

# Qualifications, Demographics, Satisfaction, and Future Capacity of the HIV Care Provider Workforce in the United States, 2013–2014

John Weiser,<sup>1</sup> Linda Beer,<sup>1</sup> Brady T. West,<sup>2</sup> Christopher C. Duke,<sup>3</sup> Garrett W. Gremel,<sup>3</sup> and Jacek Skarbinski<sup>1</sup>

<sup>1</sup>Division of HIV/AIDS Prevention, Centers for Disease Control and Prevention, Atlanta, Georgia; <sup>2</sup>Survey Research Center, University of Michigan, and <sup>3</sup>Altarum Institute, Ann Arbor, Michigan

**Background.** The human immunodeficiency virus (HIV)-infected population in the United States is increasing by about 30 000 annually (new infections minus deaths). With improvements in diagnosis and engagement in care, additional qualified HIV care providers may be needed.

**Methods.** We surveyed a probability sample of 2023 US HIV care providers in 2013–2014, including those at Ryan White HIV/AIDS Program (RWHAP)-funded facilities and in private practices. We estimated future patient care capacity by comparing counts of providers entering and planning to leave practice within 5 years, and the number of patients under their care.

**Results.** Of surveyed providers, 1234 responded (adjusted response rate, 64%): 63% were white, 11% black, 11% Hispanic, and 16% other race/ethnicity; 37% were satisfied/very satisfied with salary/reimbursement, and 33% were satisfied/very satisfied with administrative time. Compared with providers in private practice, more providers at RWHAP-funded facilities were HIV specialists (71% vs 43%;  $P < .0001$ ) and planned to leave HIV practice within 5 years (11% vs 4%;  $P = .0004$ ). An estimated 190 more full-time equivalent providers (defined as 40 HIV clinical care hours per week) entered practice in the past 5 years than are expected to leave in the next 5 years. If these rates continue, by 2019 patient care capacity will increase by 65 000, compared with an increased requirement of at least 100 000.

**Conclusions.** Projected workforce growth by 2019 will not accommodate the increased number of HIV-infected persons requiring care. RWHAP-funded facilities may face attrition of highly qualified providers. Dissatisfaction with salary/reimbursement and administrative burden is substantial, and black and Hispanic providers are underrepresented relative to HIV patients.

**Keywords.** HIV provider; workforce survey; capacity.

In the United States, an estimated 1.2 million persons are living with human immunodeficiency virus (HIV) infection [1] and, because new infections outpace deaths of HIV-infected persons, this population is increasing by about 30 000 persons per year [2, 3]. As few as 40% of HIV-infected persons are consistently engaged in HIV medical care, and only 30% achieve viral suppression [4]. Efforts are under way to increase the number of HIV-infected persons who are in care and virally suppressed, but achieving these objectives will require a workforce of HIV care providers with the capacity and qualifications to meet the needs of an expanded HIV in-care population.

Reports from the Institute of Medicine (IOM) [5], the Health Resources and Services Administration (HRSA) [6], and the HIV Medicine Association (HIVMA) and American Academy of HIV Medicine (AAHIVM) [7] have described challenges

facing the HIV care provider workforce and identified data gaps. These reports detail concerns about racial and ethnic diversity, qualifications to provide both HIV and primary care, and provider satisfaction. Information about providers within the 2 main models for delivery of HIV care in the United States—Ryan White HIV/AIDS Program (RWHAP)—funded facilities and private practices—is also limited. This information, as well as knowledge of the intentions of these providers to continue or leave HIV practice, is increasingly important in light of discussions about the future role of the RWHAP [8, 9]. Last, there are concerns about HIV care providers retiring from the workforce and not being replaced by new providers [5–7].

We analyzed data collected from a national probability sample of US HIV care providers. We describe the qualifications, demographics, satisfaction, and patient care capacity of the HIV care provider workforce over 5 years, overall and within RWHAP-funded facilities.

