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# Tuberculosis Prevention Practices and Perspectives of Physicians in DeKalb County, GA

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## Synopsis.....

*Knowing the reasons some physicians do not adhere to the disease prevention and treatment recommendations of expert committees can assist in the development of future recommendations more*

*likely to be adopted by physicians. The authors describe the attitudes and practices of physicians relative to tuberculosis prevention in DeKalb County, GA. Tuberculosis is an important problem in the county, which includes part of the City of Atlanta, as well as suburban areas.*

*Questionnaires for anonymous reply were mailed to 1,621 physicians in the county in 1991, and 848 (53 percent) were completed and returned. The final sample was 793 physicians, who were grouped into 5 specialty areas. Primary care physicians were the group most commonly involved in specific tuberculosis screening and prevention activities. Medical and pediatric specialists, surgeons, obstetricians-gynecologists, and other physicians were significantly less likely to be involved in such activities. Given that primary care physicians constitute a decreasing proportion of physicians in the United States, the findings suggest the importance of ensuring that future strategies for tuberculosis prevention take into account the increasingly specialized nature of the medical practice environment.*

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ONE OF THE NATIONAL HEALTH OBJECTIVES is to reduce the incidence of tuberculosis from the 1988 rate of 9.1 per 100,000 population to 3.5 per 100,000 or less by the year 2000 (1). The goal of an incidence rate of 1 case per 1 million population by the year 2010 has been established by the Advisory Committee for the Elimination of Tuberculosis (ACET) in its Strategic Plan (2).

The first step of that plan is "more effective use of existing prevention and control methods, especially in high-risk populations." The second and third steps specify the development and rapid transfer into public health practice of new technologies for better treatment, diagnosis, and prevention of tuberculosis. Currently, tuberculosis control efforts rely heavily on tuberculin skin testing and administration of tuberculosis preventive therapy using the drug isoniazid.

The objective of the study was to determine physicians' attitudes and practices relative to screen-

ing for and preventing tuberculosis among outpatients. Physicians were surveyed because of their key role in tuberculosis prevention, especially in performing screening tests and in prescribing. We identified those specialty groups in DeKalb County, GA, most likely to use the tuberculin skin test and to prescribe isoniazid preventive therapy. We present data that test existing suppositions about tuberculosis prevention and that should help to direct better tuberculosis prevention strategies.

## Methods

DeKalb County had an estimated population in 1990 of 545,837. The county has both urban and suburban areas, including part of the City of Atlanta. In 1990, 105 cases of tuberculosis were reported in the county, an incidence rate of 19 per 100,000 population, about twice the national rate of 9 to 10

Table 1. Indications<sup>1</sup> for tuberculin skin testing used by 793 physician survey respondents reporting the test for at least 1 outpatient during the previous year in DeKalb County, GA, in 1991

Indication	Primary care physicians (N = 198)		Surgeons (N = 95)		Medical and pediatric specialists (N = 215)		Limited ongoing direct physical care (N = 244)		Obstetricians-gynecologists (N = 41)	
	Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent
Total reporting at least 1 skin test in the previous year <sup>2</sup> .....	183	92	40	42	130	60	36	15	24	59
Test required.....	143	72	3	3	64	30	17	7	17	41
Patient with TB signs or symptoms.....	100	51	27	28	80	37	9	4	6	15
Exposure to TB case.....	120	61	11	12	56	26	14	6	9	22
Baseline test.....	94	47	7	7	37	17	7	3	3	7
Patient in high-risk group for TB.....	102	52	22	23	79	37	22	9	6	15

<sup>1</sup>More than one indication may be listed for each physician.

<sup>2</sup>The total is the denominator used in calculating percents for the various

indications.

NOTE: TB = tuberculosis.

Table 2. Type of tuberculin skin test used by physicians reporting a tuberculin skin test on at least one outpatient in the previous year among 793 physician survey respondents in DeKalb County, GA, 1991

Type of test	Primary care physicians		Surgeons		Medical and pediatric specialists		Limited ongoing direct physical care		Obstetricians-gynecologists	
	Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent
Total reporting at least 1 skin test in the previous year.....	183	100	40	100	130	100	36	100	24	100
Mantoux (syringe).....	66	36	26	65	90	69	24	67	7	29
Tine (multiple puncture)....	50	27	7	18	13	10	4	11	7	29
Both Mantoux and tine.....	51	28	4	10	13	10	4	11	2	8
No answer or did not know.....	16	9	3	8	14	11	4	11	8	33

per 100,000.

