Differences between Infectious Diseases–Certified Physicians and General Medicine–Certified Physicians in the Level of Comfort with Providing Primary Care to Patients

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Background. Human immunodeficiency virus (HIV)–related mortality has decreased because of highly active antiretroviral therapy. As the life expectancy of HIV-infected patients has increased, the management of comorbid disease in such patients has become a more important concern. We examined the level of comfort self-reported by experts in HIV medicine with prescribing medications to HIV-infected patients for hyperlipidemia, diabetes, hypertension, and depression.

Methods. As part of a larger project (the Veterans Aging Cohort Study), physicians at infectious diseases (ID) clinics and physicians at general medical (GM) clinics were asked to complete a survey requesting information about demographic characteristics, training and certification received, and self-reported comfort with prescribing medications for patients with hyperlipidemia, diabetes, hypertension, and/or depression. Comfort was rated using a 5-point Likert scale, with scores of 4–5 classified as "comfortable."

Results. Of 150 attending physicians surveyed, 51 (34%) were ID certified, 33 (22%) were GM certified but practicing at an ID clinic, and 66 were GM certified and practicing at a GM clinic. Comorbid conditions were common among HIV-infected patients treated at the ID clinics (22% of these patients had hyperlipidemia, 17% had diabetes, 40% had hypertension, and 27% had depression). However, comfort with treating these conditions was less among physicians at the ID clinic. For example, comfort treating patients with hyperlipidemia was greater for GM-certified physicians at GM clinics than for GM-certified physicians and ID-certified physicians at ID clinics (98% vs. 73% and 71%, respectively; $P < .0001$ for trend). A similar pattern was seen for treating patients with diabetes and hypertension ($P < .0001$). Comfort with treating patients with depression was generally lower, particularly among physicians at ID clinics ($P < .0001$).

Conclusions. We found that ID-certified physicians and GM-certified physicians at ID clinics reported less comfort prescribing medications for common comorbid conditions, compared with generalist physicians at GM clinics, despite a substantial prevalence of these conditions at the ID clinics. Methods are needed to increase physicians' level of comfort for prescribing treatment and/or to facilitate referral to other physicians for treatment.

Expert management of antiretroviral therapy for and appropriate prophylaxis against opportunistic infection has led to a dramatic reduction in AIDS-related morbidity and mortality [1]. Although HIV infection is being increasingly viewed as a chronic, manageable disease, experts in HIV medicine continue to provide the majority of primary care to their patients. Although most of these experts have had training in the management of general medical (GM) conditions, many have also obtained subspecialty training and certifica-

Received 22 February 2005; accepted 14 April 2005; electronically published 22 July 2005.

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Clinical Infectious Diseases 2005; 41:738–43

1058-4838/2005/4105-0023$15.00

The views expressed in this article are those of the authors and do not necessarily reflect the position or policy of the Department of Veterans Affairs.

tion in infectious diseases (ID). The subspecialty focus of their training and career may make it difficult for some experts in HIV medicine to maintain a level of comfort with advances in general medical care that is equivalent to the level of comfort associated with HIV care.

One survey of physicians attending a continuing medical education program sponsored by the International AIDS Society–USA found that ID-trained physicians were less confident in their ability to provide GM care to their patients and to assess substance use and abuse, compared with generalist physicians [2]. Another study of experts in HIV medicine demonstrated that ID-trained physicians were more likely to provide their patients with treatment adherence counseling and to refer them to other physicians for the management of diabetes and hypertension but were less likely to always discuss condom use, compared with non–ID-trained physicians [3]. One potential explanation given by the authors of that study was that ID-trained physicians might be less comfortable providing primary care services, compared with physicians without ID training.

To investigate the association between both training and site of care and the level of comfort with prescribing primary-care treatment, we compared differences in the self-reported level of comfort between physicians at GM clinics and physicians at ID clinics at 8 Veterans Health Administration sites. We hypothesized that experts in HIV medicine would be less comfortable than generalist physicians with prescribing therapy for the management of non–HIV-related chronic medical conditions.

