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Original Article

Commitment to Change Statements Can Predict Actual Change in Practice

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Abstract

Introduction: *Statements of commitment to change are advocated both to promote and to assess continuing education interventions. However, most studies of commitment to change have used self-reported outcomes, and self-reports may significantly overestimate actual performance. As part of an educational randomized controlled trial, this study documented changes that family physicians committed to make in their prescribing and then used third-party data to examine actual changes.*

Method: *Following participation in a continuing medical education program using interactive small groups, physicians were asked to identify changes that they planned to make in their practices. For prescribing changes related to four conditions, data from a provincial pharmacy registry were analyzed for 6-month periods before and after the educational intervention.*

Results: *A total of 207 physicians participated in the project, which involved monthly meetings of 30 peer learning groups. Ninety-nine physicians received experimental case-based educational modules ± personal prescribing feedback, and 91 of these indicated that they planned to make at least one change in practice. Of the 209 intended changes, 71% were directly related to the prescribing messages in the materials.*

Discussion: *In three of four indicator conditions, physicians who expressed a commitment to change were significantly more likely to change their actual prescribing for the target medications in the following 6 months. The percentage of physicians who did change their prescribing varied significantly by condition. Further study of the process of translating commitment to change into real practice change is needed.*

Key Words: Audit, commitment to change, congestive heart failure, continuing medical education (CME), diabetes, family physicians, hypertension, intention to change, otitis media, practice-based learning, prescribing feedback, problem-based learning, small-group learning,

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Introduction

Statements of commitment to change have been advocated to both stimulate and assess the effectiveness of continuing education interventions.[1–5] Such an approach, which asks physicians to provide an explicit indication of an intention to make a change as a result of an educational activity, can actually become an important ingredient in initiating the change.[3,6,7] A number of theories and conceptual models provide the underpinning for the commitment to change strategy: goal setting,[8] promise keeping,[7] transtheoretical model of change,[9] and reflective learning.[10,11] Despite this strong theoretical foundation, because most studies evaluating outcomes have used self-report data, concern has been raised that the impact of this approach may be significantly overestimated.[12]

Method

Setting

British Columbia has about 6,000 actively prescribing physicians and 4,000 active family practitioners, of whom 2,000 are members of the College of Family Physicians. Similar to other regions in Canada in January 1999, over 10% of these family practitioners (n = 413) also were registered in the Practice-Based Small Group (PBSG) Learning Program organized by the Foundation for Medical Practice Education, based at McMaster University (<www.fmpe.org>).[13]

Participants

The Better Prescribing Project (BPP) was a 2 × 2 factorial randomized controlled trial designed to evaluate the effectiveness of an interactive continuing medical education (CME) strategy ± prescribing feedback to promote evidence-based prescribing change. Letters of invitation to participate were sent to the peer facilitators of all 60 PBSGs in British Columbia. Eight facilitators did not respond, despite repeated invitations. Eighteen declined because they were unable to meet the perceived research time commitment or because the continuation of the group through the entire study period was in doubt. Two hundred and thirty-two physicians agreed to participate in the trial. Three groups were excluded owing to lack of a quorum (at least three and no fewer than 50% of members) of physicians who agreed to participate, were in active practice, and agreed to allow examination of their prescribing data as captured by a provincial pharmacy registry (B.C. PharmaNet). One additional group, which acted in an advisory capacity to the project team, was also excluded from data collection. This resulted in 207 physicians in 30 PBSGs who joined the trial.

The research was approved by the University of British Columbia Behavioural Research Ethics Committee, and informed consent was obtained from all participants.

Design

The study used a factorial design with randomization of matched groups of physicians to four arms by a technique of pair matching (Figure 1).[14] To produce better overall balance of baseline characteristics between the treatment and control groups than could be achieved by pair matching alone, the above random numbers were reassigned until the four arms of the trial differed by less than 10% on the following variables: year of graduation (a proxy for age of physician), patients per week (a proxy for size of practice), solo practice, number of other physicians in a group practice, and percentage of participants who see pharmaceutical company representatives at least once a month. The quartets were then randomly allocated into four arms: control (n = 60), prescribing portrait only (n = 48), educational module only (n = 50), and both portrait and module (n = 49).