Physicians practicing in the State of Georgia must be licensed by the Composite State Board of Medical Examiners. Licenses are mailed either to a physician's home or place of work. A list of 1,621 currently licensed physicians whose licenses were sent to addresses in DeKalb County was obtained from the Board. A questionnaire, accompanying cover letter, and stamped return-addressed envelope were sent in February 1991 to each physician on the list. Physicians were asked about their recent experience with tuberculin skin testing; the indications that they used in ordering skin tests; the type of skin test they used; their experience with prescribing isoniazid preventive therapy; and, if they had not prescribed it in the previous year, their attitudes concerning isoniazid.

Returned questionnaires identified respondents only by medical specialty. Those with more than one speciality were categorized in the specialty requiring a greater length of training. For example, a physician describing his specialty as internal medicine-

cardiology was categorized as a cardiologist. Physicians were further categorized, according to specialty, into five groups. Primary care physicians included family practice, general practice, geriatric, internal medicine, and pediatric physicians. Surgeons included general surgeons and surgical specialists. Medical and pediatric specialists included allergists, cardiologists, dermatologists, emergency physicians, endocrinologists, gastroenterologists, hematologists, infectious disease specialists, oncologists, neonatologists, nephrologists, neurologists, occupational medicine specialists, ophthalmologists, pulmonologists, and rehabilitation medicine specialists. Specialties with limited or no current direct physical care of patients included those working in administration, anesthesiology, epidemiology, laboratory medicine, nuclear medicine, pathology, preventive medicine, psychiatry, public health, radiology, and research. Obstetricians and gynecologists composed the fifth group.

Because the questionnaires did not include personal identifiers (a means of enhancing the validity of responses), followup of individual nonresponders was

not possible. To validate the results of the mail survey, we telephoned 62 physicians who were primary care physicians or medical or pediatric specialists. Physicians of other specialty groups were not included in the analysis of the telephone survey. Physicians were administered the same questionnaire that they had received in the mail; in addition, they were asked whether they had responded to the mailed questionnaire. The survey had about 70 percent power to determine whether, compared with mail survey responders, the mail survey nonresponders were two-thirds as likely to report having ordered outpatient tuberculin skin tests in the previous year.

### Statistical Analysis

Data base management and analysis were performed using the Epi Info, version 5.01, microcomputer program. The statistical significance of differences in proportions was determined using the chi-square test, with  $P < 0.05$  considered significant.

### Results

Of 1,621 questionnaires mailed, 22 were returned as undeliverable. Of the remaining 1,599 questionnaires, 848 (53 percent) were completed and returned. The 55 physicians who were retired, or were not currently working as physicians, or did not indicate their specialty, were excluded from further analysis.

**Tuberculin skin test.** The proportion of physicians who reported having ordered at least one tuberculin skin test for an outpatient within the previous year varied widely according to specialty group. Whereas 92 percent of primary care physicians had ordered the test, the proportions for the other specialty groups were substantially lower (table 1).

Among respondents who reported having used the tuberculin skin test within the previous year, there were differences according to specialty group in the indications for which the test was used. Primary care physicians as well as obstetricians-gynecologists said that the two most frequently stated indications for tuberculin skin testing were (a) that the patient had been required to have the test, such as by a school, an employer, or an outside agency, and (b) that the patient had been exposed to a person with active tuberculosis.

Among surgeons as well as medical and pediatric specialists, the most frequent indication was that the patient had signs or symptoms of tuberculosis. That indication was given by 107 of 310 physicians in those two specialties (35 percent). Their least

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frequent indication mentioned was baseline testing; that is, tuberculin skin testing for persons not in a high risk group for tuberculosis and for whom the test had been negative in the distant past or had never been done (table 1).

Among primary care physicians, there were differences according to specialty in the indications for which physicians reported having ordered the tuberculin test. Whereas a similar proportion of internists and family practitioners reported having ordered the test within the previous year because of signs and symptoms of tuberculosis (74 percent), the corresponding proportion for general practitioners and pediatricians was considerably lower (35 percent). The pattern for baseline skin testing was different among primary care specialties. The practice was quite common among pediatricians (83 percent), but less prevalent among family practitioners (63 percent), general practitioners (41 percent), and internists (39 percent,  $P < 0.001$ ).