METHODS

Study design. The Veterans Aging Cohort Study (VACS) is a prospectively enrolled cohort study of HIV-positive subjects in Infectious Disease (ID) clinics and age-, race- and site-matched HIV-negative subjects in GM clinics being conducted at the following 8 Veterans Health Administration (VA) sites: Atlanta, Georgia; Baltimore, Maryland; Bronx, New York; Houston, Texas; Los Angeles, California, New York, New York; Pittsburgh, Pennsylvania; and Washington, DC. VACS is approved by the institutional review boards at the VA Connecticut Healthcare System, Yale University, and each of the local sites.

Enrollment occurred in 2 phases. After feasibility of the project was demonstrated at 5 sites, the project was expanded to include 3 additional sites. In addition to completing individual self-report surveys, HIV-infected patients were asked to identify the physician who they considered to be responsible for their care. These physicians were then asked to complete a patient-specific survey and an additional survey requesting information about the physician's demographic characteristics, training background, length of time in practice, percentage of patients with HIV infection, whether they consider themselves to be an expert in primary care of HIV-infected patients, and level of comfort with prescribing treatment for hyperlipidemia, diabetes, hypertension, and depression. Responses to these items were scored on a 5-point Likert scale ranging from 1 (i.e., "not comfortable") to 5 (i.e., "very comfortable"). Physicians who completed surveys between September 2001 and October 2004 were included in the analysis.

The prevalences of hyperlipidemia, diabetes, hypertension, and depression in the ID clinics were obtained using *International Classification of Diseases, Ninth Revision* (ICD-9) codes in VA administrative databases during the 5-year period before enrollment in VACS. These measures have been validated against formal chart review and have been shown to be highly specific but not very sensitive (A. C. Justice et al., unpublished data). VACS-recruited, HIV-infected subjects represented the majority of patients in the ID clinics. Because recruitment of non–HIV-infected control subjects from the GM clinics was not representative of the GM clinic population (control subjects were matched to HIV-infected patients on the basis of age and race), we did not examine the prevalence of comorbidities in the GM clinics, as it would likely be dramatically underestimated. Copies of the surveys and ICD-9 codes can be obtained at the VACS Web site (available at: http://www.vacohort.org/).

Statistical analysis. The analysis of physician information was restricted to attending physicians. Physicians were grouped on the basis of the self-reported specialty certification and the clinic where they were recruited. Patient-specific surveys completed by physicians were used to determine the percentage of patient-physician dyads for which the physician was self-identified as the primary physician.

Self-reported comfort with prescribing each of the 4 types of medication were analyzed as binary variables, with the Likert scale being dichotomized such that physicians who reported a score of 4–5 were characterized as "comfortable." Bivariate analyses were performed using χ^2 tests for trend. Multivariate analyses were performed by means of logistic regression adjusting for physician sex, race, and years in practice. A second multivariate analysis was performed that included the physician's estimate of the prevalence of each condition, to determine whether the perceived prevalence was associated with the self-reported level of comfort. All analyses were done using SAS, version 9.1.3 (SAS).

RESULTS

Physician characteristics. Of the 167 physicians who completed the survey about their characteristics and background, 17 (10%) were excluded from the analysis because they reported certification in areas other than GM or ID. Of the 150 remaining physicians, 51 (34%) were ID certified, and 33 (22%) were GM certified but caring for patients in an ID clinic; the remaining 66 were GM certified and caring for patients in a GM clinic (table 1). The mean age of the ID-certified physicians

Table 1. Characteristics of physicians participating in the Veterans Aging Cohort Study, by certification and practice location.

Characteristic	GM-certified physicians at GM clinics (n = 66)	GM-certified physicians at ID clinics (n = 33)	ID-certified physicians at ID clinics (n = 51)	P
Age, years, mean ± SD	39 ± 8.1	38 ± 7.4	43 ± 7.6	.002
Male sex	50	48	61	.4
White race	70	73	84	.2
Self-reported expert in general medicine	82	64	53	.003
Self-reported expert in HIV medicine	3	55	86	.0001
Duration of practice, years, median	5	5	9	.2
Percentage of patients infected with HIV	1	98	90	.0001
Percentage of physician-patient relationships in which the respondents were the primary physician	85	85	84	.9

NOTE. Data are % of respondents, unless otherwise indicated. GM, general medicine; ID, infectious diseases.

was 43 years, which was significantly higher than the mean ages of the generalist physicians at the GM clinics (39 years) and the generalist physicians at the ID clinics (38 years) (P = .002).

