Physician Specialization and Women's Primary Care Services in an Urban HIV Clinic

JOHN R. KOETHE, M.D.,¹ RICHARD D. MOORE, M.D., M.H.S.,²
and KRYSTN R. WAGNER, M.D., Ph.D.³

ABSTRACT

To compare adherence to published primary care guidelines by general internal medicine and infectious diseases (ID) specialist physicians treating HIV-positive women we conducted a retrospective patient record review of 148 female HIV-positive patients seen at the Nathan Smith Clinic in New Haven, Connecticut, in 2001 and 2002. Four quality measures were defined to evaluate physician practices: annual cervical cancer screening, influenza vaccination and hyperlipidemia screening, and biennial mammography. Main outcome was the frequency of meeting each measure by generalist and ID-specialist physicians, and the two physician types were compared after controlling for patient clustering, age, and CD4 cell count. Among all measures, the rates of cervical cancer screening in 2001 were lowest among generalists (55%) and ID-specialists (47%) but not significantly different (odds ratio [OR] 1.26, 95% confidence interval [CI] 0.78 to 1.90), and the rates of hyperlipidemia screening in 2002 were highest for both generalists (98%) and ID-specialists (93%), but again not significant (OR 2.86, CI 0.30 to 27.6). No statistically significant differences were found between physician types for any quality measure, nor were significant differences found in the CD4 cell counts of patients of each physician type who received each service. Our results show potential for improvements in care among both generalist and ID-specialist physicians treating HIV-positive women.

INTRODUCTION

SINCE THE INTRODUCTION OF highly active antiretroviral therapy (HAART) for HIV infection the argument that primary care physicians were best suited to provide treatment¹ has been eclipsed by an emphasis on the need for advanced training in the complexity of numerous chemotherapeutics and disease sequelae.²⁻⁴ Prior studies show parity in the appropriate use of HAART and the prophylaxis

against opportunistic infections between general internal medicine physicians specializing in HIV care, sometimes referred to as "expert generalists," and infectious diseases (ID) trained physicians.⁵⁻⁷ A physician qualified to provide care to the HIV infected can be defined according to the experience and education criteria of the HIV Medicine Association (HIVMA).⁸ These are physicians who have provided continuous care to a minimum of 20 HIV-infected patients and completed or exceeded

¹Vanderbilt University School of Medicine, Nashville, Tennessee.

²Johns Hopkins Medical Institutions, Baltimore, Maryland.

³Yale University School of Medicine, New Haven, Connecticut.

minimum requirements in HIV-related continuing medical education or have completed certification/recertification in the subspecialty of infectious diseases in the preceding 12 months. Board-certified ID physicians and HIV-qualified physicians from a variety of medical disciplines often practice together in HIV specialty clinics, which provide additional primary care and multidisciplinary services shown to improve patient outcomes.^{9,10}

The demographics of HIV infection have shifted to include a greater proportion of older adults, and the number of AIDS cases in patients over 50 years of age increased fivefold between 1990 and 2001.^{11,12} Older patients have more HIV- and non-HIV-related comorbidities and shorter survival after diagnosis than younger patients.¹³ Like their non-HIV-infected counterparts, these patients can benefit from services such as routine vaccination and cancer, diabetes, and cardiovascular disease screening.^{14–16} However, prior studies show that patients of HIV clinics are more likely to receive HIV-specific interventions as compared to general preventative health services, especially when the service requires referral to another provider or department.¹⁷ Aside from question of who should treat HIV, few studies have looked at the provision of preventative health services to HIV-infected persons and differences between generalist and ID-specialist physicians in this area.^{6,18,19}

HIV-positive women require a wider range of preventative health services than men and more attention has been focused on this population. In prior studies, HIV-positive women were more likely to receive a mammogram than matched HIV-negative controls, possibly due to greater interaction with the health care system.²⁰ They were also found to have Papanicolaou (Pap) cervical cytologic examinations at rates similar to those described in general population samples, although they were nearly twice as likely to have an examination when gynecological services were available at the usual site of care.²¹ Facilitating continuity of care, HIV-positive women are more likely to visit the same clinic and see the same provider on repeat visits than HIV-negative women.¹⁸

This study assesses the provision of four preventative health services to female patients in

an urban HIV clinic by board-certified ID-specialist physicians and generalist physicians. Annual vaccination against influenza and appropriate screening for cervical cancer, breast cancer, and hyperlipidemia were selected as indicators of a comprehensive approach to care. Additionally, we compare the two physician types by the CD4 cell count of patients who received each service.

