

# The short-term effect of patient health status assessment in a health maintenance organization

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**This study was designed to test the short-term effects of health assessment on the process of care and patient satisfaction. The 29 Chart physicians used the Dartmouth COOP Charts to measure their adult patients' health status during a single clinical encounter; the 27 control clinicians used no measure of health status. We compared the change between baseline and post-intervention information for a sample of all study clinicians' patients. Most of the patients were female (67%), well educated (70% had at least a college education) and young (approximately 90% were aged 59 years or younger). We found that the ordering of tests and procedures for women was increased by exposure to the COOP Charts (52% vs. 35%;  $p < 0.01$ ); the effect in men was not as significant (37% vs. 23%;  $p = 0.06$ ). Although women reported no change in satisfaction with care, men claimed that the clinician helped in the management of pain ( $p = 0.02$ ). We conclude that the use of health status measures during a single clinical encounter in an HMO changes clinician test ordering behaviour and may improve the help male patients receive for pain conditions. The long-term impact of these management changes is not known.**

*Key words:* Functional assessment, health status.

## Introduction

The primary aim of medical care is to improve or maintain the overall functional capacity and general health of patients. Clinicians have always

informally assessed patient function without using standardized classification and measurement systems. With the advent of assessment systems like the Dartmouth COOP Charts<sup>1</sup> designed explicitly for use in everyday ambulatory practice, it is now possible to examine the extent to which institution of formal assessment has an impact on the process or outcome of care.

Several studies have examined the impact of functional measurement. Assessment programmes for the frail elderly have demonstrated multiple positive benefits.<sup>2-4</sup> However, positive effects of functional assessment in primary care settings have not been consistently documented even though the participating clinicians usually believe that the assessment is useful.<sup>5-8</sup> Failure to demonstrate greater impact of assessment in primary care practice has been attributed to insufficient education about appropriate use of the information once it is obtained, targeting of the COOP Charts at the wrong patients and inadequate attention to functional problems by busy clinicians.<sup>8</sup>

Although young, adult primary care patients may not have a high prevalence of physical disabilities for which functional measurement could be of benefit, psychological problems are frequently present and are often overlooked by the clinician.<sup>9</sup> We presumed that discovery of these problems would cause better clinician agreement between clinician and patient about the reason for the visit and result in greater patient satisfaction. Therefore, this controlled trial was designed to test the short-term effects of functional and health assessment on the process of care and patient satisfaction.

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## Methods

The study hypothesis was that the clinicians assigned to use the Dartmouth COOP Charts would be more likely to have closer clinician-patient agreement about the reason for visit, demonstrable changes in management actions and better patient satisfaction than those who did not use the Charts. To test this hypothesis we gathered baseline information about function, reason for visit and satisfaction from no fewer than 20 patients for each of 56 providers after a single clinic visit. The providers also completed an encounter form about the reason for visit and management plans. Clinicians, matched by the proportion of patients for whom the provider reported multiple reasons for visit, were then randomly assigned within each of the three study sites of a large urban health maintenance organization (HMO) to receive the Dartmouth COOP Charts and encounter form, or the encounter form only. After having standardized instruction about the use of these materials, the same information described above was ob-

tained from a similar group of patients. Figure 1 summarizes the study design.

### Clinician selection

From a list of 63 clinicians practising at least 25% of full-time at three HMO internal medicine clinical sites, 58 agreed to participate in the study and 56 completed enrolment. Forty-one were internists and 15 were nurse practitioners or physicians' assistants who independently cared for their patients.