Sixty-one percent of ID-certified physicians, 48% of GM-certified physicians at ID clinics, and 50% of GM-certified physicians were men. Although 82% of the GM-certified physicians rated themselves as GM experts, only 64% of the GM-certified physicians at ID clinics and 53% of the ID-certified physicians did so (P = .003). For 84% of the patient-physician dyads, physicians identified themselves as the primary physician for the patient; there was no difference based on physician certification.

Prevalence and comfort treating comorbidities. The prevalences of hyperlipidemia (22%), diabetes (17%), hypertension (40%), and depression (27%) were substantial in the ID clinics (figure 1). Comfort with treating hyperlipidemia was more frequently reported by GM-certified physicians (98% of respondents) than by GM-certified physicians at ID clinics (73%) or ID-certified physicians (71%) (P < .0001 for trend; figure 2). A similar pattern was seen for comfort with treating diabetes (98% of GM-certified physicians, 61% of GM-certified physicians at ID clinics, and 57% of ID-certified physicians; P < .0001 for trend). A total of 98% of GM-certified physicians reported being comfortable with treating patients for hypertension, whereas 79% of GM-certified physicians at ID clinics and 73% of ID-certified physicians rated themselves as comfortable (P < .0001 for trend). Self-reported comfort with treating depression was lower in all groups (79% of GM-certified physicians, 42% of GM-certified physicians at ID clinics, and

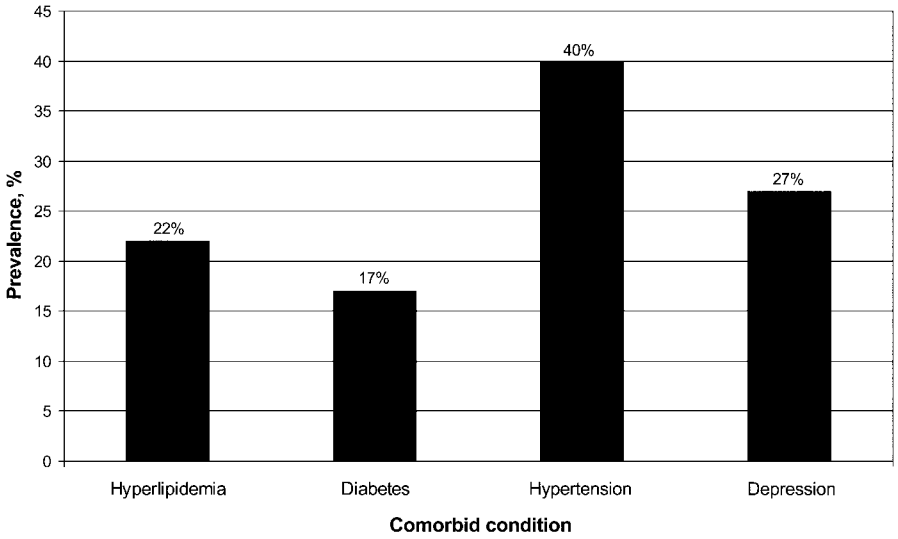

Figure 1. Prevalence of general medical conditions in the infectious diseases clinics participating in the Veterans Aging Cohort Study. Conditions were determined using *International Classification of Diseases, Ninth Revision* codes.