## METHODS

### Sample Design and Data Collection

The Medical Monitoring Project (MMP) is an HIV surveillance system that uses a 3-stage probability sampling design to assess the clinical and behavioral characteristics of HIV-infected

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Correspondence: J. Weiser, Division of HIV/AIDS Prevention, Centers for Disease Control and Prevention, 1600 Clifton Rd NE, MS-E46, Atlanta, GA 30329 (jweiser@cdc.gov).

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adults receiving outpatient medical care for HIV in the United States [10, 11]. Data describing provider characteristics and practices were obtained from the 2013–2014 MMP Provider Survey, using a national probability sample of HIV care providers obtained at the second stage of sampling for MMP. In brief, first 16 states and 1 territory were selected using probability proportionate to size (PPS) sampling with size based on estimates of the number of AIDS cases in 2002. All sampled areas agreed to participate. Second, 622 facilities providing HIV care within these areas were sampled using PPS based on the number of persons receiving care for HIV infection; of these, 505 agreed to participate (81% participation rate). A list of all physicians, physician assistants, and nurse practitioners who had completed their training and provided HIV care (defined as ordering CD4<sup>+</sup> T-lymphocyte count or HIV RNA load tests and/or prescribing antiretroviral medications) between 1 January and 30 April 2012 was obtained from each participating facility, resulting in a total of 2208 HIV care providers. All of these providers were invited to participate in the survey. Providers were recruited between June 2013 and January 2014.

In all, 2023 providers were determined to be eligible based on self-reported characteristics, and 1234 of the eligible providers returned surveys (American Association of Public Opinion Research [12], Response Rate 3–adjusted provider response rate, 64%). Final weights were assigned to each responding provider based on their probability of selection, and adjustments were made to these weights based on factors associated with nonresponse.

#### Variables Used in the Analysis

Categories of survey questions include demographic characteristics, qualifications and experience, practice characteristics, and professional satisfaction. Using facility data obtained for MMP, we ascertained whether providers worked at a facility that received any RWHAP funding or in a private practice. For analyses comparing characteristics of these 2 groups, sampled providers who practiced in facilities that were neither RWHAP funded nor private practices ( $n = 132$ ) or were both ( $n = 61$ ) were excluded. For all analyses that involved providers at RWHAP-funded facilities, providers practicing at facilities with RWHAP funding status ( $n = 107$ ) that was not ascertained were excluded. To assess whether this exclusion biased estimates of the prevalence of characteristics of providers at RWHAP-funded facilities and private practices, we performed a sensitivity analysis (see [Supplementary Methods](#)).

To investigate the differences between providers entering and leaving HIV practice, we categorized providers into 3 groups: those who (1) entered practice in the past 5 years, (2) planned to leave practice within the next 5 years, and (3) were in practice for at least 5 years and did not plan to leave practice in the next 5 years. We excluded 9 providers in practice <5 years who planned to leave within the next 5 years. To compare the counts of providers entering and leaving the workforce, the number of providers in each category and hours in HIV patient care for each provider were

converted to full-time equivalents (FTEs) [13], defined as 40 hours of HIV patient care.

#### Analytic Methods

We computed frequencies and weighted percentages describing characteristics of all US HIV care providers and 95% confidence intervals (CIs) for these parameters. Associations between selected variables and whether providers had entered or planned to leave practice within 5 years were evaluated with Rao-Scott  $\chi^2$  tests. A CI was calculated for the difference in FTEs between providers entering and leaving practice. A similar approach was used to compare the estimated numbers of HIV-infected patients cared for by providers in these 2 groups. Comparisons of providers entering and leaving practice were also performed for providers at RWHAP-funded facilities and in private practice. All estimates incorporated the final survey weights, and variance estimates were computed using Taylor series linearization to account for the complex sample design. All analyses were performed using procedures for survey data analysis using SAS/STAT 9.3 software (SAS Institute, Cary, North Carolina) and SUDAAN 11 (RTI International, Research Triangle Park, North Carolina). See the [Supplementary Methods](#) for detailed information on sampling design, sample disposition, recruitment methods, survey questions, response rate calculation, and weighting methods.