Interventions

Evidence-based, case-based educational modules of 6 to 10 pages were developed for each of four

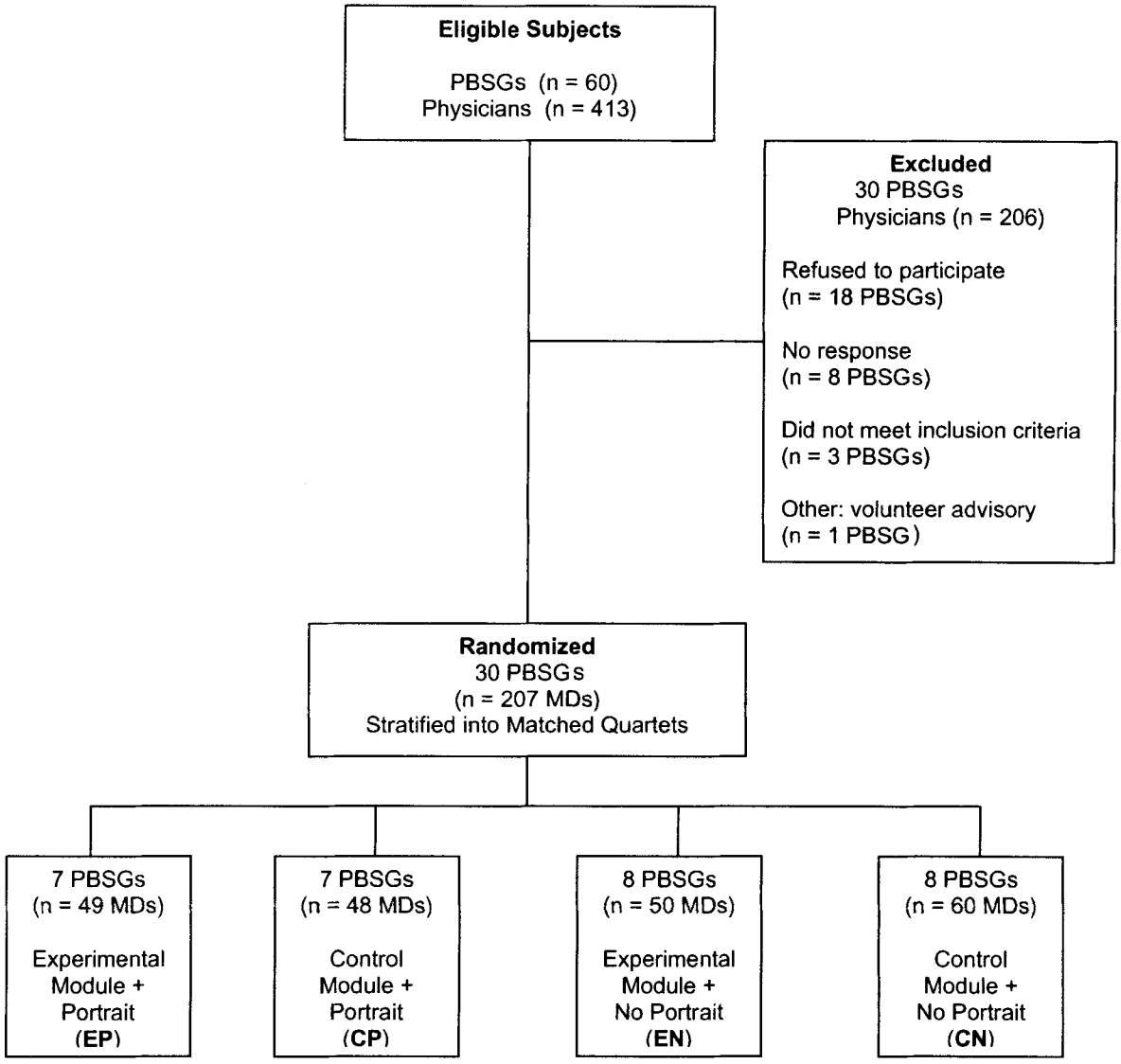

Figure 1 Study design: enrollment and allocation practice-based small groups (PBSGs).

