method of education is dissemination of printed materials containing useful information. An example of this would be mail delivery of printed practice guidelines by professional organizations to their members. Several recent studies have examined the effectiveness of distributing printed materials alone (Hunskaar *et al.*, 1996; Gifford *et al.*, 1996; Bowman *et al.*, 1992; Evans *et al.*, 1986). One randomized controlled study of a mailed CME course developed by a professional society was able to show an improvement in nine of 16 practice recommendations by those physicians who received the materials (Gifford *et al.*, 1996). Two other studies (Hunskaar *et al.*, 1996; Evans *et al.*, 1986) of mailed printed materials were not able to show any improvements in the intervention group compared with the control group,

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Figure 1 Key elements in changing physician behavior

prompting one group of authors to conclude that "resources spent on instructional materials mailed to physicians may be wasted" (Evans *et al.*, 1986). A fourth study was not randomized, but had the same materials mailed to all physicians in the study. The authors found that those physicians who actually read the materials performed significantly better in an interaction with a standardized patient than those who did not (Bowman *et al.*, 1992). Possibly, those who read the material were already contemplating change and were thus at a higher stage of readiness than those who did not read the material. Alternatively, the material itself may have had an effect on the reader. Regardless, this study underscores a key difficulty with passive education – it cannot be assumed that the material was actually internalized by the recipient. In other words, one cannot assume that mailed material is read or that an audience is paying attention.

Academic detailing

From these studies, it appears clear that passive dissemination of printed educational materials may be insufficient to provoke a change in physician behavior. A number of recent studies have looked at the effectiveness of the combination of dissemination of printed materials and other educational strategies. One approach taken in a group of studies was the combination of distribution of printed materials with individual meetings or visits by study personnel (otherwise known as "academic detailing") (Watson, M. *et al.*, 2001; Watson, E. *et al.*, 2001; De Santis *et al.*, 1994; Soumerai and Avorn, 1987). These studies generally compared control groups, which received no intervention, with experimental groups that received either printed materials alone or printed materials in conjunction with one-on-one academic detailing visits. With the exception of one study that was unable to produce a significant change in behavior in either of the experimental groups (Watson, M. *et al.*, 2001), all of these studies found improvements in the specified outcomes. In some studies, both intervention groups improved; in these cases the group that received individual visits had greater improvements than the groups that received printed materials alone (Watson, E. *et al.*, 2001; De Santis *et al.*, 1994). One study found that the intervention group improved and that the effect nearly doubled when a second educational visit was added, illustrating the importance of follow-up reinforcement in promoting change (Soumerai and Avorn, 1987).

Group activities

Another approach to physician education is through group educational activities or training sessions targeted at specific knowledge, skills or behaviors. As traditional didactic CME activities have been found to be ineffective in changing physicians' behavior (Heale *et al.*, 1988; Boissel *et al.*, 1995; Browner *et al.*, 1994), more interactive methods have been attempted. Three studies coupled mailed printed materials with a group educational activity (i.e. seminar or tutorial). (Gifford *et al.*, 1999; Anderson *et al.*, 1996; Maiman *et al.*, 1988). Overall, these studies found that this strategy produced an improvement in physician behavior compared either with the control groups or with the groups that received the printed materials alone.

Many training programs have incorporated a combination of some or all of the following elements: small group interactive discussions, role-play, video programs, case reviews, access to experts, as well as some didactic elements. Although some of these multi-faceted educational activities did not show an improvement in physician behavior (King *et al.*, 2002; Lin *et al.*, 2001; Thompson *et al.*, 2000), most programs were able to have a positive impact on the desired outcomes (Goldberg *et al.*, 2001; Stein *et al.*, 2001; Sanci *et al.*, 2000; Clark *et al.*, 1998; Ockene *et al.*, 1995; Kendrick *et al.*, 1995; Dietrich *et al.*, 1990). The successful training programs varied tremendously in length, from as brief as a single 30-minute session (Goldberg *et al.*, 2001; Stein *et al.*, 2001) to as intensive as a two-and-a-half day course (Levinson and Roter, 1993). This extensive

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course was compared with a shorter four-and-a-half hour workshop. No improvement in outcome was found with the shorter activity; only the multi-day course was shown to produce a positive effect.

