

Survey of Physician Practice Behaviors Related to Diabetes Mellitus in the U.S.

Physician adherence to consensus recommendations

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OBJECTIVE — To summarize the frequency of physician adherence to consensus recommendations for prevention of diabetic complications.

RESEARCH DESIGN AND METHODS — Survey data from a nationwide stratified probability sample of primary-care physicians were analyzed. Adherence to recommendations were reported by physician specialty, age-group, and type of diabetes treated.

RESULTS — Adherence was high for eye exams, blood pressure measurements, neurological and circulatory exams, and laboratory procedures using blood. Adherence was low for examination of the teeth and gums, examination of the feet, and laboratory procedures involving the collection of urine. Internists generally had the highest adherence rates and pediatricians the lowest. Reported adherence decreased with physician age. Adherence was higher for the management of individuals with IDDM than for those with NIDDM.

CONCLUSIONS — Recommendations for the care of diabetic individuals need to be more widely implemented. Recommendations targeted specifically to pediatricians may be necessary.

Timely application of appropriate preventive services can decrease the morbidity and cost associated with diabetes complications (1,2). Recommendations for prevention have been published (3–6) but the extent of phy-

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IDDM, insulin-dependent diabetes mellitus; NIDDM, non-insulin-dependent diabetes mellitus; IM, internist; FP, family practitioner; GP, general practitioner; PD, pediatrician; BP, blood pressure; BUN, blood urea nitrogen.

sician's knowledge of and adherence to these recommendations is unknown. This study analyzes data from a large national survey and summarizes physician's self-reported adherence to clinical and laboratory recommendations by physician specialty, age, and type of diabetes treated.

RESEARCH DESIGN AND METHODS

The National Institute of Diabetes and Digestive and Kidney Diseases conducted the Survey of Physician Practice Behaviors Related to Diabetes Mellitus between June and December 1989. A comprehensive description of the survey methods can be found in Siebert et al. (7). Physicians were asked how frequently they performed various preventive clinical and laboratory procedures. For IMs, FPs, and GPs, separate responses were solicited for the treatment of both insulin-requiring and non-insulin-requiring IDDM and NIDDM patients. PDs were asked to respond only to questions about the treatment of IDDM patients. Physicians were not asked whether they were aware of or reviewed published recommendations.

The reported frequency of clinical and laboratory care was classified as evidence of adherence if the service was performed at least as often as recommended. Logistic regression was used to investigate the relationships between adherence and the independent factors of physician specialty, physician age, and type of diabetes being treated. The presence of second- and third-order interactions was determined before model reduction and were found to be nonsignificant. Significance can be assumed to be below the 0.05 nominal level unless otherwise indicated.

RESULTS — A detailed description of the survey cohort may be found in Siebert et al. (7). Our analysis was restricted to 1434 physicians who provided complete responses for the clinical portion of the questionnaire. Of these physicians, 29% were IMs, 31% were

Table 1—Self-reported adherence rates for treatment of IDDM patient

	Physician specialty											
	IM			FP			GP			PD		
	Age-group			Age-group			Age-group			Age-group		
	<39	40–54	>55	<39	40–54	>55	<39	40–54	>55	<39	40–54	>55
Recommended treatment												
Semiannual teeth/gum exam	33	39	43	31	39	47	40	45	37	63	64	65
Annual funduscopic exam	94	90	87	94	94	79	93	89	64	95	85	84
Quarterly BP	87	80	81	85	80	81	91	85	81	41	32	35
Annual circulatory exam	90	95	92	94	90	80	82	89	77	80	72	72
Semiannual foot exam	80	70	67	70	61	63	68	64	54	53	48	51
Annual urinary protein	37	37	36	34	32	34	34	46	39	27	22	21
Annual BUN/creatinine	99	98	98	95	93	90	98	96	84	55	51	35
Annual fasting cholesterol/triglyceride	95	93	96	91	89	96	98	93	86	62	56	43

FPs, 18% were GPs, and 22% were PDs. The age distribution of the physicians within these specialties was similar, yet GPs were older on average. Self-reported adherence rates, weighted to reflect the selection probability of eligible physicians, are presented in Tables 1 and 2.

In general, only ~33% of physicians reported adherence to the recommendation for semiannual examination of the teeth and gums. Adherence rates for IMs, FPs, and GPs were similar,

whereas PDs were significantly more likely to report adherence. The self-reported adherence increased significantly with physician age. Adherence was greater for treatment of IDDM patients than for treatment of NIDDM patients.

