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Improving Physician Compliance With Preventive Medicine Guidelines

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Similar general medical outpatient clinics with randomly assigned patients were used to evaluate the effectiveness of a program that was to increase house staff compliance with preventive medicine guidelines. Two clinics were designated experimental and two served as controls. In the experimental clinics, age-specific checklists of all recommended preventive procedures (drawn from the Canadian Task Force report on The Periodic Health Examination and American Cancer Society guidelines) were appended to each patient's chart. In addition, house officers were presented with a series of weekly seminars dealing with issues in screening, as well as the specific recommendations included in the checklist. House officers in all four clinics were tested for their knowledge and attitudes toward the preventive program before and after the intervention. Counts of immunizations and mammograms performed and the total populations eligible for these procedures were determined for all four clinics. As predicted, test scores as well as mammography and immunization rates increased significantly (from 2–40 per cent) in the intervention clinics as compared with controls. We conclude that this intervention was clearly effective in the short run. However, follow-up studies will be necessary to determine whether the desired long-term effect has been achieved.

TOO LITTLE PREVENTIVE care is provided. What can be done to change the behavior of physicians responsible for providing such care? The academic medical center has been recognized as a hub for diffusing information and technology. It is an environment that fosters the acquisition of knowledge and the shaping of attitudes. A number of studies have examined the impact of various maneuvers upon house officers' use of laboratory testing. Several of these studies are summarized in the first of our "Metro Firm Trials" published in this journal.[1] Most studies of physician behavior change have explored the apparent overutilization of diagnostic testing in the teaching hospital setting. We, however, focused our attention upon the use of screening and preventive services, which have been underutilized by all indications.[2] A recent review by Carter, Belcher, and Inui[3] has chronicled some of the explanations for this underutilization, which include physician, patient, societal, and economic factors.

In this study, we test under controlled conditions and show the effectiveness of a simple intervention to improve house of-

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ficer compliance with preventive medicine guidelines. We observe the relationship between physicians' knowledge and attitudes, and their use of preventive testing.

The Setting

The study was conducted in the Medical Outpatient Department at Cleveland Metropolitan General Hospital in the fall, 1980.

The Department of Medicine was reorganized during 1975 into a system composed of four general medical firms,[4] each consisting of a 28-bed inpatient unit as well as its own outpatient clinic. House officers are randomly assigned to a firm during internship and remain with that firm for the duration of their training. Patients similarly are randomized into one of the four firms, either on inpatient admission or on first contact with the outpatient area. They are assigned to a specific house officer with whom they remain associated until the house officer leaves the program. Then they are reassigned to another house officer in the same firm. The system thus has provided us with a measure of continuity not generally available in most academic medical centers.[5] Continuity is seen in the inpatient and outpatient services and has enhanced physician–patient relationships, clinic and ward team associations, and faculty–house staff teaching relationships. Moreover, the firm system has provided us with a unique laboratory for clinical and health care research. In essence what we have are four similar groups of patients and physicians, enabling us to study the effects of a maneuver in one or more films, while using the others as controls.

Methods

For this study two firms were randomly designated experimental and one served as a control. Three age-specific checklists, each delineating recommended preventive screening tests and procedures for all patients falling within a given age group, were designed. Items included in the lists were limited to those given Class A recommendations by the Canadian Task Force on the Periodic Health Examination[6] and those recommended by the American Cancer Society (Table 1).[7]

On the experimental firms the appropriate checklist (by age) was affixed to the chart cover of each patient who came to the medical clinic to serve as a reminder of the appropriate preventive measures for that patient. A trained research assistant quickly scanned each medical record to determine whether any of the recommendations had been followed in the recent past. Her findings were recorded on the checklists and appropriate radiology requests were completed as indicated. The house officer who was responsible for the

TABLE 1. Items Included on Preventive Medicine Checklists

	Age 16–44	Age 45–64	Age 65+
Required	Check blood pressure Pap test Breast exam Tetanus immunization	Check blood pressure Pap test Breast exam Mammogram (50–60) Stool hematest Tetanus immunization	Check blood pressure Stool hematest Pneumovax Influenza immunization Tetanus immunization

The following are optional for high risk groups at physicians' discretion: PPD, VDRL, GC culture.

primary care of the patient then was left to determine which procedures should be followed. Final orders for all screening tests and immunizations thus were made by the primary care physician.

The checklist intervention proceeded for a period of 4 months. Specific counts of the vaccinations and mammograms performed were kept by the clinic nursing staff and the radiology department for the two experimental firms and one control firm. The numbers of patients seen in the clinics who were eligible for these procedures were compiled by a research assistant. The percentages of eligible patients who actually received mammograms, influenza immunizations, and pneumovax during the period of the study were tabulated with these data. Furthermore, these data enabled us to identify previously screened patients to prevent duplications.