A single recipe for a successful educational intervention does not emerge from the current literature. Although it can safely be said that merely distributing printed educational materials does not appear sufficient to effect a change in physician behavior, few other generalizations can be made. Interventions that include individual or interactive sessions tend to be more successful, but are not universally so. Among successful group educational activities, the wide range of length of sessions, frequency of meetings, methods of training, outcome measures, and duration of follow-up provide little guidance as to the "optimal" type of educational intervention.

Motivating physicians to change behavior

As discussed above, education alone may fail to change physician behavior. The psychological literature would suggest that the next step should be to assess and improve motivation (Ryan and Deci, 2000; Prochaska and DiClemente, 1982).

Physicians are inherently motivated by their desire to provide high quality patient care. Base-line motivation can therefore be affected by the perceived link between the desired action and patient outcome (Smith, 2000; Retchin, 1997). Physicians can also be motivated by their desire to be perceived as good doctors by their patients and colleagues.

For a motivational intervention to work, the behavior should be under the control of the physician. If change is not within the power of the physician, there will simply be an increase in frustration. This is seen when physicians are berated for systems issues beyond their control. It is also seen when a clear strategy to improve outcome has not been identified.

Motivation has been well studied as a tool to change patient behavior (Prochaska and DiClemente, 1982). However, fewer studies have addressed physician motivation. Feedback and reward/punishment systems are the most widely studied means of changing physician motivation.

Feedback

Feedback, also known as profiling, has been moderately successful in improving physician motivation. The goal is to show a physician how his or her behavior compares with that of colleagues or national norms. In general, people will try to fit their behavior to their perceived social norm (Trafimow *et al.*, 2002). One would expect this technique to be most successful when physicians with inferior outcomes were not previously aware of their outlier status (Fidler *et al.*, 1999).

Feedback to physicians has been used in several areas. For example, wound infection rates have been reduced by providing feedback of individual rates to surgeons (Haley *et al.*, 1985). Feedback to physicians has been associated with reduced rates of nosocomial infections when the pathogens are spread on the hands of personnel (Curran *et al.*, 2002; Nettleman *et al.*, 1991). Feedback on the cost of antibiotic prescriptions has resulted in the use of less expensive agents in some settings (Hux *et al.*, 1999). A randomized trial with feedback to 97 physicians showed that diabetes care was improved with feedback (Kiefe *et al.*, 2001). A review of feedback and immunization rates revealed that 12 of 15 studies showed a positive effect (Bordley *et al.*, 2000).

Positive results may not necessarily mean a dramatic improvement in patient outcome. In a meta-analysis of randomized trials of profiling and feedback, Balas *et al.* (1996) found that the combined odds ratio was only 1.09 for adopting the desired behavior. Although this result was statistically significant, the magnitude of the change was clearly modest. Another meta-analysis of randomized trials also concluded that the effect of feedback was positive, but modest (Thomson O'Brien *et al.*, 2000).

There are pitfalls to studying the effect of motivational interventions. One study attributed improvements in pediatric vaccination to improved documentation rather than an increased number of vaccinations (Fairbrother *et al.*, 1999). Another study found significant improvements in pediatric vaccinations after feedback and incentives, but saw similar improvements in the control group (Hillman *et al.*, 1999). Fortunately, these authors took the trouble to include a control group. In many other instances, studies are small, uncontrolled, not randomized, and limited to

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one small group or practice (Bero *et al.*, 1998, p. 26). Data on long-term outcomes are lacking.

Feedback need not be a costly intervention. In this computerized era, much of the necessary information can be obtained electronically. Chart review is a more costly alternative. Both of these methods rely heavily on the quality of documentation.