#### Ethics Statement

As a public health surveillance activity, the MMP Provider Survey was determined to be nonresearch in accordance with the federal human subjects protection regulations at 45 Code of Federal Regulations 46.101c and 46.102d and the Centers for Disease Control and Prevention's guidelines for defining public health research and public health nonresearch [14, 15].

## RESULTS

#### Demographics, Qualifications, and Practice Characteristics

We estimated that in 2013 there were 8257 (95% CI, 6902–9611) HIV care providers in the United States, of whom 63% were white, 11% black, 11% Hispanic, and 16% other races. HIV specialist criteria were met by 58% of providers; 83% provided primary care, and 39% provided care in a language other than English (Table 1).

An estimated 37% of providers provided HIV expert assistance to their colleagues, and 25% of providers received HIV expert assistance from other providers. Among providers with caseloads of 0–20 patients, 52% received HIV expert assistance, as did 19% of providers with 21–50 patients, and 21% of providers with >50 patients. An estimated 94% of providers were accepting new patients and 59% expected an increase in the number of patients they would be able to care for in the next 5 years, while 12% expected to be able to care for fewer patients.

#### Professional Satisfaction

Although most providers were satisfied with several aspects of practice, 37% were satisfied or very satisfied with salary and reimbursement and 33% were satisfied with the time required and available for documentation/administrative work (Table 2).

**Table 1. Demographics, Qualifications and Experience, and Care Delivery Among Human Immunodeficiency Virus (HIV) Care Providers at All HIV Healthcare Facilities and at Ryan White HIV/AIDS Program–Funded Facilities and Private Practices (N = 1234)—Medical Monitoring Project, 2013–2014 Provider Survey**