At the time the checklists were introduced into the medical clinics, a series of five seminars dealing with issues of screening and preventive medicine was offered to the medical house staff. These seminars were given weekly during the first 2 months of the clinic intervention. The first session was devoted to a general discussion of screening and of the methods employed to determine the efficacy of various screening maneuvers and preventive interventions. Subsequent sessions dealt with the specific recommendations being encouraged in the medical clinics. While house officers from all firms were invited to these sessions, those from the experimental firms were particularly encouraged to attend. In fact, with only one exception, no house officers from the control firms attended, and even attendance by members of the experimental firms was poor, averaging 1.2 seminars per physician for the 22 physicians in these firms.

A test instrument was developed to assess physicians' knowledge of and attitudes toward the use of preventive procedures and screening maneuvers. This test was administered to all medical house officers and faculty prior to the experimental intervention and seminar series, and again to all house officers at the conclusion of the study. The test consisted of two parts, one dealing with factual information drawn directly from the Report of the Canadian Task Force on the Periodic Health Examination and from the American Cancer Society guidelines, and the other dealing with attitudinal issues concerning physicians' choices of screening tests in varied clinical situations. Positive scores for the attitudinal section were given for those screening tests judged appropriate for a given situation by a panel of experts; negative scores were given for those judged inappropriate.

Results

The results of the intervention are summarized in Table 2. Over the 4-month period of the study only 5 per cent of the eligible controls received pneumovax, while 42 per cent of patients on the experimental firms were immunized. Influenza immunizations were delivered to 4 per cent of the eligible population on the control firm and 36 per cent of the experimental group. Similarly, mammography was performed in only 4 per cent of the control group and 32 per cent of eligible patients in the experimental firms. All differences are significant at the $p < .001$ level.

The data are graphically presented in terms of monthly rates in Figure 1. Virtually none of our patients routinely received screening mammograms or immunizations at the start of our intervention. This occurred partly because the influenza vaccine for that year was released just at the beginning of the study. The effects of the intervention, however, were seen immediately. Pneumovax and influenza immunization rates rose 30 per cent on the intervention firms during the first month of the study and continued to rise to almost 60 per cent during the subsequent 2 months,

TABLE 2. Immunization and Mammography Rates Among Eligible Patients During 4-Month Intervention

	Experimental Firms (8B & 11C)		Control Firms (6C)	
	Number Eligible	% Completed	Number Eligible	% Completed
Pneumovax	547	42%	291	5%
Influenza	581	36%	291	4%
Mammogram	290	32%	138	4%

$p < 0.001$ in all cases.

finally dropping during the fourth month. Rates on the control firm remained less than 10 per cent for the duration of the study. Similar results were seen in the case of mammography screening. It should be noted that it was impossible to eliminate previously screened patients from our tabulation of denominators, that is, the populations eligible for immunizations and mammograms. Therefore rates reflect the most conservative possible estimates of completed procedures. Furthermore, because patients tend to return to our medical clinics at about 3-month intervals, it is conceivable that the drop noted toward the end of the study represents the return of patients who had already undergone appropriate screening and vaccination for that year.

The data presented up to this point have been analyzed in terms of the patient population on the firms. Because our intervention was directed toward improving the delivery of preventive measures to our patients, we felt that the patient population was an appropriate unit of analysis to evaluate its effectiveness. However, our interest in the effect of our intervention upon physicians' attitudes and behaviors necessitated that the data also be examined using the physician as unit of analysis.

Differences between mean scores for delivery of mammography, influenza immunization, and pneumovax by physicians on the experimental and control firms all were significant at the $p < .001$ level. Similarly, point-to-serial correlations using Pearson's R showed highly significant differences between experimental and control groups in support of the experimental hypotheses. Membership on the experimental firms was correlated strongly with the delivery of mammography ($r = 0.53$, p

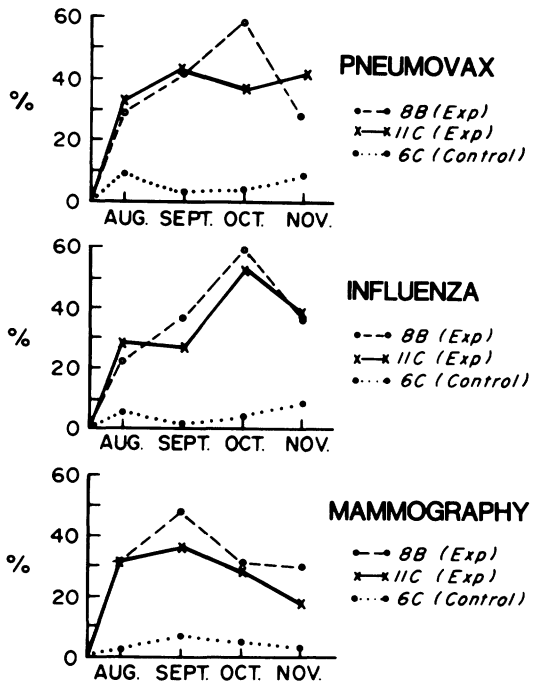

FIG. 1. Percentage of eligible patients receiving immunizations and mammograms: comparisons of experimental and control firms.

