

# Ten Years of Screening for Cancer in a Family Practice

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*The Cohocton office of Tri-County Family Medicine has maintained an active screening program for breast cancer, colorectal cancer, and cervical cancer since 1974. This article reports a retrospective study of all patients with a diagnosis of cancer during the ten-year period from July 1974 to June 1984. Particular attention was paid to the relationship of screening to the diagnosis of these cancers.*

*Sixty-nine cancers were diagnosed during the study period. Screening detected 7 of 11 breast cancers, 2 of 11 colorectal cancers, and 2 of 3 cervical cancers. In addition, all cases of respiratory cancer occurred in cigarette smokers and were therefore theoretically preventable. The data suggest that a large population of inactive, unscreened patients is a major obstacle to cancer prevention.*

Screening recommendations for a number of cancers have been published by several groups,<sup>1-6</sup> and data concerning the occurrence of cancer and survival rates in the general population are well known.<sup>4</sup> Less is known however, about the types of cancer seen by individual primary care physicians or the impact of ongoing screening programs on the cancer patients they treat.

An estimated 30 percent of annual cancer deaths could be prevented by early diagnosis and treatment.<sup>5</sup> General and family physicians are the largest group of primary care providers and are responsible for one third of ambulatory care visits each year.<sup>6</sup> Their frequent contact and continuity of care with the patient population create an ideal opportunity to affect early cancer detection through screening.

In analyzing the reasons why health maintenance, specifically screening for cancer, is not done more routinely, it is useful to look at cancer screening from the perspective of the primary care physician. Most cancer research projects are done by large institutions, and demographic data are population based.<sup>7-9</sup> The individual physician, however, responds to the rewards and frustrations of his or

her individual experience, which may be lost in, or different from, data based on large populations.

The purpose of the study reported here was to describe the spectrum of cancers diagnosed over a ten-year period by one family physician and to evaluate the impact of an ongoing screening program on the diagnosis of breast, colon, and cervical cancer.

## METHODS

The study was conducted at the Cohocton office of Tri-County Family Medicine. Cohocton is a village with a population of about 1,000 persons located 60 miles south of Rochester in western New York State. The practice is staffed by a board-certified family physician (P.S.F.) and a full-time physician's assistant. The patient population has remained stable at about 1,300 active families or 3,000 patients during the study period. Patients are considered active in the practice if any family member has been seen within the past two years and the patient has been seen once at any time. Patients are considered to have participated in the screening program if they participated at any time during the ten-year study period. Patients are considered noncompliant with screening if they are more than six months overdue for offered screening procedures. The population is rural and largely lower middle class. There is approximately a 17 percent turnover of patients leaving the practice and being replaced by new patients each year.

In May of 1984 a review of all patient charts was done to obtain an accurate age and gender count of the practice

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TABLE 1. AGE DISTRIBUTION AND INVOLVEMENT IN THE SCREENING PROGRAM OF PATIENTS WITH DIAGNOSED CANCER

Cancer Location	Age Range of Patients When Cancer Diagnosed (in years)	Number of Cancers Diagnosed	Number of Patients in Screening Program	Number of Patients Not in Screening Program
Colon and rectum	41-83	11	7	4
Lung	52-74	11	3	8
Breast	58-76	11	8	3
Skin	63-87	10	6	4
Prostate	68-87	6	3	3
Other gastrointestinal	64-88	6	3	3
Lymphoma and leukemia	39-82	4	2	2
Uterine cervix	42-63	3	3	0
Ovary	45-49	2	1	1
Other respiratory	72-77	2	0	2
Unknown primary	81-82	2	0	2
Bladder	75 (1 case)	1	1	0
Total		69	37 (54%)	32 (46%)

to provide a population denominator. The Cohocton practice was comparable to census data for the United States population except for a 3 percent excess of women in the 21- to 30-year age group.

Selective longitudinal health maintenance has been a focus of high priority for this practice throughout the study period, including specific screening strategies for breast, colorectal, and cervical cancer.<sup>10</sup> Patients aged between 40 and 50 years are urged to have a six-slide, three bowel movement fecal occult blood test every two years. Those aged over 50 years are encouraged to have this test done annually. Women are urged to have a Papanicolaou smear every two years after two negative annual smears, to perform monthly breast self-examinations, and to have physician breast examinations every two years before the age of 50 years and every year thereafter. Sigmoidoscopy and mammography were not routinely recommended during the study period.