Characteristic	All Providers (N = 1234)			Providers at RWHAP-Funded <sup>a</sup> Facilities (n = 723)			Providers in Private Practice <sup>a</sup> (n = 211)			Rao-Scott $\chi^2$ P Value Comparing Columns B and C
	Column A			Column B			Column C			
	No.	Weighted % <sup>b</sup>	(95% CI)	No.	Weighted % <sup>b,c</sup>	(95% CI)	No.	Weighted % <sup>b</sup>	(95% CI)	
<b>Demographics</b>										
Age, y										.44
<40	211	17.5	(12.9–22.2)	132	19.5	(14.4–24.5)	29	12.7	(5.3–20)	
40–49	326	24.0	(21.2–26.8)	192	23.9	(20.3–27.5)	56	25.7	(17.5–33.9)	
50–59	453	38.4	(32.3–44.6)	284	40.6	(34.6–46.6)	76	41.8	(30.3–53.3)	
≥60	204	20.1	(14.8–25.3)	96	16.0	(10–21.9)	42	19.9	(9.6–30.1)	
Sex										.006
Male	620	56.5	(49.6–63.5)	314	44.7	(37.8–51.6)	143	68.2	(53.4–83)	
Female	585	43.5	(36.5–50.4)	397	55.3	(48.4–62.2)	61	31.8	(17–46.6)	
Race/Ethnicity										.80
White	783	62.9	(55.8–70.0)	438	60.7	(48.2–73.2)	145	61.6	(50–73.2)	
Black/African American	89	10.8 <sup>d</sup>	(3.8–17.7)	65	12.0	(6.8–17.2)	10	12.4 <sup>d</sup>	(0–27.3)	
Hispanic	158	10.7 <sup>d</sup>	(3.5–17.8)	111	12.6 <sup>d</sup>	(0–25.5)	14	7.3 <sup>d</sup>	(1.0–13.6)	
Other	179	15.6	(10.7–20.6)	102	14.7	(9.3–20.1)	37	18.7	(10.3–27.1)	
Sexual orientation										.67
Heterosexual	980	85.1	(81.0–89.2)	580	83.0	(78.9–87.1)	144	80.8	(71.7–89.9)	
Gay, lesbian, or bisexual	211	14.9	(10.8–19.0)	123	17.0	(12.9–21.1)	59	19.2	(10.1–28.3)	
<b>Qualifications and experience</b>										
Certification type										.0002
Infectious diseases board-certified physician <sup>e</sup>	564	44.5	(37.3–51.7)	289	33.6	(24.9–42.3)	108	53.1	(37.2–69)	
Other board-certified physician	319	30.0	(22.8–37.3)	173	25.7	(19.9–31.4)	71	34.2	(19.1–49.2)	
Non-board-certified physician	61	4.8	(2.2–7.4)	44	7.2 <sup>d</sup>	(.7–13.8)	5	1.3 <sup>d</sup>	(0–2.6)	
Nurse practitioner	217	15.2	(10.3–20.1)	169	25.6	(17.8–33.4)	11	5.5 <sup>d</sup>	(1.7–9.3)	
Physician assistant	63	5.4	(2.6–8.2)	42	7.9 <sup>d</sup>	(2.1–13.7)	13	5.9 <sup>d</sup>	(0–12.5)	
Physician board certification										.06
Infectious diseases	564	59.7	(51.1–68.3)	289	56.7	(47.3–66)	108	60.9	(43.7–78)	
Internal medicine	164	20.0	(15.2–24.9)	88	18.8	(13.3–24.2)	46	27.2	(13–41.5)	
Family medicine	102	17.0	(11.2–22.7)	47	17.8	(9.9–25.7)	19	10.2 <sup>d</sup>	(3.1–17.2)	
Pediatrics	33	1.6	(.9–2.3)	27	4.3	(2.3–6.2)	1	0.3 <sup>d</sup>	(0–1)	
Other board certified	20	1.7 <sup>d</sup>	(.5–2.9)	11	2.5 <sup>d</sup>	(.5–4.5)	5	1.4 <sup>d</sup>	(0–3)	
HIV specialist (HIVMA criteria or AAHIV-S)	865	57.8	(51.2–64.4)	533	71.5	(63.3–79.7)	125	43.2	(32.3–54)	<.0001
HIV patients for whom you provide continuous and direct care										.003
0–20	103	15.1	(9.5–20.7)	38	8.0	(4–12.1)	29	19.4 <sup>d</sup>	(5.8–33.1)	
21–50	186	19.6	(14.4–24.8)	98	15.5	(9.7–21.4)	36	26.8	(12.9–40.6)	
51–200	479	39.0	(34.2–43.8)	289	38.4	(31.4–45.3)	72	38.5	(22.1–54.8)	
≥200	437	26.3	(20.4–32.1)	281	38.0	(30.1–46)	67	15.3	(8.1–22.5)	
Years caring for HIV patients										.14
0–10	427	35.3	(29.9–40.7)	267	37.6	(32.3–43)	59	32.1	(20.1–44.1)	
11–20	428	36.1	(32.1–40.0)	278	41.5	(35.6–47.3)	62	33.6	(24.5–42.8)	
≥21	365	28.6	(24.6–32.6)	171	20.9	(16.3–25.4)	86	34.3	(21.4–47.1)	
Provides primary care <sup>f</sup>	1094	83.1	(78.4–87.8)	679	93.8	(89.8–97.8)	163	74.4	(64.4–84.4)	<.0001
Provides care in language other than English	519	38.7	(31.3–46.2)	334	47.9	(37.5–58.4)	76	31.3	(20.8–41.8)	.009
<b>Care delivery</b>										
Comanagement of patients with other HIV care providers										.02
Provides expert assistance to less experienced providers	527	36.9	(30.5–43.2)	325	44.1	(36.7–51.5)	77	31.5	(21–42)	
Receives assistance from HIV experts	241	25.3	(19.5–31.0)	156	28.9	(19.7–38.1)	31	21.8 <sup>d</sup>	(8.5–35.1)	.45
Caseload of 0–20 patients and receives expert assistance	52	52.2	(38.1–66.4)	24	6.2 <sup>d</sup>	(2.2–10.3)	12	9.2 <sup>d</sup>	(1.5–16.8)	.46

Table 1 continued.