selected clinical conditions: hypertension, type 2 diabetes, congestive heart failure, and otitis media. They were authored by a team of BC family physicians and specialists following PBSG guidelines that include review by a content expert and the PBSG medical editor. The modules present two to three cases representative of family practice patients, together with an information section that presents in point form the best evidence to inform management. The modules are discussed in small groups, and participants are encouraged to decide on their approach to the cases. Commentaries on the cases are included at the end of the module to illustrate one or more ways in which the evidence can be applied to the clinical problems outlined in the case histories.

To provide prescribing feedback for these same four conditions, the project team produced one-page prescribing portraits that graphically compared individual and group prescribing rates for 12 months prior to the study (example in the Appendix). Each portrait also contained a suc-

cinct, evidence-based educational message summarizing the key points of evidence provided in the modules. On the back of the page was an explanation of how the histogram was derived, plus potential limitations of the data. In all cases, the format and content of these portraits were pretested with the volunteer PBSG for clarity and accuracy.

The control groups for the experimental modules received unrelated educational modules of the group's choice from the existing library of modules produced by PBSG, and those in the control group did not access the experimental modules until after the course of the study. The controls for the prescribing feedback portraits received no portraits.

The experimental modules and the prescribing feedback portraits were specifically designed to promote change in prescribing as follows: (1) increase use of thiazides in the management of hypertension; (2) increase use of metformin in the management of type 2 diabetes; (3) increase use of angiotensin-converting enzyme inhibitors, β-blockers, and spironolactone in the management of patients with congestive heart failure; and (4) decrease total use of antibiotics while increasing the use of amoxicillin as a proportion of all antibiotics used to treat acute otitis media in children age 2 to 12 years.

Impact Measure: Prescribing Preference

With the consent of the participating physicians, prescription records for all drugs relevant to the study were released from PharmaNet for a period from 1 year prior to the study through 6 months after all groups had completed the educational intervention (January 1, 1998 to June 6, 2000). Patients' and physicians' unique identification numbers were encrypted to preserve anonymity.

Summaries of prescribing rates for each individual physician in the year prior to the study were produced by first counting the number of unique patients who received a prescription for a drug that was the focus of the module. This number was then divided by the total number of unique patients for whom the physician had prescribed any class of drug for the same indication. "Same indication" was operationally defined for each target condition (Table 1). The result represented the physician's prescribing "preference" for the focus drug. The average prescribing preferences for the physician's own small group and for all physicians in the BPP study were also calculated and shown in the prescribing portrait.

Participant Questionnaire: Log Sheet

At the end of each PBSG session, participants completed a brief questionnaire pertaining to their level of interest in the topic, assessment of the quality of the module, and the impact, if any, anticipated in their practice. This form, modified slightly to record additional group process data, constitutes a normal part of the PBSG process. Participants who received portraits also completed a brief questionnaire concerning their understanding of the portraits and any suggestions for improvement.

Data Analysis

Data analysis of impact on prescribing was blinded by labeling the four parallel arms with arbitrary codes. The investigators were blinded to the intervention status of the four arms until the analysis of prescribing impact was complete.

For each topic studied, patients were classified as being newly treated if none of the drugs in the operational definitions for the specific condition were dispensed to them in the previous year. To assess this, we counted patients newly prescribed any drugs for each of the conditions: before intervention (the 6 months prior to mailing of the materials) and after intervention (the total 1 to 6 months after the groups met; the 1–3 and 4–6 months periods combined). The otitis media condition was excluded from final analysis as the operational definition was unable to yield accurate

Table 1 Operational Definitions for Diagnosis of Clinical Conditions

Hypertension: The operational definition of newly treated hypertension (i.e., the denominator of the preferences for antihypertensives) was all patients who had received at least one antihypertensive drug for the first time in at least 365 days but who did not receive furosemide (a marker of congestive heart failure) or a nitrate (a marker of angina).