Those physicians who ordered a tuberculin skin test for at least one outpatient within the previous year were asked the type of test they had used (table 2). About two-thirds of surgeons, medical and pediatric specialists, and physicians in specialties with limited or no ongoing direct physical care of patients reported exclusive use of the Mantoux test. However, among primary care physicians, exclusive use of the Mantoux test was reported by only 36 percent, exclusive use of the tine (or multiple puncture through skin) test by 27 percent, and use of both tests by 28 percent. Similarly, a low proportion of obstetricians-gynecologists reported exclusive use of the Mantoux test (29 percent). Internists, however, departed from that pattern; 66 percent reported exclusive use of the Mantoux test.

**Isoniazid prescribing practices.** Large differences were found among specialty groups in the proportions of physicians who, after the completion of their medical training, reported ever having started a patient on isoniazid preventive therapy (table 3). The highest proportion was among primary care physi-

Table 3. Self-reported prescribing practices for isoniazid (INH) preventive therapy, by specialty group, among 793 physician survey respondents in DeKalb County, GA, 1991

Practice	Primary care physicians (N = 198)		Surgeons (N = 95)		Medical and pediatric specialists (N = 215)		Limited ongoing direct physical care (N = 244)		Obstetricians-gynecologists (N = 41)	
	Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent
Ever started a patient on INH .....	144	73	29	31	116	54	52	21	10	24
Started a patient on INH in previous year .....	57	29	7	7	44	20	13	5	3	7
Ever renewed an INH prescription .....	105	53	23	24	90	42	50	20	9	22
Renewed INH prescription in previous year .....	46	23	11	12	32	15	10	4	3	7

Table 4. Attitudes of physicians who had not prescribed isoniazid (INH) preventive therapy within the previous year, among 793 physician survey respondents in DeKalb County, GA, 1991

Attitude	Primary care physicians (N = 198)		Surgeons (N = 95)		Medical and pediatric specialists (N = 215)		Limited ongoing direct physical care (N = 244)		Obstetricians-gynecologists (N = 41)	
	Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent
Total of responders who had not prescribed INH in previous year <sup>1</sup> .....	95	100	74	100	130	100	201	100	31	100
Prescribing INH is not within my specialty .....	10	11	58	78	67	52	174	87	25	81
INH not effective enough .....	1	1	1	1	2	2	8	4	1	3
INH side effects are too dangerous .....	0	0	0	0	2	2	1	0	1	3
Not comfortable managing INH side effects .....	8	8	22	30	27	21	52	26	14	45
Many patients do not like INH .....	17	18	4	5	16	12	23	11	1	3
Six months or more of preventive therapy is too long .....	4	4	0	0	2	2	7	3	0	0
Better to wait until a patient gets TB and then that can be treated .....	0	0	1	1	2	2	1	0	0	0
INH preventive therapy is not adequately reimbursed .....	9	9	0	0	2	2	3	1	1	3

<sup>1</sup>The total is the denominator used in calculating percents for the various attitudes.

NOTE: Of the 334 physicians who responded that prescribing INH is not within their medical specialty, 130 (39 percent) did not respond to any of the

seven other questions. Physicians were permitted to respond affirmatively to none, some, or all of the statements; therefore, column percentages need not sum to 100.

Table 5. Followup telephone survey responses of primary care physicians and medical and pediatric specialists, by mail survey response category, DeKalb County, GA, 1991

Practice	Telephone survey					
	Mail survey responders (N = 28)		Mail survey nonresponders (N = 34)		Mail survey responders (N = 413)	
	Number	Percent	Number	Percent	Number	Percent
Prescribed outpatient tuberculin skin test in previous year .....	24	86	26	76	313	75
Ever started a patient on INH .....	21	75	20	59	260	63
Started a patient on INH in previous year .....	6	21	5	15	101	24

NOTE: INH = isoniazid.

cians (73 percent), and the lowest among specialists with limited or no ongoing direct physical care of patients (21 percent). Although 54 percent of medical and pediatric specialists reported ever having started a patient on isoniazid, there were differences within the group according to specialty. For example, that practice was especially common among pulmonologists (100 percent) and infectious disease specialists (100 percent). Variations within the primary care group were seen, with internists having more experience with isoniazid therapy (81 percent) than general practitioners (45 percent,  $P = 0.002$ ).

