

Preventive Care: Do We Practice What We Preach?

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Abstract: We used insurance claims from enrollees in the Rand Health Insurance Experiment to determine the amount of selected components of preventive care received by a representative sample of the non-aged population in the United States and to determine whether insurance coverage was an important determinant of that amount. Only 45 per cent of infants received timely immunization for DPT and polio; 93 per cent received some well child care by 18 months of age. In the three-year experimental period, only 4 per cent of adults had a tetanus shot, 66 per cent of women aged 17-44 and 57 per cent aged 45-65 received a Pap smear, and 2 per cent of women aged 45-65 had a mammogram. Cost sharing was associated with even less preventive care: 60 per cent of children on the free plan and

49 per cent on cost sharing plans received preventive care of any type. For adults, women on the free plan received more preventive care of several kinds, and those aged 45-65 received more Pap smears than those on cost-sharing plans. Even with free care, most enrollees did not receive adequate preventive care. Thus, free care alone, while significant, is not a sufficient incentive to providing recommended levels of preventive care. The average per person insurance charge for increasing the amount of preventive care to a level consistent with that recommended would be \$22 for a complete set of immunizations by age 18 months, \$9 for a Pap smear every three years, and \$97 for a Pap test and mammogram every three years. (*Am J Public Health* 1987; 77:801-804.)

Introduction

In recent years, increasing attention has focused on providing services that may prevent or reduce the social and economic costs of some diseases. In 1979 the Canadian Task Force on the Periodic Health Examination¹ outlined a set of targeted preventive procedures, along with recommended frequencies of administration. In the following years, the American Cancer Society (ACS),² the American College of Physicians,³ and the American Academy of Pediatrics⁴ issued their own sets of preventive care recommendations.

Little is known about the amount of preventive care that most Americans receive or about the determinants of that care. Data from the Center for Disease Control (CDC)⁵ indicate that two-thirds to three-fourths of one-year-olds have not had a complete set of immunizations. The National Center for Health Statistics⁶ provides 1973 data on self-reported receipt of a limited number of preventive procedures. Several investigators have found poor compliance with preventive care standards for patients seen in university-based group practices⁷⁻⁹ and Romm, *et al*,¹⁰ found wide variation but generally low use of preventive procedures in their examination of practices of 39 volunteer physicians in North Carolina. Canadian studies based on physician self-report yield similar results,^{11,12} while a recent study by McPhee, *et al*,¹³ suggests that some physicians may overestimate the amount of preventive care they provide. A patient survey done for the American Cancer Society¹⁴ indicated that most adults do not receive mammography or stool guaiac examinations as recommended.

We used claims data from the Rand Health Insurance Study to estimate the frequency of preventive care and to determine whether cost-sharing was an important determinant of compliance with preventive care recommendations.

Methods

The Health Insurance Experiment

The Health Insurance Experiment (HIE) was a randomized trial of cost sharing on the demand for health services and the health status of individuals. The HIE enrolled families for either three or five years in six sites: Dayton, Ohio; Seattle, Washington; Fitchburg, Massachusetts; Franklin County, Massachusetts; Charleston, South Carolina; and Georgetown County, South Carolina. The experiment ran from 1974 to 1982.

Participants in the HIE were a random sample of the general population at each site with the following exclusions: 1) those 62 years of age and older when the experiment began; 2) those with incomes in excess of \$25,000 in 1973 dollars (\$58,000 in 1984 dollars); 3) those eligible for the Medicare disability program; 4) those in the military and their dependents; 5) those in jail or institutionalized in long-term hospitals; 6) those with military service-related disabilities. The population sample included was considered to be generally representative of the United States population under age 65.^{15,16}

Families participating in the experiment were randomly assigned to one of 14 different insurance plans with different levels of cost sharing. In each plan, there was an upper limit of, at most, \$1,000 on out-of-pocket expenses per family. The plans were grouped into five basic categories: free care, 25 per cent coinsurance rate, 50 per cent coinsurance rate, 95 per cent coinsurance rate, and an Individual Deductible Plan (95 per cent coinsurance for outpatient care with a maximum out-of-pocket expenditure of \$150 per person or \$450 per family and free inpatient care). Plans covered ambulatory and hospital care, mental health care, dental services, and drugs. Coverage for preventive services was the same as for other medical services. Physicians of study participants were not notified of plan assignment.