### Patient selection

Research assistants asked 20-30 patients of participating clinicians in sequence to complete the questionnaire about their function, health, reason for visit and satisfaction with care after the clinic visit. All adult patients over the age of 18 were

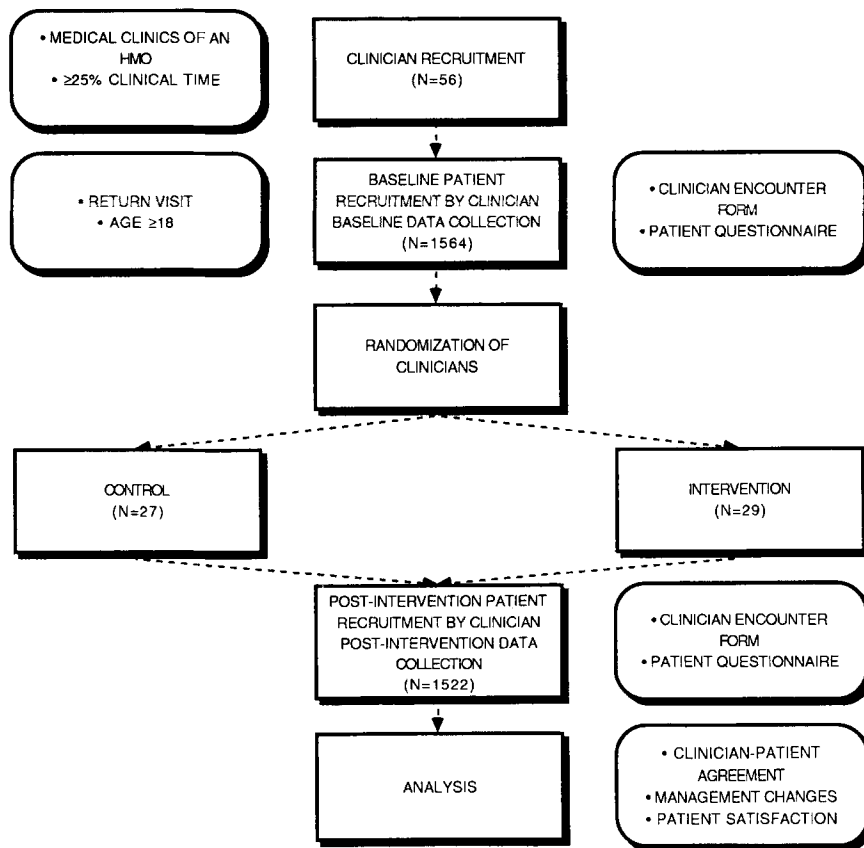


Figure 1. Overview of study design.

included unless this was the initial visit at the study site; new patients were excluded because they had not established a relationship with the clinician and the administrative nature of the care they receive varies significantly by clinical site. After the intervention 20–30 patients per clinician were identified in the same manner and asked to complete the same questionnaire following their visit.

### Measurements

The self-administered patient questionnaire included items about:

- sociodemographics (education and gender)
- functioning and wellbeing<sup>10</sup>
  - emotional wellbeing (5 items)
  - physical functioning (6 items)
  - social functioning (1 item)
  - bodily pain (1 item)
  - current health (5 items)
- satisfaction with the visit (14 items)
- perceived importance of different areas of functioning (5 items)
- perceived help by provider in different areas of functioning (5 items)
- reasons for visit and perceived importance of each reason (6 items)

The patients required 10 min on average to complete the questionnaire after the clinic visit. The clinician never saw the patient responses to the questionnaire. The clinician encounter form focused on the two most important complaints for this visit. The clinician reported the nature of the problem, estimated the importance of the problems to the patient and to the clinician, and indicated actions taken for the problem. Clinician actions were coded as tests/X-rays, new or refill prescriptions, patient advice/education and referral. The overall acuteness of the visit was also rated by the clinician.

### Random assignment of clinicians

Prior to the start of this study, a sample of each clinician's patients were studied to evaluate potential case-mix differences. Clinicians were then blocked in the proportion of patients for whom they reported multiple reasons (problems) for an office visit and were randomly assigned to the

experimental conditions within blocks. Twenty seven were in the control group and 29 were in the intervention (Chart) group.