METHODS

Study setting

We conducted a retrospective cohort study at the Nathan Smith Clinic (NSC), an urban HIV clinic affiliated with Yale-New Haven Hospital (YNHH), located in New Haven, Connecticut. Clinic providers include physicians certified in internal medicine, ID-specialist physicians and fellowship candidates in the Yale School of Medicine ID-training program, nurse practitioners (NP), and physician assistants (PA). Additionally, the clinic has a nurse trained to perform Pap testing, offices of social work and case management, and issues referrals to other specialty clinics and diagnostic services located on the YNHH campus.

Study patients and physicians

We identified 346 female HIV-positive patients seen at the clinic in 2001 or 2002. All patients had serologically confirmed HIV infection. Two hundred forty-seven patients (71%) met the minimum eligibility requirements for inclusion: a documented primary provider and at least three visits to the clinic during the calendar year in either year under study. A further 99 eligible patients assigned to one of three nurse practitioner or physician assistants employed by the clinic were excluded because the number of these providers was too small for meaningful analysis.

Seven general internal medicine physicians and 15 ID-specialist physicians, including four fellowship candidates under the supervision of an ID-specialist, provided care to eligible patients in 2001 and 2002 at the clinic. Each provider had a panel of patients they saw for scheduled, nonurgent visits. Not all of the gen-

eralist physicians met the continuing medical education requirements of the HIVMA for a HIV-qualified provider, and one generalist physician did not treat the required minimum number of patients according to HIVMA guidelines. However, no distinction was drawn among generalists on degree of HIV expertise. Each generalist physician treated between 1 and 26 of the eligible patients during the study period, while each ID-specialist treated between 1 and 16 eligible patients.

Patients were assigned to a provider at the initial visit and continued under the care of that provider through the duration of the study. Following the initial clinic visit more complex patients may have been assigned to a physician rather than a PA/NP, however there were no defined criteria for the assignment of a patient to a particular type of physician. In a few instances a patient may have switched from a generalist to an ID-specialist provider, or vice versa, during the study, and these patients were excluded.

Quality of care measures

The quality of care measures (Table 1) were based upon national consensus guidelines available during the study period.²² These included annual influenza vaccination and annual cervical cancer and hyperlipidemia screening for all women, and screening mammography biennially (at minimum) for women over 40 years of age. Recommendations from the United States Preventative Service Task

Force on screening mammography in women age 40–49 changed from a “C” recommendation (insufficient evidence for or against screening) to a “B” recommendation (fair evidence) in September 2002.^{23,24} There were no other changes in utilized guidelines during the study period. All measures were dichotomous. Eligibility criteria for each measure and appropriate evidence of meeting the measure were defined. Recommendations on influenza vaccination and cervical cancer screening are specific to HIV patients, while breast cancer screening guidelines are the same for the general population. Annual hyperlipidemia screening was included as it relates to cardiovascular risk factor reduction, though in 2001–2002 no evidence-based guidelines existed on the optimum management of lipids in patients on antiretroviral therapy or HIV patients in general.²⁵

Data collection

All available records from 2001 and 2002 were reviewed for each eligible patient. Data was collected from the YNHH computer system (Logician, MedicoLogic), which records laboratory, radiology, and pathology results, referrals, vaccinations, clinical provider and procedure notes, and other records of patients seen in a hospital clinic or admitted to the hospital. Information on patient age, primary provider, earliest and latest CD4 cell count in each year, and evidence of outcome measures as described in Table 1 were recorded.