Diabetes: The operational definition of newly treated type 2 diabetes mellitus (the denominator of the preferences for hypoglycemic drugs) was all patients 40 years or older receiving metformin, any sulfonylurea, acarbose, or insulin for the first time in at least 365 days. Patients under 40 years were excluded to remove most type 1 diabetic patients.

Congestive heart failure: Congestive heart failure (the denominator of the preference) was operationally defined as patients who received furosemide *either* concurrent to a prescription for an ACEI/AIIRA, a β-blocker, or spironolactone or at any time since January 1, 1997. The numerator was patients who were, in at least the previous 365 days, newly treated with one or more of an ACEI, an AIIRA, a β-blocker, or spironolactone. This operational definition likely still underestimated patients with congestive heart failure.

Otitis media: Unlike the other conditions, an operational definition of otitis media could not be determined solely from prescribing information; the calculation of preference for the use of antibiotics needed to include the decision *not* to prescribe. To measure the physician's preference to prescribe versus not to prescribe an antibiotic for otitis media, the denominator should be those children diagnosed with otitis media. However, reliable diagnostic data were not available for individual participants in the study but only for BC physicians as a whole. Accordingly, instead of overall preference for antibiotics among study participants, we took as a proxy the preference among *all* general practitioners in the province. The denominator was the number of patients ages 2 to 12 years seen at least once during 1998, and the numerator was the number of those who received an antibiotic prescription. Assuming that at least 50% of antibiotic prescriptions for that age group were for otitis media, we then calculated the overall group prescribing preference. This calculation was not possible for the individual or small groups, so the portraits given to physicians showed only their numerators—the number of their patients (2–12 year olds) who received antibiotic prescriptions in 1998. They were then asked to make a "best guess" of their denominator and then calculate their personal rate of antibiotic prescribing. We did not use the best guess denominators in our before and after comparisons, only the numerators. This assumes that any changes in the denominators over time were the same in groups randomized to interventions and groups randomized to controls. In addtion, we calculated preferences for amoxicillin/ampicillin versus other antibiotics using as the denominator the total number of patients aged 2–12 years who had received an antibiotic prescription.

ACEI = angiotensin-converting enzyme inhibitor; AIIRA = alpha II receptor antagonist; BC = British Columbia.

prescribing preferences specifically for this condition, and portraits with individualized feedback could not be generated.

Our overall hypothesis was that physicians' *preferences* among alternative drugs for patients initiated on drug therapy would be influenced by the experimental modules plus portraits. "Preference" was defined as the fraction of patients with the specific condition who were newly prescribed the "target" drug (numerator) among all of the patients who were newly prescribed any drugs used for the same clinical condition (denominator). This fraction was computed for the periods before and after the interventions, and the difference in prescribing between the time periods was termed the "preference difference" (PD). To adjust for any prescribing changes in the control group and thus provide a more accurate absolute measure of the impacts of the interventions, we subtracted the control group's PD from the intervention group's PD. This difference between PDs reflected absolute changes in prescribing and was termed the "adjusted preference difference" (APD).

Please indicate below how this module will change *or* confirm your current practice, *Choose all responses that apply.* Please give specific examples under each applicable section.

☐ Yes, ...*specify change(s) below:* ⇨	*Are there any barriers or problems that we anticipate?* _ No _ Yes Please describe:
☐ Considering changing, ...*specify below:* ⇨	*What would enable us to change our approach?*
☐ No, confirmed current practice (no need to change) ⇨	*Please comment:*
☐ No, not yet convinced of need to change ⇨	*Please comment:*

Figure 2 Example of the commitment to change section of a log sheet.

To obtain confidence intervals (CIs), identical tables were constructed for the same physicians and same dates in the year prior to the study, and the variance among groups versus within groups was measured. To assess the need to adjust for clustering of effects (physicians within small groups and patients within physicians), a C-statistic was calculated and found to be less than zero, indicating no clustering.[15]

Results

A total of 207 physicians participated in the project, which involved monthly meetings of 30 peer learning groups in communities of various sizes throughout British Columbia. An average of 76% of participants attended each group meeting and completed a self-report form (log sheet) at the end of the session (Figure 2).