### Intervention

After randomization to the two study groups, each participating clinician had a standard, scripted 10 min face-to-face instructional session with a physician (the principal investigator) about the intervention. The instruction focused on the management of patient problems with function using case examples from actual practice situations. An article about the measurement of function in primary care practices was also provided.<sup>11</sup> Chart clinicians were also shown how to use the Dartmouth COOP Charts.

Control clinicians were reminded about the general purpose of the study and the use of the encounter form.

The post-intervention data collection period followed the intervention within 3 weeks. Patients of physicians randomized to the Chart group were given six COOP Charts by the receptionist prior to the clinician-patient encounter. The six COOP Charts used in this study were physical condition, emotional condition, daily work, social activities, health change and overall condition.<sup>1</sup> Each Chart has a five item response range and requires less than 30 s for completion (see Figure 2 for an example). After completing the Charts the patients took them to the clinicians. All patients, including those who used the Charts, continued to complete the questionnaire after the clinic visit and all clinicians completed the encounter forms.






### Scoring and analysis of data

Reasons for visit were coded by one member of the research staff who was blinded to the patient study group using the International Classification of Primary Care.<sup>12</sup> The categories of visit were grouped into 17 categories by system and, in the case of 'general' reasons for visit, subcategorized further into symptoms and complaints or general diagnostic/preventative procedures. To analyse these codes for agreement, we matched the 17 categories for the two most important reasons for visit listed by the patient and the provider.

The 14 patient satisfaction items assessed provider interpersonal skills (6 items), technical quality of care (3 items), amount of time spent by the

## FEELINGS

During the past 4 weeks . . .  
 How much have you been bothered by  
 emotional problems such as feeling anxious,  
 depressed, irritable or downhearted and blue ?

Not at all		1
Slightly		2
Moderately		3
Quite a bit		4
Extremely		5

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**Figure 2.** An example of a COOP Chart.

provider (1 item), waiting time at the office (1 item) and overall benefits of care received (1 item). Factor analysis of these items revealed that patient perceptions of interpersonal skill, technical quality, and time spent were indistinguishable, consistent with previous research.<sup>13,14</sup> Hence, we derived a 10-item measure of patient satisfaction with the provider which had high internal consistency reliability ( $\alpha = 0.96$ ).<sup>15</sup>

The four multi-item measures of patient functioning and wellbeing had acceptable internal consistency reliability as well: physical functioning ( $\alpha = 0.86$ ) role functioning ( $\alpha = 0.75$ ), emotional wellbeing ( $\alpha = 0.79$ ) and current health ( $\alpha = 0.60$ ).

Provider management actions were simply enumerated in the following major categories:

tests/procedures, referrals, new medications, and patient education/counselling.

Multi-item scores for satisfaction and function were transformed linearly to a 0–100 distribution. This means that a score shown for these items corresponds to a percentage of the possible score on the original scale.

In order to measure change (by provider) before and after the intervention in clinician–patient agreement about reason for visit, clinician management of the patient and patient satisfaction, least-squares regression was used to estimate the unique effects of the intervention on each outcome measure, adjusting for baseline score on the outcome. Analyses were performed at the provider level, for male and female patients separately.

## Results

### Patient characteristics and process of care

Most of the patients at baseline were female (67%), well educated (70% had at least a college education) and young (approximately 90% were aged 59 years or younger). Table 1 shows the baseline health status, function and reason for visit by provider group assignment. Also shown are the baseline variables that might be affected by the Charts: patient-clinician agreement about reason for visit, process of care measures, and patient satisfaction with care. We identified no significant differences between the Chart and control groups at baseline.

The study patients were healthy. For example, compared to patients with corresponding scores for functioning and wellbeing for 9,385 patients in the Medical Outcomes Study,<sup>16</sup> patients in this study scored significantly better ( $p < 0.01$ ) on self-reported physical and role function, current health and pain. However, despite the generally good health of the subjects, women reported poorer emotional wellbeing and social functioning than men at baseline. Women seeking care also felt that the reason for visit was more often for non-physical functional limitations than men. Because of these important differences between male and female patients, the impact of the Charts was examined independently by gender.