These analyses use data from the first four sites and from the first three years of experiment. Data from the South Carolina were excluded because the claims data at that site were incomplete at the time our analysis was done. However, there is no reason to suspect that compliance with preventive care recommendations was better in South Carolina than in other sites. With the exception of children born into the study, we considered only individuals enrolled for the entire three years. After the exclusion guidelines were applied,

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3,823 individuals were eligible for inclusion in the study. These included 819 adult males aged 17–44, 248 males aged 45–65, 878 females aged 17–44, and 331 females aged 45–65, 647 children aged 0–6, and 803 children aged 7–16. We also included the 97 newborns who were both born into the study and remained in the study for at least 18 months.

Classification of Visits

The focus of this analysis was all claims for face-to-face, outpatient visits in which “preventive services” were provided. Data on the completeness of claims data for visits have been previously reported.¹⁷ For children, we defined preventive visits as all those associated with the diagnosis or procedure codes for well care examinations, immunizations, or tuberculosis tests. For adults, we defined such visits as all those associated with claims for the following diagnoses and procedures: immunizations, annual physical examinations, administrative examinations, general medical examinations, multiphasic screening examinations, routine gynecologic examinations, and office visits listed only as well care visits.

Pap smears, mammography, and sigmoidoscopy were considered to be “preventive services” only if the diagnoses (other than well care) listed on the claim form associated with the visit could not conceivably have been the reason for the laboratory test.

Each laboratory test was linked with the visit at which it was requested using a set of rules based on provider and dates of service.¹⁸

Visits were classified as “preventive,” or “non-preventive” according to the type of services that were delivered. Visits were classified as both “preventive” and “non-preventive” if a preventive service was given during a non-preventive visit. Charges were allocated according to the proportion of diagnoses and procedures that were preventive or non-preventive.

Because physicians rarely bill separately for counseling about health habits, we could not examine the amount or nature of this activity with HIE claims data. We also did not examine prenatal, maternity, dental, or mental health care.

Standards for Comparison

We used recommendations of the Canadian Task Force, the American Cancer Society, the American College of Physicians, and the American Academy of Pediatrics to derive standards with which to compare the frequency of preventive care seen in the HIE sample. For children these were: diphtheria-pertussis-tetanus (DPT) and polio immunization at 2, 4, 6 and 18 months; measles-mumps-rubella (MMR) vaccination at 12–18 months; and tuberculosis (TB) skin testing at 12–18 months. For adults these included: tetanus immunization every 10 years; influenza vaccine yearly for high-risk adults; Pap smears every three years for women 17–65; mammography every one to three years for women over age 45, sigmoidoscopy every three years for men and women over age 45.

Data Analysis

We calculated proportions of participants receiving a given procedure using analysis of variance methods. Except for the individual deductible plans, all cost sharing plans were grouped together for analysis. We used two-tailed t-tests to contrast proportions for free and cost-sharing plans and corrected all inferences for intrafamily and intertemporal correlation.

Charge for Increasing Preventive Care

We estimated the charge for increasing preventive care from the level seen in the HIE to a level that would comply with recommended standards using the following assumptions:

- All procedures are done in a physician’s office.
- The charge for a person with no physician visit during the HIE equals the charge for an intermediate visit plus the charge for the procedure(s) in question because a physician visit would be required for the enrollee to undergo the procedure. If a person with no visits needed multiple procedures, there was a charge for only one visit.
- The charge for a person with a previous physician visit equals the charge for the procedure in question or the charge for the procedure in question plus the charge for upgrading a visit (e.g., from “intermediate” to “extended”) because a longer visit would be required for the enrollee to undergo the procedure. This did not apply to childhood immunizations.
- The figures given are in 1984 dollars.