The experience of starting a patient on isoniazid preventive therapy within the previous year was reported by a much smaller proportion of physicians than was having ever started a patient on that drug. Twenty-nine percent of primary care physicians and 20 percent of medical and pediatric specialists reported having started a patient on isoniazid within the previous year. In other specialty groups, the proportions were 7 percent or less. However, among pulmonologists and infectious disease specialists, the proportion was much higher (91 percent). Excluding pulmonologists and infectious disease specialists, only 12 percent of the medical and pediatric specialist group reported having started a patient on isoniazid in the previous year. The proportions of physicians who reported ever, or within the previous year, having renewed an isoniazid prescription, were in general similar or slightly lower than the corresponding proportions noted for starting isoniazid.

Physicians who had neither started nor renewed a prescription for isoniazid preventive therapy within the previous year were asked to respond to statements about the therapy (table 4). Prescribing of isoniazid was not considered within the medical specialty of 78 percent of surgeons, 87 percent of physicians in specialties with limited or no ongoing direct physical care of patients, and 81 percent of obstetricians-gynecologists. Those three specialty groups next most commonly reported that they were not comfortable managing the side effects of isoniazid.

A similar order of frequency of responses was noted among medical and pediatric specialists; however, in this group, a smaller proportion (52 percent) felt that prescribing isoniazid was not within their specialty. Among primary care physicians, in contrast with other specialty groups, only 11 percent indicated that prescribing isoniazid was not within their medical specialty. Their most frequent responses were that many patients do not like taking isoniazid (18 percent), that managing the side effects of isoniazid would make the physicians uncomfortable (8 percent), and that managing isoniazid preventive

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therapy was not adequately reimbursed (9 percent).

Four other statements about isoniazid therapy that could explain its not being prescribed were indicated by 4 percent or fewer responders in all specialty groups. Those statements were that isoniazid was not effective enough in preventing tuberculosis; the side effects of isoniazid made it too dangerous to prescribe; 6 months or more was too long a period for preventive therapy; and a preference to wait to see if a patient developed active tuberculosis, which can then be treated directly.

**Physicians' telephone survey.** A telephone survey was conducted to gain information about primary care physicians and medical and pediatric specialists who did not respond to the mailed questionnaire. Of the 62 physicians reached by telephone, 28 had responded to the mail questionnaire and 34 had not (table 5). Although responders to the mail questionnaire reported somewhat more frequent ordering of the tuberculin skin test and isoniazid than nonresponders, those differences were not statistically significant; other responses in the telephone survey of questionnaire responders and nonresponders also did not differ significantly from the mail questionnaire responses.

## Discussion

Learning the reasons that physicians do not adhere to the recommendations of expert committees may aid in the development of new recommendations that physicians are more likely to adopt (3, 4). Our survey sheds new light on physicians' attitudes and practices relative to tuberculosis prevention recommendations.

We found that specialty group was an important determinant of physicians' tuberculosis prevention activity. For example, among primary care physicians who had not prescribed isoniazid within the previous year, 89 percent nonetheless acknowledged that it was within their medical specialty. Most physicians in other specialty groups did not believe prescribing

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isoniazid to be within their medical specialty. Thus, in considering physician nonadherence to guidelines, it is important to determine whether physicians even perceive the guidelines to be directed to them. Yet even when guidelines concern a procedure that is performed by a relatively clearly circumscribed group of physicians, such as cesarean section performed by obstetricians, adherence still may not always result. Lomas and coworkers have written that guidelines for practice may predispose physicians to consider changing their behavior; but unless there are other incentives, or disincentives are removed, guidelines may be unlikely to effect rapid change in actual practice (4).

Prior studies and analyses to decide whether isoniazid preventive therapy is indicated have focused on comparing the risks of morbidity and mortality from tuberculosis with risks from isoniazid related hepatitis. Two analyses of this type (5, 6) support recommendations for isoniazid preventive therapy endorsed by the Centers for Disease Control and Prevention and the American Thoracic Society (7); however, another analysis did not support the recommendations (8).

Investigators have speculated about why there has been less than universal adherence by the medical community to those recommendations. Glassroth has written that most opportunities for the application of tuberculosis prevention (other than among persons exposures to infectious cases) occur outside the public sector. As a result, many health care professionals working in nonpublic settings have only an occasional opportunity to manage tuberculosis and related problems, such as tuberculosis prevention (9). Comstock suggested that physicians may prefer to accept the improbable risk of being sued for tuberculosis that developed because preventive treatment was not recommended, rather than the more immediate risk of a suit arising from the side effects of treatment (10).