TABLE 1. QUALITY OF CARE MEASURES

<i>Quality of care measure</i>	<i>Population</i>	<i>Criteria for meeting quality measure</i>
Annual cervical cytological screening	All patients without documented or reported hysterectomy	Annual pap smear performance documented, pathology report in chart, pap smear offered to patient but refused, or documentation of pap smear performed elsewhere
Biennial screening mammography	All patients over age 40	Documentation of at least one mammogram over 2-year period, radiology report in chart, mammogram offered to patient but refused, or documentation of mammogram performed elsewhere
Annual hyperlipidemia screening	All patients	Laboratory evidence of annual serum triglycerides or total cholesterol assay, or documentation of assay performed elsewhere
Annual influenza vaccination	All patients	Documentation of annual influenza vaccination or report of vaccination performed elsewhere

Statistical analysis

We examined the relationship between provider type and quality measures using logistic regression, controlling for patient age and CD4 cell count. A generalized estimating equation was used to estimate the regression parameters and to account for clustering of unequal numbers of patients among providers. The results were converted from a logarithmic odds scale and presented as adjusted odds ratios with 95% confidence intervals to aid in interpretation.

A CD4 cell count for each patient was determined by averaging the earliest and latest available values within the study period. The data for CD4 cell counts of patients in the generalist and ID-specialist groups did not conform to a normal distribution. We used a Mann-Whitney test to compare the CD4 cell counts of patients who met each quality measure in the two groups. We report the median CD4 cell count of patients who met the quality measure in the generalist and ID-specialist groups and the *p* value. Statistical significance in this study was defined as a *p* value < 0.05. Analysis was performed using SAS software (SAS Institute, Cary, NC).

RESULTS

The study cohort consisted of 148 patients eligible for one or both years of the study period and a total of 226 patient-years. All patients were female and HIV-positive with a median age of 36 and a mean CD4 cell count of 452. Thirty-nine percent of patients saw a generalist as a primary provider and 61 percent saw an ID-specialist.

Table 2 compares the patient populations of the generalist and ID-specialist physicians. The mean absolute CD4 cell count in each group is not significantly different, but among generalist patients, 43% had a decline in CD4 cell count over the period they were eligible for the study, compared to 47% of ID-specialist patients (data not shown). The percentage of patients with a mean CD4 count below 200 cells per microliter was nearly twice as high in the ID-specialist patient population compared to the generalist population (26% versus 14%) and approached a significant difference (*p* = 0.09). The ID-specialist group also included a greater proportion of patients with mean CD4 cell counts below 50 cells per microliter (9% versus 3%). The mean age of patients of the two physician types differed by 0.3 years, which was not significant.

After controlling for age, CD4 count, and the unequal distribution of patients among physicians, we found no statistically significant difference between generalists and ID-specialists for any quality measure (Table 3). Rates of Pap testing, hyperlipidemia screening and influenza vaccination improved among both generalists and ID-specialists from 2001 to 2002, with the rate of hyperlipidemia screening highest among all measures for both physician types in 2001 and 2002.

Table 4 compares the CD4 cell counts of generalist and ID-specialist patients who received each service. We report the median CD4 cell count of each group and the Mann-Whitney *p* value. There was no significant difference for any quality measure. Only for the incidence of Pap testing was the median CD4 cell count of ID-specialist patients lower than that of generalist patients in both years of the study. Of note, the median CD4 cell count for patients referred

TABLE 2. COMPARISON OF GENERALIST AND ID-SPECIALIST PHYSICIAN PATIENT POPULATIONS

	<i>Patients of generalist physicians (SD, observations)</i>	<i>Patients of ID- specialist physicians</i>	<i>t test of χ^2</i>
CD4 cell count (mean cells/ μ L)	462 ($\pm$ 251, <i>n</i> = 58)	446 ($\pm$ 304, <i>n</i> = 90)	<i>p</i> = 0.74
$\geq$ 200	50/58 (86%)	67/90 (74%)	<i>p</i> = 0.09
<200	8/58 (14%)	23/90 (26%)	<i>p</i> = 0.09
<50	2/58 (3%)	8/90 (9%)	<i>p</i> = 0.20
Patient age (mean years)	44.0 ($\pm$ 8.74, <i>n</i> = 58)	43.5 ($\pm$ 9.4, <i>n</i> = 90)	<i>p</i> = 0.86

ID, infectious diseases.