Log sheets for the three selected conditions documented 192 commitment to change statements (average of 64 per condition). Depending on the condition, 62.5% to 75% of participants indicated that they planned to make at least one practice change (Figure 3). Even though 78.6% (151 of the 192) of the intended changes did relate to changes in prescribing, overall, only 56.3% of the intended practice changes (108 of the 192) were directly related to the major evidence-based messages contained in the prescribing portraits and educational modules (Table 2). Most of the other intended changes related to other information contained in the materials (e.g., dosages of medication, need for patient education),

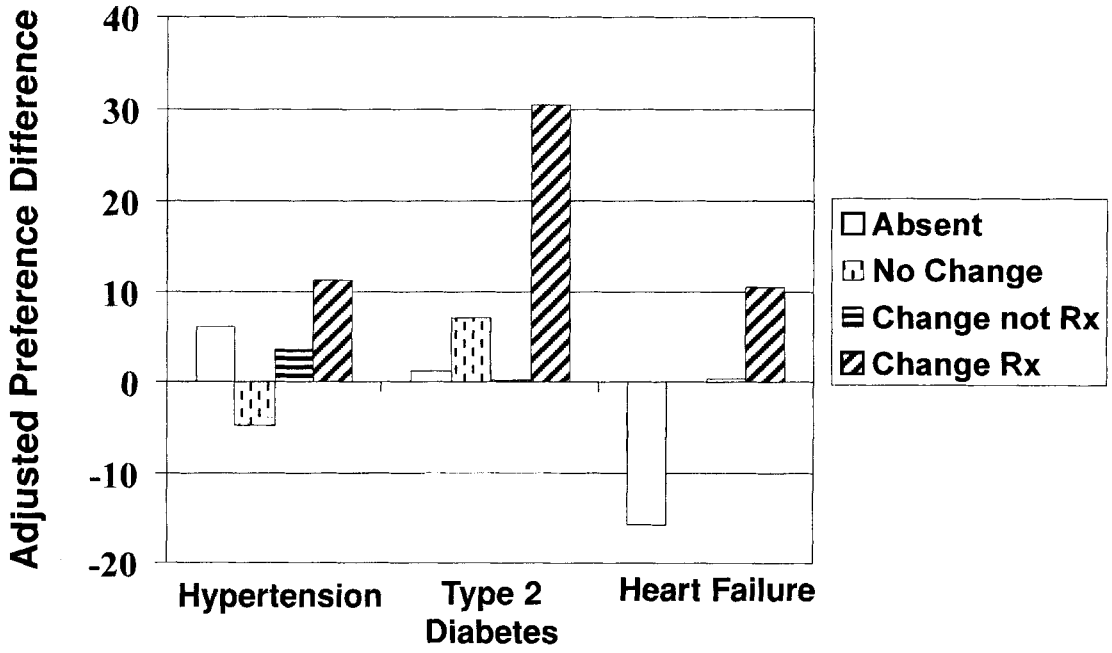

Figure 3 Commitment to change variation by condition. Rx = treatment.

although some planned changes were entirely unanticipated.

After the educational interventions, actual prescribing data from PharmaNet were analyzed according to the stated commitment to change the target drugs for those physicians in groups that received the experimental modules ± prescribing portraits. Across *all* conditions, 91% expressed an intent to make at least one change in practice. For individual conditions, an average of 70% of the doctors who attended the sessions (and thus received the educational

Table 2 Commitment to Change by Condition (Summary)

Numbers	Hypertension	Diabetes Mellitus	Heart Failure	Total	Comments
No. of MDs	96	96	99	291	
No. who attended	71	80	71	222	76.3%
No. who completed	67	75	71	213	73.2%
No. of MDs CTC	53 (75%)	50 (62.5%)	50 (70%)	153	52.6% of all study MDs; 68.9% of attendees; 71.8 % of those who completed forms
No. of changes planned	62	58	72	192	Average 64 per condition
No. of treatment changes consistent with key "message"	27 (82%)	31 (67%)	50 (69%)	108 (56.3%)	Average 36 per condition
Average no. of changes/MD	1.17 (0–3)	1.16 (0–2)	1.44 (0–3)	1.24 (0–3)	

CTC = commitments to change.