Feedback is not always successful (Vingerhoets *et al.*, 2001; Balas *et al.*, 1996; Mugford *et al.*, 1991; Hillman *et al.*, 1999; Freeborn *et al.*, 1997). Considering the difficulty in getting negative studies published, there are a surprising number of studies in the literature showing no effect of feedback. In one study of general practitioners, feedback of patient satisfaction data about continuity and medical care had no effect (Vingerhoets *et al.*, 2001). Another study found no effect of feedback on reducing lumbar spine films (Freeborn *et al.*, 1997). It is not always clear why these interventions were not effective. However, it appears that passively providing feedback data is not as successful as actively engaging physicians in the process (Hillman *et al.*, 1999).

There is no scientific evidence demonstrating the best way to deliver feedback. Before any feedback campaign is adopted, the level of physician buy-in must be addressed (Mugford *et al.*, 1991). For example, physicians may think that it is very important to decrease surgical wound infection rates, but that meeting federal documentation guidelines is meaningless. In the latter case, education may be used first to explain the importance of meeting guidelines and the consequences of failing to do so. Clearly, some issues actually are trivial and should not be forced on busy physicians.

The timing of feedback is also important. One study significantly improved drug dosing by providing instant computer feedback on renal function (Falconnier *et al.*, 2001). In this case, feedback was provided in a timely enough fashion to change orders for doses that were not appropriately adjusted. In contrast, data that are provided weeks or months after the behavior are less likely to influence outcomes.

Feedback to physicians will usually result in challenges to the validity of the data. While it is not possible to adjust perfectly for severity of illness, and not cost-effective to review enormous numbers of charts, it is critical that the data be of sufficient quality to sustain conclusions about outliers.

Reward/punishment

Human behavior can be influenced by rewards or punishments (Elliot and Thrash, 2002; Rilling *et al.*, 2002). Not surprisingly, physicians often react negatively to systems that sanction or punish them for their actions. Even reward systems may be controversial, especially if they create a potential conflict of interest between the need to provide the best possible care and the need for the physician to be compensated (Hillman, 1987; Kao *et al.*, 1998).

Financial incentives gained popularity with the rise of health maintenance organizations (Landon *et al.*, 1998). Bonuses may be paid for appropriate behavior or withheld for behavior that does not meet criteria. The amount of the incentive may be linked to the degree of compliance (Hillman *et al.*, 1999). In addition, the effect of incentives may be diluted if the incentive is paid to a group or institution rather than directly to the physician (Hillman *et al.*, 1992; Conrad *et al.*, 2002).

Unfortunately, most financial rewards are provided for reducing cost rather than improving care. Capitation and withholding compensation are routinely used to reduce the utilization of resources by physicians. A systematic review of the literature showed that these interventions were indeed effective in reducing resource use (Chaix-Couturier *et al.*, 2000). However, there are several caveats (Hu and Reuben, 2002). The effect of one capitated insurance plan may be diluted by the number of patients who are not capitated in a physician's practice (Balakrishnan *et al.*, 2002; Glied and Zivin, 2002). Although these compensation systems have been designed to limit cost, they may have unexpected effects on patient outcome. Untoward effects are not consistent and study results have been mixed (Riley *et al.*, 1999; Ware *et al.*, 1996). Incentive payments to physicians are not always considered appropriate by either physicians or patients (Rolnick *et al.*, 2002).

Punitive actions include loss of reimbursement, loss of privileges to see or admit patients, and the requirement for remedial action (Kane and Garrard, 1994). When the sanctions are sufficiently grave, there is no doubt that physician behavior changes. When faced with financial sanctions

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if federal prescribing standards were not met, physicians prescribed fewer antipsychotics in nursing homes (Shorr *et al.*, 1994). Even cumbersome regulations that are poorly linked to patient outcome can be enforced through sanctions. The documentation guidelines for Medicare are backed up by multi-million dollar judgments against physician groups and hospitals, despite an absence of any studies showing an effect on patient care (SoRelle, 1998).