The charges for visits and procedures used in these calculations are the mean charges for such services appearing in claims during the HIE. These figures were: newborns—intermediate visit, \$23; males age 17–44—intermediate visit, \$29; extended visit, \$41; males age 45–65—intermediate visit, \$26; extended visit, \$36; females age 17–44—intermediate visit, \$30; extended visit, \$33. For procedures, charges were: DPT vaccine—\$7, polio vaccine—\$6, Pap smear—\$13, mammogram—\$87.

This analysis did not take into account the costs of the following: investigation of false positive tests, hours of work lost in obtaining the procedure, any unnecessary or nonrecommended tests performed during an additional visit, any worry or concern associated with undergoing a procedure, and any complications that arose as a result of the procedure.

Results

Newborns

During the first 18 months of life, most recommended preventive care consists of immunizations and well-care examinations. We report three, rather than four, doses of DPT and polio vaccines for several reasons. First, an infant is considered to have adequate immunity against DPT or polio after he has received at least three doses of vaccine. Second, vaccine administration may be delayed because of an intercurrent viral illness. Finally, some infants do not receive vaccines exactly on schedule. Even with one delayed vaccine, nearly 100 per cent of the sample would ideally have received three doses of vaccine. Only 44 per cent of the 97 newborns in our sample received three doses of DPT vaccine by the time they were 18 months old; 45 per cent received three doses of polio vaccine; 60 per cent received an MMR; and 55 per cent received tuberculosis skin testing. Finally, 7 per cent of newborns had no well care in the first 18 months of life (Table 1).

Adults

Based on the recommendations that adults receive tetanus immunization every 10 years, 30 per cent of the adult sample should have received a tetanus vaccination during the three-year study. Yet, only 1 per cent of the study sample received tetanus immunizations for preventive purposes, i.e., unrelated to trauma. When we included all accident-

TABLE 1—Compliance with Preventive Care Recommendations

Procedure	Population	%	
		Complying with Standard	That Should Have Complied with Standard
Immunization	newborns		
DPT 3+ doses		44	100
Polio 3+ doses		45	100
Measles-Mumps-Rubella		60	100
Tuberculosis Skin Testing	newborns	55	100
Well Care Examination one or more visit(s)	newborns	93	100
Vaccinations	adults aged 17–65		
Tetanus		1 ^a	30
Influenza		3	8
Pap Smears	women aged 17–44	66	100
	women aged 45–65	57	100
Mammography	women aged 45–65	2 ^b	100
Sigmoidoscopy		<1 ^c	100

^a4% if accident-related vaccines are included^b8% if nonpreventive tests are included^c3% if nonpreventive tests are included

related immunization in our analysis, only 4 per cent met the standard. Eight per cent of the sample aged 45–65 had chronic obstructive pulmonary disease and thus should have received influenza vaccine. Only 3 per cent of adults received this vaccine during the first three years of the HIE and only two participants had annual vaccination.

Pap smears were the most frequently performed cancer screening procedure. About 66 per cent of women aged 17–44, and 57 per cent aged 45–65 received at least one Pap smear in the three years of the study. In contrast, only 2 per cent of women aged 45–65 received mammography as a preventive measure at least once in three years. If mammograms performed for reasons other than prevention are included, this figure rises to 8 per cent. No women had yearly mammography.

Three per cent of adults aged 45–65 had sigmoidoscopies during the three-year period; less than 1 per cent were considered preventive measures.

Effects of Cost-Sharing

Table 2 presents data on the effect of cost sharing on immunizations and pap smears. Higher levels of cost sharing were associated with fewer immunizations for children under age seven; adults on the free plan received more immunizations than those in cost-sharing plans; women in both age groups enrolled in the free care plan received more Pap smears than those on cost-sharing plans.