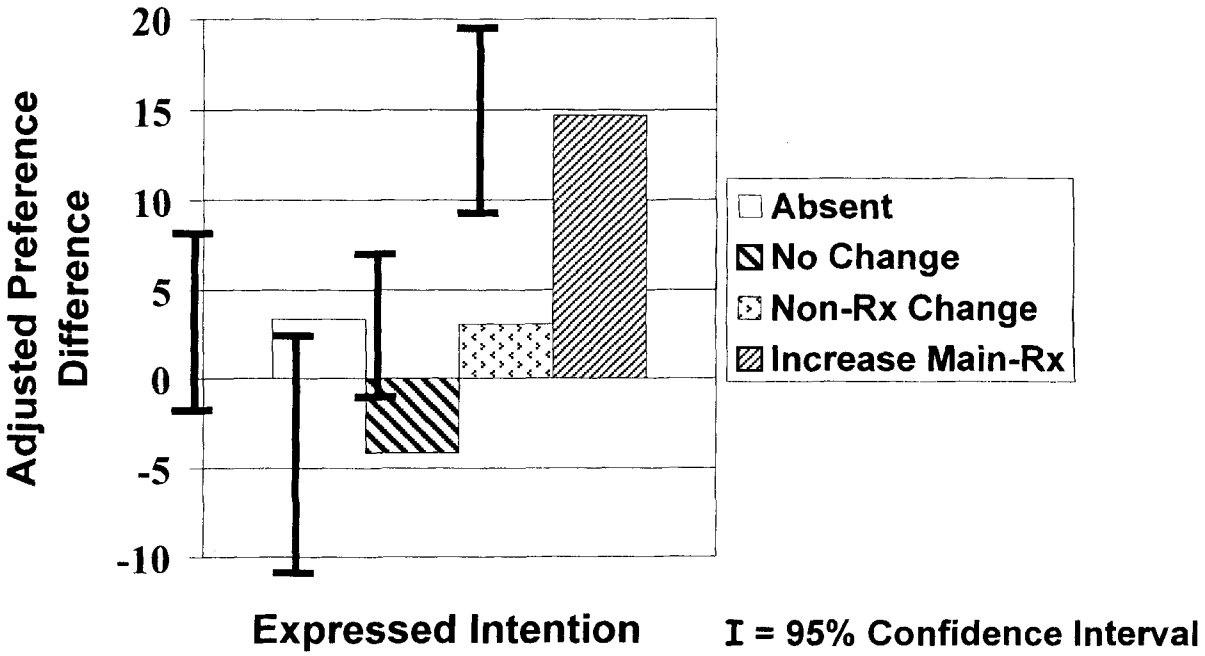

Figure 4 Overall impact of expressed commitment to change. Rx = treatment.

intervention) expressed an intent to make changes in practice. The remaining 30% indicated either that they were *considering* a change *or* that their current practice was confirmed. It was rare that participating physicians indicated that they were "not convinced" by the educational materials.

Conclusions

Overall, for those physicians who stated a commitment to change prescribing, pharmacy registry data showed that actual prescribing change for the target drug during the 6 months after the educational intervention was significantly associated with self-reports (Figure 4). In other words, physicians who committed to change prescribing were far more likely to change their prescribing in the following 6-month period (APD = 14.7%, 95% CI 9.8 to 19.5) than those who did not (APD = −4.1%, 95% CI −11.5 to 3.3). These results indicate that self-reported change of prescribing can be a proxy for actual change.

However, as reflected in the differences by condition (see Figure 3) and the wide CIs (see Figure 4), variation was large. Indeed, at the level of the individual physician, fewer than 5% of participants planned to change prescribing of the target drugs in all four conditions. At the group level, there was no single PBSG in which *all participants* planned to make evidence-based changes in *any* single condition.