Facilitating behavior change

The final element in the process of changing physician behavior is facilitation. For the purposes of this article, facilitation refers to the process of making it easier for the physician to implement change. Of the three elements, this is the least studied.

Computerized information systems have many uses, and can assist physicians in a number of ways. These information systems can be programmed to provide reminders and offer guidelines or recommendations for clinical decisions, and are the primary methods of facilitation reported in the literature.

Reminders

Since 1976, there have been a number of randomized controlled studies on the effectiveness of computerized reminders in various settings. Many of these studies have evaluated the impact of reminders in out-patient settings. Two trials found that computer-generated reminders, when placed in patients' charts, were effective in increasing the rate of completed mammography (Burack *et al.*, 1996; Burack and Gimotty, 1997). Another study found that the combination of computer-generated reminders displayed on the screen and printed on a patient encounter form increased the proportion of patients in compliance with several previously identified standards of care in 12 Veterans' Affairs medical centers (Demakis *et al.*, 2000). Another study found that computer-generated reminders printed on patient encounter forms increased both the rates of discussions about advanced directives and completion of advanced directive forms (Dexter *et al.*, 1998).

Randomized controlled studies of computer-generated reminders in an in-patient setting have had mixed results. One study found no improvement in implementation of multiple preventive procedures for hospitalized patients (Overhage *et al.*, 1996). The second study, which was conducted at the same institution by several of the same authors, found that computerized reminders increased ordering rates of pneumococcal and influenza vaccines, prophylactic heparin, and prophylactic aspirin on discharge (Dexter *et al.*, 2001). The authors attribute their success to small changes in the presentation of the reminders such as a distinctive color scheme and repeated display of the reminders throughout the patients' hospitalizations.

Reminders do not have to be computer-generated to be effective. A 1994 study showed that the combination of personalized written and oral reminders were effective in increasing compliance with a practice guideline regarding length of stay for patients admitted to a coronary care unit who were believed to be at low risk for complications (Weingarten *et al.*, 1994). This same study found that increased compliance resulted in overall decreased length of stay and cost per patient.

Computerized decision support systems

In addition to a computer-based patient record including information such as laboratory values, computer-based decision support systems (CDSSs) have the ability to incorporate patient-specific information with evidence-based computerized guidelines or protocols in an effort to facilitate improved clinical decision making. The use of these tools is felt to be a response to both the information revolution and poor compliance of physicians with practice guidelines (Morris, 2000).

CDSSs have been found to be effective in various aspects of medical care. One study found that a computer-assisted decision support program designed to improve antibiotic management resulted in decreased antibiotic cost per patient, an increase in percentage of surgical patients who received appropriately timed antibiotic prophylaxis, and a 30 per cent decrease in antibiotic-associated adverse events (Pestonik *et al.*, 1996). Another study found that blood test ordering behavior could be changed with use of a decision support system based on established guidelines (van Wijk *et al.*, 2001).

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As with educational and motivational interventions, there are several published studies that have shown no benefit from the use of computerized decision support systems or reminders. One such study found that reminders placed in patients' charts had no effect on rate of Pap smear completion (Burack *et al.*, 1998). A systematic review reported on several studies in which decision support systems failed to effect change in drug dosing, diagnosis, and preventive care (Hunt *et al.*, 1998).

There are several benefits to reminders and computerized clinical decision support systems. The data provided are delivered in a timely fashion, often at the moment when a clinical decision is being considered. CDSS protocols can provide patient-specific instructions that can be carried out with little variability among clinicians (Morris, 2000). Additionally, studies have found that use of reminders and/or computer-generated protocols has resulted in decreased costs associated with the implementation of specific guidelines (Pestonik *et al.*, 1996; Weingarten *et al.*, 1994). Finally, several reviews have found that reminders appear to be consistently more effective when compared with other interventions (Kupets and Covens, 2001; Smith, 2000; Shea *et al.*, 1996; Austin *et al.*, 1994; Johnston *et al.*, 1994; Haynes and Walker, 1987).