Charges for Attaining Standards

Although we could not estimate the extent to which life expectancy might be extended by preventive practices, we did estimate the monetary charges involved in bringing the HIE sample up to compliance with recommendations for childhood immunization, Pap smears, and mammography. The charge, averaged over all children less than 18 months, would be \$22 per child more than is now spent to ensure that every child had a complete set of immunizations. The average additional charge would be about \$9 per woman aged 17–65 for at least one well care visit with a Pap smear every three years. If mammography were performed once every three years for women aged 45–65, the additional charge for this age group would rise to \$97.

Discussion

Unlike previous studies, this study provides data on preventive procedures based on actual claims data from representative population samples at five sites. Thus it does not suffer from the limitations of self-reported data or from a focus on university-based practices. As in other studies, use of all preventive procedures in the HIE population was far below that recommended. While participants on free care plans did receive significantly more Pap smears and immunizations, use of these services remained quite low.

Cost sharing was clearly not the only obstacle to receipt of preventive care. Other reasons for the low use of preventive services need to be explored and may relate both to

TABLE 2—Effect of Cost Sharing on Immunizations and Pap Smears: Per Cent with Any in Three Years

Procedure	Population/ Age Group	Levels		Difference	
		Free Plan	Cost Sharing Plans	Free Minus Cost Sharing	95% Confidence Interval
Any Immunizations	Children 0–6	58.9	49.1	9.8	.9, 18.7
	Adults 17–44	6.4	4.7	1.7	-.8, 4.2
	Adults 45–65	15.7	7.7	8.0	1.6, 14.4
Pap Smears	Women 17–44	72.2	62.6	9.6	3.0, 16.2
	Women 45–65	65.0	51.9	13.1	2.2, 24.0

physician and patient factors. Some physicians may not have been aware of the Canadian Task Force and the American Cancer Society recommendations, which were introduced during the time of the HIE. Romm¹⁰ and Dietrich¹⁹ indicate that physicians are more likely to perform preventive procedures when they judge their importance to be high. McPhee, *et al*,¹³ point out that some physicians do not perform cancer screening tests because of forgetfulness, dislike of performing the procedure, and lack of time. Yankauer recommends that physicians make use of non-preventive visits to provide preventive care.²⁰ Hopefully, use of preventive services will increase as mechanisms to encourage physicians to provide preventive care during office visits become more prevalent and effective. Factors influencing patient demand for preventive services may include sociodemographic characteristics, public awareness of the benefits of preventive care, fear of receiving a given procedure, and discomfort and inconvenience associated with cancer screening tests.

The charges for increasing compliance appear high, particularly since they do not include costs of educating both physicians and the public about preventive care. It is also possible that these charges may be unrealistically low because of changes in physicians' pricing practices. It may be possible to lower these charges by use of mass screening techniques, public health services, and more efficient use of non-preventive visits.

Several limitations of these data deserve mention. First, this data set recognizes only those procedures which generate a separate bill. Although this could have resulted in underestimating frequencies of preventive procedures, the fact that our reported frequencies of Pap smears and immunizations are similar to those reported by the National Center for Health Statistics⁶ and the CDC⁵ suggests that these claims data are fairly complete. Secondly, we may have missed some preventive procedures performed during visits for reasons other than prevention, thereby underestimating the frequency with which they were performed. However, this seems unlikely because inclusion of tetanus vaccinations, mammograms, and sigmoidoscopy for non-preventive reasons did little to change our estimates of compliance. Finally, classification of visits as preventive or non-preventive is based on the diagnosis listed on the claim form. We do not have data on the accuracy of such diagnoses and thus cannot assess how often our classification of visits may have been wrong.

Regardless of these limitations, it is clear that despite numerous recommendations, preventive procedures are underused. Free care may increase the prevalence of some preventive practices, but free care alone is an insufficient incentive to provide adequate levels of preventive care. Future research should address the non-monetary issues affecting both physicians' decisions to provide, and patients' decisions to seek, preventive care.

The past decade has seen increased public demand for, and attention to, health promotion, of which specific preventive care procedures are a part. At the same time, pressures

to reduce health care costs are creating incentives to reduce the amount of preventive care. The conflicts between increased public demand, the pressures of cost containment, and the otherwise low provision of preventive services by physicians must be reconciled.

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