Cancer diagnoses were available through the practice's diagnostic coding system using the Royal College of General Practitioners' code starting in 1972, and more recently using the International Classification of Health Problems in Primary Care (ICHPPC-1).<sup>11</sup> Charts of all patients coded for malignancy between July 1, 1974, and June 30, 1984, were reviewed. Only patients active in the practice at the time of the cancer diagnosis were included in the study. Patients with cancer that was diagnosed elsewhere who subsequently joined this practice were not included.

Charts were reviewed for the following information: (1) type of cancer, (2) stage at diagnosis, (3) patient gender and age at diagnosis, (4) presence of known risk factors (where applicable), (5) method of detection (symptomatic or asymptomatic but detected by health maintenance screening), (6) type of treatment, (7) outcome, and (8)

participation in the health maintenance program. When necessary, additional information was obtained from regional tumor registries, inpatient hospital records, and direct patient contact.

## RESULTS

One hundred forty-six preliminary cancer diagnoses were coded during the ten-year study period. Sixteen patients were lost to follow-up because they had moved or their charts were not available and are not included in the study. Chart review eliminated 17 patients with cancer diagnosed elsewhere before they joined the practice, 18 with cancer diagnosed before the study period began, and 26 without malignancy after workup. The remaining 69 patients constitute the study group.

The location of the cancers diagnosed, the patients' age at the time of cancer diagnosis, and whether the patient participated in the health maintenance screening program are displayed in Table 1. Thirty-seven (54 percent) of the 69 patients were active in the health maintenance program when their malignancy was diagnosed. Most patients with cancer were older adults. Only one patient was aged less than 40 years. Six patients were aged less than 50 years. No malignancies were diagnosed in children during the study period.

Seven of the 11 patients with diagnosed colorectal cancer were participating in periodic stool occult blood testing. Two of these seven cases were noncompliant with screening and were detected after the onset of symptoms. Two of the five participating patients were detected when asymptomatic by stool occult blood testing. The three remaining patients who observed screening recommen-



dations had false-negative stool occult blood test results and were identified because of symptoms. One of these patients had a cancer of the descending colon that would have been detectable by 60-cm flexible sigmoidoscopy. Overall staging of these patients was favorable with nine of the 11 colorectal cancers diagnosed in Duke's stage A or B.

Eight of the 11 patients with diagnosed breast cancer were involved in the screening program of physician breast examination and patient self-examination. Two cancers were diagnosed by physician examination and five were self-reported by women who had been taught self-examination. One patient was symptomatic with breast tenderness. All breast cancers diagnosed in women involved in screening were stage I or II. All three patients not in the screening program had stage III or IV cancers and died from their malignancy. Four of the eight patients in the screened group survived thus far without recurrence of breast cancer (two- to ten-year follow-up).

No specific screening for lung cancer was employed by this practice. Tobacco use was screened for, however, and cessation of cigarette smoking encouraged for the primary prevention of lung cancer (as well as for other health reasons). All 11 cases of lung cancer were diagnosed in smokers and thus were potentially preventable. Only three of 13 patients with respiratory cancer were involved in the health maintenance program, the lowest proportion of any group of cancer patients in this study.

Three cases of cervical cancer were discovered. All three women participated in screening. Two cancers were detected as carcinoma in situ by Papanicolaou smear during regular screening checkups. One of these patients is alive without cancer recurrence, the other died of other causes without recurrent cancer. The third patient developed vaginal bleeding one month after a normal Papanicolaou smear. She was referred to a gynecologist, who also obtained a repeat normal Papanicolaou smear and then did a dilatation and curettage of the uterus that revealed stage Ib cervical cancer. This patient is alive without recurrence of cancer six years after treatment.

The ten skin cancers diagnosed included 7 basal cell carcinomas, 2 squamous cell carcinomas, and 1 malignant melanoma. No patients died or had significant morbidity from skin cancer.

No cases of bone, renal, brain, or endocrine (other than pancreatic) cancer were diagnosed. Two patients had advanced disease with metastases at the time of diagnosis and the primary source was unknown. Six patients had multiple malignancies.