Agreement, measured by matching the two most important reasons for visit listed independently by the clinician and patient, was 70% overall. Ninety-one percent of the patients said they mentioned all of the most important reasons for the visit to the provider. Satisfaction with care was also generally high. Although the second most important reason for visit was emotional, the degree to which the patient claimed that the clinicians helped demonstrates a large discrepancy between physical and emotional components; help for emotional components was much less than for physical components.

### Clinician use of the charts

Using a standard questionnaire, we asked the 29 Chart Group clinicians about their use of the Charts. Fourteen clinicians claimed that the use of the charts did not increase time spent with

**Table 1.** Baseline data for patients of clinicians randomized to control or chart groups<sup>a</sup>

	Control	Chart
<b>Functioning and wellbeing</b>		
Physical functioning	85 (5)	83 (6)
Role functioning	88 (6)	87 (5)
Pain	41 (7)	41 (6)
Emotional wellbeing*	70 (5)	71 (4)
Social functioning*	86 (5)	85 (5)
Current health	79 (4)	79 (4)
<b>Common reasons for visit<sup>b</sup></b>		
General symptoms**	54 (15)	53 (14)
Diagnostic procedures	28 (14)	33 (13)
Respiratory	14 (7)	18 (10)
Circulatory*	10 (8)	15 (10)
Musculoskeletal*	14 (10)	13 (6)
<b>Importance of reason for visit in functional terms</b>		
Physical functioning	93 (3)	93 (3)
Pain	71 (8)	70 (5)
Daily activities**	73 (7)	74 (4)
Emotional**	87 (5)	86 (5)
Social activities**	64 (7)	61 (6)
<b>Patient-clinician agreement about reason(s) for visit<sup>b</sup></b>		
	70 (11)	71 (12)
<b>Process of care measures</b>		
Tests/X-rays ordered**	42 (23)	42 (16)
New medications	26 (13)	21 (13)
Patient advice/education*	57 (26)	63 (21)
Referral	14 (9)	11 (7)
<b>Patient satisfaction with care</b>		
Overall	85 (5)	85 (5)
<b>Degree to which the clinician helped with the functional component of the visit</b>		
• Physical	78 (7)	77 (6)
• Pain	42 (8)	43 (10)
• Daily activities	34 (8)	35 (10)
• Emotional	52 (9)	50 (10)
• Social activities	28 (9)	27 (9)

Numbers in parentheses = one standard deviation.

\* Women scored worse than men ( $p < 0.05$ ) for these variables.

\*\* Women scored better than men ( $p < 0.05$ ) for these variables.

<sup>a</sup> All scores have been transformed linearly to a 0–100 distribution (refer to Methods).

<sup>b</sup> The patients' verbatim principal reasons for visit were coded using the International Classification for Primary Care<sup>12</sup> and summarized in these common categories.

patients; for the 12 who believed that time increased for most patients, the average number of additional minutes required was four. In this generally healthy, young adult population, 16/26 (62%) of the clinicians reported that the Charts provided new information for 15–30% of the clinical encounters. However, when new information was provided, only half of the clinicians reported acting on it.

### Effects of the COOP Charts

Because the complete analysis contained 52 variables, we conservatively screened for differences between groups that differed significantly by a probability of 2/100 or less in order to minimize Type I errors. The numbers shown in Table 2 are predicted scores at follow-up for all of the variables listed in Table 1, adjusting for baseline score based on 493 men and 1,029 women patients. Of all the variables examined, we found that the use of the COOP Charts affected only two: the ordering of tests and procedures for women was increased by exposure to the COOP Charts ( $p < 0.001$ ) and that men reported greater help with functional problems related to pain ( $p = 0.016$ ). Chart use was also associated with increased, but statistically, insignificant ordering of tests and procedures (37% vs. 23%;  $p = 0.06$ ). We were unable to determine whether the Charts might have been more effective in patients who were in fair or poor health because only 10% of the patients claimed this degree of functional impairment.