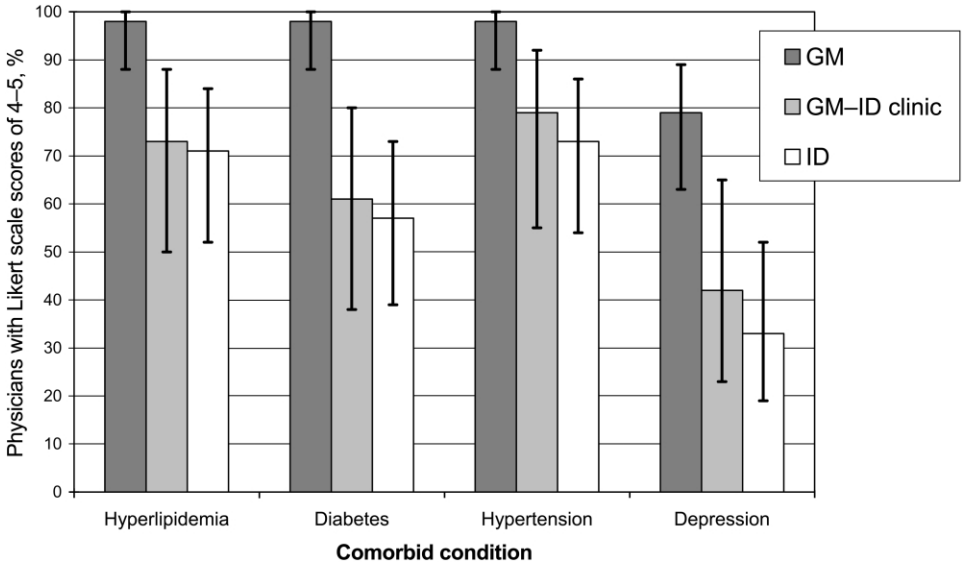

Figure 2. Self-reported level of comfort with prescribing treatment for hyperlipidemia, diabetes, hypertension, and depression for physicians participating in the Veterans Aging Cohort Study. Responses were scored on a 5-point Likert scale ranging from 1 (i.e., "not comfortable") to 5 (i.e., "very comfortable"). For purposes of analysis, scores were dichotomized, such that physicians who reported a score of 4–5 were characterized as "comfortable." GM, general medicine–certified physicians; GM–ID clinic, GM-certified physicians working at infectious diseases (ID) clinics; ID, ID-certified physicians. *Bars,* 95% CIs.

33% of ID-certified physicians; $P < .0001$ for trend), although the relative pattern remained the same. Multivariate analyses revealed that physician sex, race, and years in practice had a minimal influence on the level of comfort, with certification and clinic site being the dominant influences on self-reported comfort.

DISCUSSION

In addition to managing antiretroviral therapy for and prophylaxis against opportunistic infections, the long-term treatment of HIV-infected patients requires management of a multitude of comorbid conditions, including hyperlipidemia, diabetes, hypertension, and depression. In this analysis, we demonstrated that ID-certified physicians and GM-certified physicians at ID clinics reported substantially less comfort with prescribing treatments for these conditions than did GM-certified physicians.

Physician discomfort with prescribing does not appear to be related to exposure to patients with hyperlipidemia, diabetes, hypertension, and depression. Analysis of administrative data revealed that the prevalences of these conditions are substantial in the ID clinics. Because administrative data likely underestimate the true prevalences of these conditions, the reported estimates are conservative. In addition, aging patients receiving prolonged antiretroviral therapy are likely to have developed additional comorbid conditions. In a separate analysis, we included physicians' self-reported estimates of prevalences of these conditions into the multivariate models and determined that this did not influence their comfort with managing these conditions (data not shown).

Early during the HIV infection epidemic, primary care physicians often focused on caring for sick and dying HIV-infected patients, and expertise was required for the management of opportunistic infections. During the pre-HAART era, primary care physicians were shown to have difficulty recognizing physical findings associated with HIV infection or diagnosing and managing pneumonia due to *Pneumocystis jiroveci* (previously known as *Pneumocystis carinii*) [4, 5]. With the introduction of increasingly complex HAART, the care of HIV-infected patients has shifted to an even more specialist-based setting. As medical care for HIV-infected patients has grown increasingly complex, the level of training and expertise needed to provide quality HIV care has dramatically increased. As the HIV epidemic continues, it is becoming clearer that most primary care physicians who do not care for large numbers of HIV-infected patients cannot maintain the level of knowledge and experience necessary to provide HIV care. In addition, in both the pre-HAART and HAART eras, HIV-related experience at the physician and hospital level has been demonstrated to be important in predicting patient outcomes [2, 6–12].