Most physicians reported performing annual funduscopic exams, although GPs were less likely to do so. Adherence declined significantly with increasing physician age. Physicians of all

specialties and age-groups tended to adhere to guidelines less frequently for NIDDM patients than for IDDM patients.

The majority of physicians reported measuring BP at least quarterly. Physician specialty was a significant factor; PDs had the lowest self-reported adherence rate and GPs had the highest. Physician age was not a significant factor. Reported adherence was greater for the treatment of IDDM patients than for NIDDM patients.

Table 2—Self-reported adherence rates for treatment of NIDDM patient

	Physician specialty								
	IM			FP			GP		
	Age-group			Age-group			Age-group		
	<39	40–54	>55	<39	40–54	>55	<39	40–54	>55
Recommended treatment									
Semiannual teeth/gum exam	24	30	34	27	34	33	33	28	35
Annual funduscopic exam	93	85	84	91	87	74	90	80	62
Quarterly BP	64	62	60	66	63	71	79	75	74
Annual circulatory exam	86	93	89	90	79	80	80	83	65
Semiannual foot exam	62	57	53	58	47	56	50	40	44
Annual urinary protein	31	32	20	30	30	26	25	39	44
Annual BUN/creatinine	99	97	97	97	93	90	98	93	91
Annual fasting cholesterol/triglyceride	95	96	97	95	92	95	100	94	95

Self-reported adherence to the recommendation for yearly circulatory and neurological exams was also good. Physician specialty was related to adherence, with all specialties' rates differing significantly. Physician age was also significant, and adherence for NIDDM patients was significantly lower than for IDDM patients.

Self-reported adherence to the recommendation for semiannual foot exams was significantly related to physician age. The effect of specialty was significant with IMs having the highest reported rates. Recommendations were followed more frequently for the treatment of IDDM patients than for NIDDM patients.

The reported rates for annual quantitative measurement of urinary protein indicated poor adherence. Physician specialty and patient type were significantly related to adherence, yet age was not. Adherence rates were highest for the treatment of IDDM patients.

Self-reported rates of adherence to annual blood tests for BUN and creatinine were very high among all groups of physicians except PDs. IMs had the highest self-reported rates, and older physicians tended to adhere to the recommendations less often than younger physicians.

The self-reported adherence to recommendation for annual fasting blood tests for cholesterol and triglycerides was high for all specialists and ages except the PDs. IMs had the highest adherence; however, adherence declined as the age of the physician increased.

CONCLUSIONS— The results of this survey indicate that some recommendations are adhered to more often than others. In general, reported adherence is good with eye exams, BP measurement, and neurological and circulatory exams, whereas it is poor with examinations of the teeth, gums, and feet. Adherence is good with blood tests and poor with urine tests. Low adherence to some recommendations is apparent regardless of specialty, age, or type of diabetes being treated. This may be the result of physi-

cians disagreeing with or having insufficient knowledge of recommendations. For many clinical and laboratory guidelines, self-reported adherence was highest for IMs and lowest for PDs. This may reflect differences in medical training and experience. Older physicians often had lower adherence rates, a finding that is supported by other studies (8,9). These results suggest that continuing medical education may be best targeted at older physicians and at subgroups of physicians based on specialty.

Adherence rates for all clinical and laboratory tests were higher for the management of IDDM patients than for the management of NIDDM patients. This suggests that NIDDM may be perceived as a less serious illness than IDDM and thus receives less preventive services. This greatly increases the burden of diabetes because NIDDM constitutes most cases, and some complications—including periodontal, cardiovascular, and foot disease—are more common in older NIDDM patients.

When interpreting the results of this survey, potential sources of bias must be considered. One source of bias is that the adherence rates were calculated from self-reported practices and likely overestimate actual practices (10). Another potential source of bias is that responding physicians may adhere to the recommendations at different rates than nonresponders. Quite likely, nonresponders may be even less likely than responders to adhere to recommendations for practice. Both sources of bias would estimate higher physician adherence than what might actually occur. Another limitation of the survey is that physicians were not asked about their adherence based on the age and the duration of diabetes of the patient being treated. These important patient characteristics are likely to influence adherence rates.

Previous studies have demonstrated the difficulty in bringing clinical practice in line with scientific knowledge (10,11). An essential feature for success-

fully implementing recommendations appears to be adequate review and validation among physicians peers (12,13). In addition, patients must have an active role in their primary care. Finally, we must recognize that physicians work in a large, contextual framework and the environmental factors—including patient load, time constraints, office based systems, availability of service, and reimbursement policies—profoundly affect their behaviors. Future interventions must address these factors.

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