Characteristic	All Providers (N = 1234)			Providers at RWHAP-Funded <sup>a</sup> Facilities (n = 723)			Providers in Private Practice <sup>a</sup> (n = 211)			Rao-Scott $\chi^2$ P Value Comparing Columns B and C
	Column A			Column B			Column C			
	No.	Weighted % <sup>b</sup>	(95% CI)	No.	Weighted % <sup>b,c</sup>	(95% CI)	No.	Weighted % <sup>b</sup>	(95% CI)	
Caseload of 21–50 patients and receives expert assistance	34	19.0 <sup>d</sup>	(7.7–30.3)	23	6.3 <sup>d</sup>	(1.1–11.4)	6	2.3	(.0–4.7)	.09
Caseload of >50 patients and receives expert assistance	149	20.6	(14.6–26.6)	105	16.5	(11.1–21.8)	12	10.5 <sup>d</sup>	(.0–22.9)	.47
Hours devoted to patient care per week										<.0001
0–19	224	13.3	(11.0–15.7)	150	19.2	(13.4–25)	16	6.5 <sup>d</sup>	(2.3–10.7)	
20–29	184	12.5	(9.1–15.8)	122	15.9	(12.5–19.2)	14	7.7 <sup>d</sup>	(1.2–14.1)	
30–39	201	11.4	(7.8–15.1)	143	21.5	(16.3–26.8)	14	2.7 <sup>d</sup>	(.7–4.8)	
≥40	614	62.8	(56.5–69.0)	304	43.4	(37.3–49.5)	164	83.1	(75–91.2)	
Accepting new patients	1149	93.5	(90.7–96.4)	684	96.1	(94.6–97.7)	191	94	(89.8–98.2)	.28
No. of patients able to care for in 5 y										.60
Fewer or no patients	146	11.5	(8.0–15.1)	79	11.2	(7.5–14.9)	23	7.8	(3.7–12)	
Same number of patients	371	29.3	(24.7–33.9)	210	30.5	(24.3–36.6)	68	29.9	(18.6–41.1)	
More patients	708	59.1	(53.0–65.2)	430	58.3	(52.3–64.4)	117	62.3	(50.6–74)	
Will leave practice within 5 y	122	9.4	(6.7–12.2)	65	11.1	(6.3–15.8)	12	3.5	(.9–6.2)	.0004
Practices at a facility that:										
Uses an electronic medical record	759	62.2	(48.9–75.5)	456	55.0	(38.3–71.8)	117	63.2	(42.4–84)	.46
Utilizes an integrated team	874	54.1	(45.6–62.6)	638	89.3	(85.1–93.5)	37	14.9	(6.7–23.1)	NA
Provides on-site case management	850	50.8	(41.5–60.1)	636	90.4	(85.9–94.8)	41	16.0 <sup>d</sup>	(0–34.3)	<.0001
Provides on-site adherence counseling	927	54.2	(43.9–64.6)	670	92.1	(87.5–96.8)	81	29.7	(20.8–38.5)	NA
Provides on-site mental health services	799	45.1	(36.8–53.4)	614	80.2	(75–85.5)	23	5.6 <sup>d</sup>	(0–11.4)	NA
Provides on-site substance abuse treatment	433	23.5	(17.3–29.6)	347	46.3	(34–58.6)	8	1.4 <sup>d</sup>	(0–2.9)	<.0001
>50% of patients are:										
Nonwhite	907	62.0	(48.6–75.4)	618	83.8	(74.6–93.1)	92	42.6	(28.6–56.6)	<.0001
Women	60	6.3	(2.7–9.8)	41	7.3 <sup>d</sup>	(2.9–11.6)	5	3.6 <sup>d</sup>	(0–8.9)	.36
Men who have sex with men	563	47.6	(37.1–58.0)	268	35.5	(25.9–45.1)	140	55.6	(40.9–70.4)	.002
Injecting drug users	35	2.9 <sup>d</sup>	(.0–6.7)	31	7.3 <sup>d</sup>	(0–16.6)	0	NA	NA	NA

Abbreviations: AAHIV-S, American Academy of HIV Medicine Practicing HIV Specialist; CI, confidence interval; HIV, human immunodeficiency virus; HIVMA, HIV Medicine Association; NA, not applicable; RWHAP, Ryan White HIV/AIDS Program.