This evidence and the rapid development of increasingly complex antiretroviral regimens have forced a shift in HIV care from a generalist to predominantly ID-trained, HIV care physicians. Because of the demonstrated importance of HIV-related experience, the Panel on Clinical Practices for Treatment of HIV Infection, convened by the US Department of Health and

Human Services, "recommends HIV primary care by a clinician with at least 20 HIV-infected patients and preferably at least 50 HIV-infected patients" [13, p. 3]. Although the majority of HIV-related care is managed by specialists or generalists who developed expertise, all primary care doctors were encouraged to develop competency in areas such as HIV infection diagnosis, primary opportunistic infection prevention, sexual history taking, and risk counseling [14]. The HIV Medicine Association of the Infectious Diseases Society of America has recently published guidelines for the primary care treatment of HIV-infected patients [15]. These guidelines acknowledge the large body of non–HIV-focused guidelines and state that "all persons in the United States [should] be managed according to standard practices appropriate for the individual's age and sex" [15, p. 609]. Although these guidelines address the management of hyperlipidemia and impaired glucose tolerance, they do so only in cases where they arise in association with antiretroviral therapy.

We demonstrated that, although 53% of ID-certified physicians consider themselves to be experts in primary care and consider themselves responsible for the patient's primary care (the ID-certified physicians considered themselves to be the primary physician for 84% of the patients), they acknowledge being less comfortable prescribing medications for common chronic medical problems. The same pattern was observed for GM-certified physicians who have focused on HIV care. Although 64% of the GM-certified physicians at ID clinics rated themselves as experts in primary care, they also reported a level of comfort that was lower than that reported by GM-certified physicians working in the GM clinic. This suggests that it is not just specialist-focused training and certification—but ongoing clinical focus, as well—that determines comfort. This pattern was observed for treating the 4 common comorbid conditions we examined: hyperlipidemia, diabetes, hypertension, and depression.

Our study did not look at patient-specific factors or actual patterns of use for medications prescribed to treat the 4 conditions. It is possible that, even though they are less comfortable prescribing these agents, ID-certified physicians may be prescribing them appropriately. However, lack of comfort may affect practice, particularly in situations where optimal management may not be obvious. One interesting finding was that only 79% of the GM-certified physicians reported comfort with prescribing antidepressants. It has been shown elsewhere that depression is undertreated during primary care, supporting a potential link between physician comfort and clinical practice [16].

A potential limitation of our study was that physician enrollment may be biased. VACS was not designed to sample a random selection of ID- or GM-certified physicians; rather, it was designed to sample a representative selection of patients. Generalizability of our results is improved by the fact that physicians represent 8 different, geographically diverse US sites; however, all physicians were recruited from within the VA system. Although practice patterns in the VA system may differ from private or other public settings, HIV-infected patients in the VA system may represent the coming wave of increased numbers of HIV-infected patients: they are older and frequently have comorbid conditions.

There are several potential strategies to increase the HIV specialist's comfort with providing primary care. First, additional educational activities can create greater familiarity with these non–HIV-related medications. A second strategy is for specialists in HIV medicine to increase the amount of consultation they have with GM-certified physicians or other subspecialists, especially for the many patients with comorbid conditions. A third strategy is to increase the use of comanagement strategies, in which specialists in HIV medicine and GM-certified physicians work together in the same clinical setting to provide comprehensive primary and HIV-related care. These strategies will be especially important for prevalent conditions and those conditions that have a large impact on patient outcome, including quality of life and mortality.

Acknowledgments

We thank the patients and physicians who have participated in the Veterans Aging Cohort Study.

Financial support. Veterans Affairs Health Services Research and Development (Research Career Development grant 04-125-1); National Institute on Aging (NIA), an interagency agreement between the NIA and the National Institute of Mental Health (grant K08 AG00826); and the National Institute on Alcohol Abuse and Alcoholism (grant U01-13566).

Potential conflicts of interest. All authors: no conflicts.

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