TABLE 3. COMPARISON OF GENERALIST AND ID-SPECIALIST PHYSICIANS BY QUALITY MEASURE

Quality measure	Proportion of patients meeting quality measure		Adjusted odds ratio	95% confidence interval
	Generalist physicians	ID-specialist physicians		
Pap test 2001	0.55	0.47	1.26	0.78–1.90
Pap test 2002	0.59	0.64	0.88	0.44–1.80
Screening mammography 2001–2002	0.61	0.59	0.76	0.54–1.06
Hyperlipidemia screening 2001	0.93	0.87	2.01	0.73–5.54
Hyperlipidemia screening 2002	0.98	0.93	2.86	0.30–27.6
Influenza vaccination 2001	0.69	0.48	1.93	0.49–7.53
Influenza vaccination 2002	0.77	0.58	1.89	0.73–4.90

ID, infectious diseases.

for mammography was highest in both the generalist and ID-specialist patient populations.

DISCUSSION

In this study we examined the provision of routine primary care services to female patients of an HIV clinic by generalist and ID-specialist physicians. After controlling for age, CD4 cell count, and the clustering of patients under the care of more active providers, we found no statistically significant difference in the annual rate of Pap testing, hyperlipidemia screening,

and influenza vaccination, or the biennial rate of mammography over the period 2001 to 2002. Furthermore, we found no significant difference in the median CD4 cell count of patients who received each service in the generalist and ID-specialist groups.

We report rates of gynecologic examination and Pap testing among both generalist and ID-specialist physicians which are lower than those reported in the HIV Epidemiological Research Study (HERS) and the HIV Cost and Services Utilization Study (HSCUS).^{18,21} In the HERS interviewer-administered questionnaire, 71% of HIV-infected women reported a gyne-

TABLE 4. COMPARISON OF CD4 CELL COUNTS OF PATIENTS MEETING QUALITY MEASURES

Quality measure	Median CD4 cell count of patients meeting quality measure		Mann-Whitney test p value
	Generalist physicians	ID-specialist physicians	
Pap test 2001	455	343	0.50
Pap test 2002	436	394	0.79
Screening mammography 2001–2002	455	538	0.54
Hyperlipidemia screening 2001	454	393	0.67
Hyperlipidemia screening 2002	405	410	0.76
Influenza vaccination 2001	436	498	0.78
Influenza vaccination 2002	404	394	0.65

ID, infectious diseases.

colonic examination in the prior year, and a further 19% reported an examination in the prior 2 years. Pap testing was not specified as a component of the examination. In the HSCUS survey, 81% of women reported a Pap test in the prior 12 months. The highest rate of Pap testing we found was 64% among patients of ID-specialists in 2002. Pap testing at the clinic does not require referral to an outside provider, as providers have the option to perform the test or request that a nurse perform the test. The need for referral to another provider may decrease utilization rates in HIV care, but we do not see this as a factor in our results.¹⁷ We recorded only those patients with cytopathology results or provider documentation of Pap testing. In the survey method used by HERS and HSCUS, the onus is on the patient to determine the time elapsed since testing, which has been shown to lead to overreporting.²⁶

The rate of screening mammography among generalist patients (61%) and ID-specialist patients (59%) over the period 2001–2002 approximates the findings of the Women's Inter-agency HIV Study (WIHS), in which 64% of participants age 40 to 49 reported ever having a mammogram.¹⁹ We expect our rate of screening would increase if we included patients who had a mammogram prior to 2001, or if mammography could be performed in clinic rather than through referral. Our results contrast with the 70% of women over age 40 who reported a mammogram in the prior 2 years in the National Health Interview Survey (1987–2000) and the 83% who reported ever having a mammogram in the 2002 data from the Behavioral Risk Factor Surveillance System.^{27,28} Again, our study relied on documentation of a mammogram rather than a survey method.