<sup>a</sup> Excludes providers who worked at facilities that were both RWHAP-funded and private practices (n = 61) or neither (n = 132) or for whom RWHAP funding status was not ascertained (n = 107).

<sup>b</sup> Values exclude “don’t know” responses.

<sup>c</sup> Percentages of providers who worked at facilities that received RWHAP funding among 1127 providers at facilities with known RWHAP funding status.

<sup>d</sup> Coefficient of variation is >.30; estimate may be unreliable.

<sup>e</sup> Physicians (Doctor of Medicine [MD] and Doctor of Osteopathic Medicine [DO]) who were board certified in infectious diseases and another specialty were classified as infectious diseases physicians.

<sup>f</sup> Defined as point of first contact and comprehensive care, with emphasis on prevention and coordination of care.

Three-quarters of providers always or usually had sufficient time to provide HIV care to new and established patients.

**Characteristics of Providers at RWHAP-Funded Facilities and in Private Practices**

We estimated that in 2013, 3462 (95% CI, 2320–4605) or 41.9% (95% CI, 33.3%–50.6%) of US HIV care providers were in private practice. Among providers at facilities with known RWHAP funding status, 3470 (CI, 2741–4199) or 47.5% (95% CI, 35.4%–59.6%) practiced at RWHAP-funded facilities. Compared with providers

in private practice, more providers at RWHAP-funded facilities were female (55% vs 32%;  $P = .006$ ), nurse practitioners (26% vs 6%;  $P < .0005$ ), and HIV specialists (72% vs 43%;  $P < .0001$ ), and larger percentages cared for  $\geq 200$  patients (38% vs 15%;  $P = .003$ ), provided primary care (94% vs 74%;  $P < .0001$ ), provided care in a language other than English (48% vs 31%;  $P < .01$ ), provided expert assistance to other providers (44% vs 32%;  $P = .02$ ), and planned to leave practice within the next 5 years (11% vs 4%;  $P = .0004$ ) (Table 1). Compared with providers in private practice,

**Table 2. Professional Satisfaction of Human Immunodeficiency Virus (HIV) Care Providers at All HIV Healthcare Facilities and at Ryan White HIV/AIDS Program–Funded Facilities and Private Practices (N = 1234)—Medical Monitoring Project, 2013–2014 Provider Survey**

Response	All Providers (N = 1234)			Providers at RWHAP-funded <sup>a</sup> Facilities (n = 723)			Providers in Private Practice <sup>a</sup> (n = 211)			Rao-Scott $\chi^2$ P Value Comparing Columns B and C
	Column A			Column B			Column C			
	No.	Weighted % <sup>b</sup>	(95% CI)	No.	Weighted % <sup>b,c</sup>	(95% CI)	No.	Weighted % <sup>b</sup>	(95% CI)	
Satisfied or very satisfied with <sup>d</sup>										
Salary and reimbursement	432	36.7	(30.4–43.0)	252	35.7	(30.6–40.9)	57	31.2	(20.4–42)	.47
Amount of time required and available for documentation/administrative work	387	32.8	(26.9–38.6)	241	38.0	(31.5–44.4)	44	23.7	(12.8–34.6)	.03
Work schedule/on-call responsibilities	751	57.2	(53.5–60.9)	473	69.5	(65.9–73.1)	97	43.6	(34–53.2)	<.0001
Supportive services to assist with patient management	667	49.6	(44.4–54.8)	412	59.3	(52.9–65.7)	83	38.6	(26.9–50.3)	.005
Support and coverage from other HIV care providers	906	68.0	(63.9–72.2)	559	78.3	(73.4–83.2)	127	57.2	(45.7–68.8)	.003
Availability of specialists for consultation and referral	815	65.2	(60.1–70.4)	456	62.5	(54.5–70.6)	155	66.2	(55.7–76.7)	.63
Effort required to keep up with clinical and/or pharmaceutical advances	732	57.8	(53.2–62.5)	440	64.4	(58.5–70.3)	115	51.1	(37–65.3)	.12
Always or usually has sufficient time to provide HIV care to:										
Patients entering care for the first time <sup>e</sup>	877	76.0	(71.6–80.4)	489	72.7	(67–78.5)	168	82.6	(74.3–90.9)	.07
Established patients <sup>e</sup>	894	74.8	(70.7–78.9)	507	74.3	(68.7–79.9)	160	77.5	(69.7–85.3)	.51