Overall, these findings support the notions that educational interventions focused on improving evidence-based prescribing can have an impact when targeted to general physician populations *and* that commitment to change statements are predictive of subsequent changes in prescribing in practice. They also provide insights into why interventions have weak effects. Some people are influenced in ways other than the main intention, some people are not influenced, and some people do not have the opportunity to make the planned change (no newly treated patients with the condition during the follow-up period). As well, some people do not complete

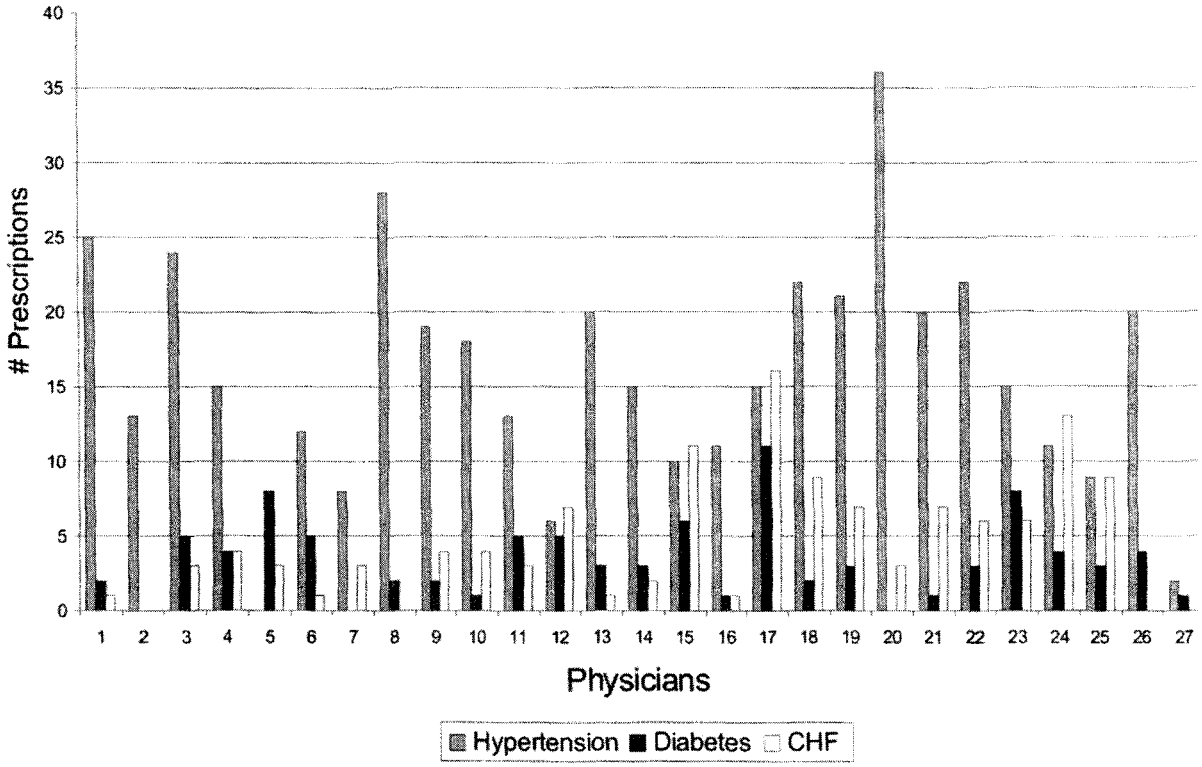

Figure 5 Opportunity to change treatment. CHF = congestive heart failure.

the educational intervention, and this influences "intention-to-treat" analysis.