In our questionnaire, we attempted to assess perceptions of those issues by physicians who had not prescribed isoniazid within the previous year. We were surprised to find that our findings frame the issues differently than earlier studies. Relatively few

physicians expressed concern that isoniazid was not effective enough, or that its side effects were too dangerous, although they did indicate somewhat more frequently that they were not comfortable managing those side effects. Moreover, fewer than 1 percent indicated a preference to wait to see whether an infected patient developed active tuberculosis, which then can be treated. This is a course some investigators have implied is appropriate in certain circumstances (8).

Our findings indicate that the vast majority of nonprimary care physicians do not consider prescribing isoniazid because they believe that practice to be outside their medical specialty. For primary care physicians, questions about patients' acceptance of isoniazid may explain why some physicians do not prescribe it; of the primary care physicians who had not prescribed isoniazid within the previous year, 18 percent gave as a reason the belief that many patients do not like taking isoniazid.

The tuberculin skin test is an essential component of tuberculosis prevention strategies involving isoniazid. Despite the recommendation that all persons know their *Mycobacterium tuberculosis* infection status (2), we found that physician-initiated baseline testing was the least frequently reported indication for testing. Among primary care physicians, as well as obstetricians-gynecologists, the most common indication for testing was that the patient was required to have the test. Thus, the requirement for a tuberculin skin test, commonly made by schools, employers, and others, can powerfully supplement the recommendation for baseline testing. Relatively commonly reported indications for tuberculin skin testing were that a patient showed signs or symptoms of tuberculosis, or was exposed to a person with active tuberculosis, or was in a group at high risk. The indications for testing presuppose a familiarity with the risk factors and clinical manifestations of tuberculosis; testing may be enhanced through education materials written for health care providers, such as the National Tuberculosis Training Initiative's Core Curriculum on Tuberculosis (11).

The Mantoux method of tuberculin skin testing, which involves injecting the tuberculin beneath the skin with a syringe, is a more accurate method than the tine (multiple puncture through skin) test for detecting infection with *M. tuberculosis*. Tine testing is intended not for diagnostic use, but for surveys or screening among groups of asymptomatic persons not known to have been exposed to a case of tuberculosis, of whom only a small proportion are expected to have tuberculous infection (12). We found that the use of the tine test, either alone or in

combination with the Mantoux, was more prevalent among primary care physicians (55 percent) than among other groups. The tine test's continuing common usage results at least in part from its easier administration; however, there may be a lack of awareness that the Mantoux technique for testing performs better. Further study to determine why primary care physicians prefer the tine test to the Mantoux test will be necessary in devising strategies to enhance use of the Mantoux test, where appropriate.

Recent experience with isoniazid was not common among responders in our study. Although the vast majority of primary care physicians indicated that prescribing isoniazid was within their medical specialty, fewer than a third reported prescribing it within the previous year. Because our questionnaire was brief, we could not determine whether that finding resulted from a lack of eligible candidates for isoniazid, a relative lack of screening for tuberculous infection, or other reasons.

Several possible limitations of our study should be noted. First, in any survey using a questionnaire, the problem of nonresponse must be considered. Given that our study was based on a single mailing to active physicians, who replied anonymously, we believe that the 53 percent response rate was good. Although the telephone survey found that mail survey responders and nonresponders differed somewhat, those differences were neither statistically significant nor substantial. Second, to maximize the response rate, our questionnaire was brief. Questions were qualitative rather than quantitative because our primary interest in this study was whether a physician practiced a prevention modality, rather than how often. Third, the study was limited to one Georgia county, and confirmation of our findings in other geographic areas would strengthen the findings' generalizability. However, we do not believe that our findings are unique to DeKalb County, GA.

In conclusion, we found that primary care physicians were the physician group most commonly involved in tuberculosis prevention activities. Medical and pediatric specialists were significantly less likely to be involved in those activities. Our findings raise particular concern for tuberculosis prevention, given two current trends in the supply of primary care physicians. First, declining proportions of medical school graduates are interested in and matching to primary care specialty residency training positions (13). Second, there is a continuing decrease in the proportion of physicians who practice primary care specialties (14).

To enhance tuberculosis prevention, recommenda-

tions and incentives for adopting preventive practices need to be designed for the increasingly specialized medical practice environment.

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