### Discussion

This controlled trial was designed to test the short-term effects of functional and health assessment on the process of care and patient satisfaction. The specific hypothesis was that the clinicians assigned to use the Dartmouth COOP Charts

would be more likely to have closer clinician-patient agreement about the reason for visit, demonstrable changes in management actions and better patient satisfaction than those who did not use the Charts.

We found that the ordering of tests and procedures for women was increased by exposure to the COOP Charts and that men exposed to the Charts reported greater help by the clinician with functional problems related to pain. All measures were obtained immediately following the clinical encounter and the study design does not allow us to determine whether or not clinician action was appropriate to the situation. Therefore, we do not know whether the observed changes in test ordering for women and perceived help with pain and physical function for men would eventually improve these patients' overall satisfaction or well-being.

For these adult patients in an HMO setting, verbatim patient-clinician agreement about reasons for visit and satisfaction with care was high. The Charts did not further increase agreement or overall patient satisfaction.

The study reported here has several important design limitations. First, the study examined the use of brief functional assessment in a relatively young, healthy population. Therefore, few of these healthy patients had 'room to improve'. Targeting of the COOP Charts at sicker patients might have produced different results. Second, the impact of functional assessment was determined only at a single visit for samples of patients before and after the intervention using the provider as the unit of analysis. To detect change in satisfaction and the process of care from only one brief clinical encounter would be difficult under the best of circumstances. The design was insensitive to changes caused by interventions that require longitudinal follow-up for detection. A longitudinal study of patients exposed to the Charts is still required. Third, clinician response to the Charts was highly variable—half reported that they seldom changed management plans when presented with new information from health status measurement. Health status measurement will not result in improved patient outcomes if clinicians do not act on the information. Clinicians must be educated on how to link measurement to specific action.

In spite of these limitations, the results of this study provide important insights into the process of care. For example, although over 80% of the patients reported that emotional issues were a major reason for clinic visits, emotional problems

**Table 2.** Significant effects of functional measurement on post-intervention variables<sup>a</sup>

	Control	Chart	Statistical significance of difference
Process of care measures			
Tests/X-rays ordered (females)	35	52	$p < 0.001$
Patient satisfaction with care <sup>b</sup>			
Degree to which the clinician helped with the functional component of the visit			
• Pain (males only)	33	47	$p = 0.016$

<sup>a</sup> Numbers in the table are predicted scores among intervention groups for the variables shown in Table 1 that were significantly different ( $p < 0.02$ ) at follow-up after adjusting for baseline score.

<sup>b</sup> All scores have been transformed linearly to a 0–100 distribution (refer to Methods).

were least often helped by the clinician. In addition, women were much more likely than men to view their reason for visit in 'psychosocial' terms. For men, the finding that brief functional assessment improves communication about pain suggests that either the clinicians systematically do not usually address the impacts of pain or that the men (possibly due to social role expectations—'machismo') do not express the degree of impairment to the clinician. These interesting gender differences should be addressed in future studies.

In the future, health status measurement may be routinely employed by providers to monitor quality of care and detect patient problems. This study demonstrates how such a system could be implemented without disrupting office and clinician activities. However, the results also indicate that monitoring and detection often uncover issues which demand additional explanation, appropriate action and better measures. For example, if more tests are obtained for women in an HMO as a result of health status screening, why are such tests obtained? What tests, if any, should be ordered? What difference does test ordering have on patient outcome? The principles of total quality improvement tell us that the results we have reported here represent a first step and not a final answer.<sup>17</sup>

We conclude that the use of brief functional and health status measures in young adults may increase the ordering of tests for female patients and improve the help male patients receive from clinicians for painful problems. Future testing of brief health status measures should be targeted at patients at greater risk for functional impairment and the results of the intervention ought to be observed over a longer period of time. In addition, clinicians ought to be educated about specific methods to manage the problems identified by health status measurement so that identification is linked with appropriate action.<sup>18</sup>

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J. Wasson et al.

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