Disadvantages of reminders and CDSSs have also been identified. These facilitation techniques often require physicians to modify their personal style of patient management. Many experienced physicians are hesitant about adopting new practices and are resistant to introduction of standardized methods (Morris, 2000). It is common to have more than one reasonable approach to the same clinical scenario, but the CDSS can only incorporate one. If this approach is different from the one with which a physician is most comfortable, he is unlikely to follow the CDSS protocol. Additionally, the expense of implementing these protocols and reminders may be prohibitive. Finally, few studies have looked at how long the behavior change remains in effect. The aforementioned Veterans' Affairs medical centers study found that, despite the fact that the reminders remained active, their benefit declined over the course of the study.

In summary, both reminders and computerized decision support systems have been shown to be effective in facilitating behavior change in physicians. However, their effectiveness is dependent upon the setting in which they are used.

While facilitation methods are effective in invoking change by making it easier for physicians to recall and act on guidelines, it would seem that the converse would also be true. Constructing barriers in an effort to prevent undesirable behavior should also be effective. Two studies demonstrated that requiring infectious disease consultation before ordering restricted antibiotics resulted in a significant decrease in expenditures for antimicrobial agents (Bassetti *et al.*, 2001; Saez-lloren *et al.*, 2000). The latter of these two studies also reported increased susceptibility rates for nosocomial isolates; however, no difference was noted in length of stay or mortality rates (Saez-lloren *et al.*, 2000). Unfortunately, research in this area is limited.

Discussion

As medical science advances and other pressures are imposed, it is constantly necessary for physicians to alter their behavior. Physicians are generally a well-educated and highly motivated group. Yet, compliance with guidelines and recommendations is often poor. Scientific studies have not identified an optimal method for effecting behavior change in physicians. Rather, it appears that multifaceted interventions, combining several approaches, tend to be the most successful (Gross *et al.*, 2001; Smith, 2000; Greco and Eisenberg, 1993). Successful programs could be expected to incorporate all three elements: education, motivation, and facilitation.

Behavior change is a process. It is logical that education would be the first step in that process. Physicians cannot act if they are unaware of guidelines or recommendations. Passive education is suboptimal, as studies have shown minimal impact on effecting the desired change. Activities that require focused attention and direct involvement, such as interactive workshops, are likely to have a better response. Once educated, physicians must be willing to modify their style of clinical practice. Feedback, rewards, and punitive actions, when administered in a timely fashion, can provide additional motivation to

physicians to improve clinical management. These interventions appear to be received best when there is a high level of physician buy-in and no perceived conflict of interest. Lastly, reminders and clinical decision support systems, which can also provide relevant and patient-specific information in a well-timed fashion, have the potential to facilitate improved clinical decisions. These techniques appear to be effective in a variety of clinical situations and settings.

As previously stated, effecting change amongst physicians can be difficult because it often involves altering long-established practices. To some physicians, any attempt at changing behavior is threatening. Whenever possible, the design of interventions to effect change should involve physicians. According to one article, buy-in of physicians is the starting-point and can be assisted via enlistment of local opinion leaders, involvement of all stakeholders, dissemination of intended plans, and consensus conferences (Gross *et al.*, 2001).

Much remains to be learned in this area. Studies are lacking on how long a desired change is maintained. Very few studies address the phenomenon of recidivism, yet models of human behavior would show us that recidivism is natural and should be expected. More randomized controlled trials and head-to-head comparisons of interventions are needed. Future studies should be expected to possess the same rigor and robust methodology as are demanded in other areas of clinical research. Finally, future research should include cost-benefit analyses in an effort to ensure that the benefits of interventions effective in changing physician behavior are not outweighed by the cost of implementation.

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