Annual screening for hyperlipidemia was greater than 90% among generalist and ID-specialist physicians, the highest rates among all quality measures, and increased in both groups from 2001 to 2002. We attribute this to two factors. The first is the inclusion of a total lipid panel in the standard set of HIV blood tests ordered through the clinic computer system. Providers who chose to order tests individually may not have included an annual lipid panel. This argues for the development of computerized quality measures systems to automate the

ordering of annual screening tests. The second factor may be the publication of the Third Report of the National Cholesterol Education Program in 2001, which recommended lower target lipid levels and may have influenced the practice habits of clinic providers.²⁹

We found higher rates of influenza vaccination among patients of generalist physicians compared to ID-specialists in both 2001 and 2002, but these differences were not significant. We had expected to find higher rates of influenza vaccination among those providers with formal infectious diseases training, and our results point to the extent that vaccination of at-risk populations has become a routine component of primary care. Other vaccinations more specific to HIV patients such as the hepatitis A and B vaccines could not be assessed due to incomplete documentation. Additionally, we could not assess the rate smoking cessation counseling for the same reason.

The clinic employed two PAs and one NP who were excluded from the study due to the small sample size. These three providers, however, cared for 40% of the patients meeting eligibility requirements. Prior studies show that PAs and NPs provide HIV care with a quality equal to that of ID-specialist physicians as measured by several quality of care indicators, and may exceed physicians in the rate of Pap testing.³⁰ We were unable to confirm these findings in this study.

Our study has several limitations. It is limited to HIV-infected women at a single clinic site, and the reported frequency of disease screening and vaccination may not be representative of physicians at other sites. Second, our data collection method may have led to underreporting in some components of the study, as the computer system used by YNHH was not fully adopted for provider documentation by the Nathan Smith Clinic until 2001. While laboratory, pathology, and radiology results were available, clinic notes may have been incomplete, and patients who received a Pap test, mammogram, or influenza vaccination at another hospital or clinic may have been missed. Third, we excluded patients who were not seen at the clinic at least three times within a calendar year, and we expect that the rates of screening and vaccination in this population were

lower than what we report. This population likely includes noncompliant patients and patients with significant social or psychiatric barriers to care. Last, the greater variance in CD4 cell counts among patients in the ID-specialist group compared to the generalist group may indicate more of a difference in patient populations than the reported mean CD4 cell counts suggest. The assignment of a new patient to a clinic provider may not be random, and patients with complex comorbid conditions, such as diabetes or cardiovascular disease, may have been disproportionately assigned to a generalist physician.

Women infected with HIV are more often economically disadvantaged in comparison to HIV-infected men, report greater difficulty in obtaining care, and are more likely to utilize emergency departments and require hospitalization.^{31–33} This population represents a growing challenge for healthcare providers. The provision of primary care, HIV care, and ancillary services, such as case management and chemical dependency counseling, together a single site has been shown to improve retention rates, patient outcomes, and decrease inpatient hospitalizations.^{10,34} Unfortunately, as shown by Roberts et al.,³⁵ reimbursement rates for HIV outpatient services have not kept pace with the increasing expenditures associated with this combined services model, threatening the continued benefits associated with these clinics. As non-AIDS-related causes of death now account for over 50% of deaths among HIV patients on HAART in resource-rich nations, it could be argued that the provision of high quality primary care, disease screening, and behavioral and nutritional interventions is becoming equally as important as the provision of antiretroviral therapy.^{36,37} Competency in addressing primary care needs in HIV clinic patients on the part of all providers will only become more crucial. In this study we found no significant difference in the provision of four selected primary care services to HIV-infected women among generalist and ID-specialist physicians in an urban HIV clinic. Our results also show that improvements can be made in the provision of high-quality general health care on the part of clinic physicians overall.

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Address reprint requests to:

John R. Koethe, M.D.

Division of Infectious Diseases

Vanderbilt University School of Medicine

A2200 MCN

1161 21st Avenue South

Nashville, TN 37232-2582

E-mail: john.r.koethe@vanderbilt.edu