## DISCUSSION

In this study 69 cancers were diagnosed in a ten-year period, all but one in persons aged over 40 years. This finding

leads to several insights that are important to consider when discussing the primary care physician's role in cancer diagnosis and management. First, the most common cancers were diagnosed at a rate of only 1.1 per year. Second, although diagnoses of individual cancers were made infrequently, in this practice one cancer was diagnosed every one to two months; when considered in conjunction with the cancer diagnoses made elsewhere and managed by the practice, and that cancer management is frequently intensive, the diagnosis and treatment of cancer is a major part of the primary care physician's work. Third, in the aggregate, infrequently occurring cancers are diagnosed frequently. Of the 69 cancers detected, 20 represented cell types or locations of cancers diagnosed less than three times in ten years. Most of these cancers were single occurrences. The primary care physician must have a broad-based training and high index of suspicion to diagnose and manage these cancers.

It cannot be claimed that this practice is necessarily a "typical" family practice. The age and gender distribution, however, is closely comparable to national census figures. The average annual incidence of all malignancies diagnosed was 7 per 3,120 patients, or about 220 per 100,000 population. When this rate is added to the 17 cases diagnosed elsewhere but treated by this practice, an annual rate of about 273 per 100,000 population is calculated. This rate is much lower than the national average incidence of 540 cancers per 100,000 population.

Skin cancers were diagnosed significantly less frequently than would be predicted. Possible reasons for the low rate of skin cancer detection include (1) the northern climate, (2) skin cancers being diagnosed and treated elsewhere without the primary physician's knowledge, and (3) failure of diagnostic coding of this relatively benign cancer. The low rate of skin cancer detection in this study, less than one-third the national annual rate, accounts for a large fraction of the difference between the observed study annual rate and the reported national annual rate of cancer detection.

A previous practice audit in conjunction with a study of physician compliance with the screening program showed that of eligible active patients (two or more visits in the past two years), over 96 percent had a record of smoking status, over 76 percent had had a fecal occult blood test, over 77 percent of women had had a Papanicolaou test, and over 80 percent of women had had a physician breast examination in accordance with the screening protocol.<sup>12</sup> In this study, however, ten (40 percent) of the 25 breast, colorectal, and cervical cancers that potentially could have been detected by screening occurred in patients who were noncompliant or not involved in the screening program. (Screening detected ten cancers and failed to detect five cancers). In addition, only three of 11 patients with lung cancer, which is amenable to primary prevention, were involved in screening. Rem-



ington et al<sup>13</sup> have shown smokers to have a higher rate of certain unhealthy behaviors. Lack of health maintenance participation may also be associated with cigarette smoking. Thus, although a high percentage of active patients in the practice received screening, 20 of 38 patients (53 percent) diagnosed with cancers amenable to primary or secondary prevention either were not involved in, or were noncompliant with, the health maintenance program. Strategies to increase the involvement of the inactive or noncompliant patient in the health maintenance program must receive priority attention if cancer prevention is to achieve its full potential.

The number of cancers diagnosed in this study is too small to measure the effect of screening on morbidity and mortality for specific cancers. Nevertheless, a given family physician's motivation to continue compulsively encouraging his patients to participate in a screening program will depend to a large extent on the positive impact of that screening. From the perspective of the individual physician examining his experience, these morbidity and mortality data are interesting.

The results of fecal occult blood testing for colorectal cancer are disappointing in that only two cancers were detected by screening in asymptomatic patients and there were three false-negative tests. Only one additional cancer could have been detected had flexible sigmoidoscopy been included in the screening program.

Physician breast examination and patient self-examination initially appeared to have been more successful. Seven cancers were detected by screening, all stage I or II. Unfortunately, the long-term outcome is not so positive. Four patients are currently surviving without recurrence. Mammography has recently been added to the screening protocol in hopes of improving long-term breast cancer survival.

Screening for cervical cancers by Papanicolaou smear testing every two years seems quite satisfactory. All three cases have been cured. The one case not diagnosed by screening would not have been detected by screening no matter how frequently Papanicolaou smears were done.

Seven patients who participated faithfully in screening had cancers that were not detected until symptomatic. This number is equal to the number of patients who had screenable cancers but did not participate in preventative screening. If one also includes those smokers who developed lung cancer, the data show over twice as many cancers not presenting until symptomatic in patients not involved in preventative health maintenance as cancers missed by active screening. Patient noncompliance is a more significant problem than lack of screening test sensitivity or frequency of testing.

In assessing the utility of screening programs such as the one used at Tri-County Family Medicine, it is important

to consider the detection and treatment of preneoplastic lesions. The present study design did not allow quantification of the detection of benign colorectal polyps or dysplastic precancerous cervical lesions, because only malignancies were coded and retrieved. As detection and treatment of these precancerous lesions are important to cancer prevention, the value of screening tests may be greater than the incidence of detected malignancies would suggest.

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