Discussion

Studies have reported a rate of "compliance" with expressed commitment to change from 47% to 87%.[1,5,16,17] However, the majority of these studies used only self-report measures to document outcomes. Adams et al. found that, in 8 of 10 selected studies that used self-report as well as objective measures, self-report of adherence to practice guidelines overestimated the objective measures in 87% of 37 comparisons.[12] The median overestimation was 27%, and for 32 of the 37 measures, the differences from these overestimations were statistically significant: "The magnitude of this bias is greater than the degree of improvement observed after many interventions."[12] Because of this systematic bias, they cautioned against using self-report as the sole assessment measure. The present study suggests that although the absolute rate of prescribing change in the group that expressed a commitment to change was modest (14.7%), it was statistically and clinically significant when compared with those that did not express a commitment to change.

Our findings are most similar to those of Curry and Purkis.[2] They also studied prescribing changes in the context of commitment to change statements, using automatic duplicate prescription pads and self-reported behavior changes. In their study, 61 physicians completed duplicate prescriptions for 6 weeks before and 16 weeks after a CME course on prescribing. Prior to the 2-day course, participants were randomized into four groups. Half of the participants (30/61) were assigned to two groups that were asked at the conclusion of the course to state any prescribing changes that they proposed to make as a result; the

Lessons for Practice

- Physicians who express a commitment to change their prescribing of specific medications as a consequence of an interactive educational intervention are significantly more likely to change their prescribing in the following 6 months.
- More research is needed to better understand the specific factors necessary for an effective commitment to change approach.
- An understanding of the complexity of physician behavior change, including barriers and facilitators of change, must guide the selection of effective change strategies.

other two groups were not asked about plans to change. They concluded from their study that there was good evidence that participants in the two commitment to change groups "actually changed behavior in the directions indicated by their commitments" ($p = .04$ and $p < .001$). Although Curry and Purkis did not demonstrate any significant changes in overall prescribing behaviors in any of the groups, as we did in our study, commitment to change findings were similar. That is, those physicians who committed to change *did* change their prescribing behavior.

There are limitations to this study. The sample size of participating physicians in the BPP is small—less than 100 in total in the groups receiving the experimental modules ± prescribing portraits. In addition, we considered only patients newly prescribed drugs for the target conditions by the participating physician as there is evidence that family doctors are often hesitant to change a drug prescribed by a colleague. A follow-up period confined to 6 months postintervention further limited the ability to demonstrate changes that may eventually take place. Across all three conditions, there was *no* opportunity for 26% of physicians who committed to change to act on their commitment (Figure 5).

BPP physicians may differ from other physicians as they have registered in a CME program that involves participation in enduring learning groups of peers. However, analysis of the overall prescribing patterns for these clinical conditions (hypertension, type 2 diabetes, congestive heart failure) did not identify any significant differences between PBSG participants and other family/general practitioners in British Columbia. Similarly, although it might be assumed that this group of physicians would be more open to educational or feedback interventions, the numbers and rates of commitment to change statements reported by participants in this study are actually lower than those reported for other CME events.[17,18]

Similar to other studies, commitment to change was an intentional part of our interventions in this study, and *all* participants were asked to indicate whether they would change practice as a result of the educational intervention.[6,16,17,19] Thus, we did not examine the impact of the commitment to change approach itself. Other studies have addressed this by randomly assigning participants to "commitment" groups (asked to make explicit commitments to change) or "no commitment" groups (not asked to make commitments).[2,3] These studies have shown positive trends favoring the commitment to change approach, but further studies like these are needed.

This study does provide support for the use of explicit statements about commitment to change as one method of assessing the potential impact of CME interventions as physicians who reported that they intended to change prescribing were far more likely to change their prescribing behavior. The change in prescribing preferences was significantly associated with a commitment to change

prescribing in the manner planned. However, the degree of planned change was not consistent across all conditions studied (see Figure 4). In many ways, this is an expected finding. Changing clinical practice is a complex process, and it is extremely unlikely that any single educational intervention will be sufficient to effect a change in the clinical practices of all physicians who participate in a CME activity.[20–23]

Even though change in prescribing may be one of the most feasible to make, there are complicated interwoven factors and formidable barriers to any practice change.[24–26] Given the variability of change across physicians and across conditions, this study provides strong support for the recommendation that "The relative influences of components of the commitment-to-change model require further study to determine more clearly their roles in causation and measurement."[27]

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