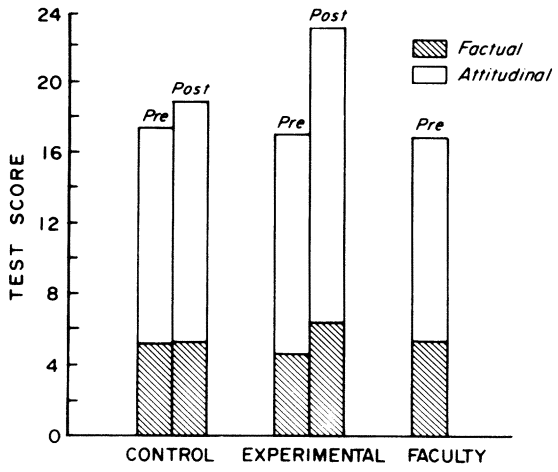

FIG. 2. Comparison of pretest and posttest scores between experimental and control firms.

< 0.001), influenza immunizations (r = 0.65, p < 0.0001), and pneumovax (r = 0.70, p < 0.0001).

Scores of the pretest and posttest were tabulated following the clinic intervention to assure that there was no bias in terms of faculty–house staff interactions. Three separate scores were calculated, one for the total test, a perfect score being 36; one for the attitudinal portion alone, a perfect score being 27; and one for the factual portion alone, a perfect score being 9. The results are summarized in Figure 2. No statistically significant differences were observed between the mean factual, attitudinal, or total scores of control and experimental groups on pretesting. Similarly, no differences were noted between house staff and faculty mean scores on pretesting. However, a significant difference was observed in the mean attitudinal and total test scores ($p < 0.05$ in both cases) on posttesting between the experimental and control groups. Similarly, the differences between experimental and control groups in the improvement in total scores from pretest to posttest was significant ($p < 0.05$). Unexpectedly, no difference was observed in the mean posttest factual scores between experimental and control groups.

An examination of point-to-serial correlations revealed that among physicians in experimental firms, improvement in scores from pretest to posttest was strongly related to seminar attendance ($r = 0.67$, $p < 0.0006$) but was not correlated with the use of preventive procedures. Seminar attendance alone similarly was not correlated with the use of preventive procedures.

Correlations between the use of the three preventive measures were high (Mammography and influenza vaccine +0.49 $p = 0.002$; mammography and pneumovax +0.52 $p = 0.001$; and pneumovax and influenza +0.91 $p < 0.0001$).

Discussion

Much of current medical practice is based upon precedent alone. The application of scientific rigor to the evaluation of the effectiveness and efficacy of various preventive and therapeutic regimens, as well as of systems for their implementation is a relatively recent development. Not surprisingly, in this context evaluative data often has had less clinical impact than may be appropriate. Consequently we frequently observe high utilization of interventions of questionable efficacy, while those of demonstrated value may be consistently underutilized. The causes of this discrepancy between ideal and actual practice are manifold and relate to issues of technology diffusion, knowledge, and attitudes of practitioners and patients, and to a wide variety of incentives determined by the personal, professional, social, and economic environment.

In this study we examined the use of a small number of preventive interventions of well-documented efficacy.[6–8] These procedures and preventive maneuvers have been evaluated carefully in the literature and were found to be safe and effective. Guidelines for their use have been clearly defined and target populations upon whom specific interventions would

have the most impact have been determined.

Because the effectiveness of these preventive interventions has been well documented in the literature, we felt that it was safe to assume that the process of immunization and screening would result in desired outcomes. The efficacy of the recommended screening procedures has been demonstrated in detecting diseases at a point early enough to alter their natural histories. Few medical practices have been submitted to such intense scrutiny. It follows that compliance with these guidelines should be part of standard medical practice. Surprisingly, this has not been the case. Confusion exists with respect to what items should be included in the periodic health examination and the frequency with which they should be performed.[2]

In our clinics we found that, with the exception of blood pressure measurements, routine screening and preventive procedures rarely were carried out. We therefore proceeded to design an intervention to improve house staff compliance with preventive medicine guidelines. The intervention itself purposely was kept simple, relying upon a minimum of on-site staff supervision and monitoring. What we observed was a rather remarkable change in the house officers' attitudes and use of preventive procedures. It was interesting to see that the effect of the educational seminars seemed far less important than the simple checklists in changing physician behaviors. It appeared that a change in attitude, rather than in specific factual knowledge, was correlated most closely with the change in use of preventive procedures. Further research will be necessary to determine what factors influence attitude most directly. Similarly, further investigation will be necessary to determine the duration of the effect of our intervention.

It may be, however, that an intervention of the sort we have described should be repeated on an annual basis in teaching hospitals. As with all new information and diffusing technologies, simple knowledge of efficacy and effectiveness does not ensure appropriate use. A constant reminder, perhaps in the form of a checklist, may be necessary to improve the delivery of certain procedures that should be, but often are not, regularly considered by physicians. A system to ensure the periodic application of screening and preventive maneuvers of demonstrated effectiveness clearly can contribute to the provision of quality care.

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