Abbreviations: CI, confidence interval; HIV, human immunodeficiency virus; RWHAP, Ryan White HIV/AIDS Program.

<sup>a</sup> Excludes providers who worked at facilities that were both RWHAP-funded and private practices (n = 61) or neither (n = 132) or for whom RWHAP funding status was not ascertained (n = 107).

<sup>b</sup> Values exclude “don’t know” responses.

<sup>c</sup> Percentage of providers who worked at facilities that received RWHAP funding among 1127 providers at facilities with known RWHAP funding status.

<sup>d</sup> Each item was rated by respondents on a 5-point scale ranging from very unsatisfied to very satisfied.

<sup>e</sup> Both questions were rated by respondents on a 4-point scale ranging from never to always.

more providers at RWHAP-funded facilities were satisfied or very satisfied with time for documentation/administrative work (38% vs 24%;  $P = .03$ ), work schedule and on-call responsibilities (70% vs 44%;  $P < .0001$ ), supportive services to assist with patient management (59% vs 39%;  $P = .005$ ), and support and coverage from other HIV care providers (78% vs 57%;  $P = .003$ ) (Table 2).

#### Characteristics of Providers Entering and Leaving the Workforce

Of all providers, an estimated 16.7% (95% CI, 12.3%–21.9%) had entered the HIV workforce within the past 5 years and 8.2% (95% CI, 5.7%–10.7%) expected to leave practice within 5 years. Compared with providers planning to leave practice, providers entering practice were younger and fewer were male, provided primary care, or provided expert assistance to less experienced providers (Table 3). Entering providers were less satisfied with the time for documentation/administrative work or with the support and coverage from other HIV care providers, and fewer reported having sufficient time to provide HIV care to established patients (Table 4).

#### Five-Year Projection of Changes in Workforce Size and Patient Care Capacity

If the rates at which HIV care providers entered and anticipated leaving the workforce were to remain constant, an estimated 443

FTE providers will enter practice by 2019, offsetting the 253 FTEs who will leave, resulting in a net gain of an estimated 190 FTEs ( $P < .01$ ; Table 5). The estimated patient care capacity of providers entering practice (175 306 patients) will offset the capacity of providers leaving practice (109 992 patients), resulting in a net gain in patient care capacity of an estimated 65 314 patients in the 5 years after 2014. If current HIV incidence and death rates continue, the number of persons requiring HIV care will increase by 30 000 per year or at least 100 000 over 5 years, outpacing the increase in patient care capacity [2, 3] (Table 6). Within RWHAP-funded facilities, we estimate a net gain of 120 FTEs ( $P < .05$ ) with no significant change in patient care capacity (Tables 3 and 4). Estimates for providers in private practice and patients under their care were statistically unstable, having coefficients of variation  $>0.3$ , and are not reported.

#### DISCUSSION

The HIV care provider workforce faces several challenges to meeting the needs of the growing number of HIV-infected persons requiring medical care. Racial and ethnic diversity in the workforce is limited; providers with smaller caseloads receive

**Table 3. Demographics, Qualifications and Experience, and Care Delivery Among Providers Who Entered Human Immunodeficiency Virus (HIV) Practice and Providers Who Plan to Leave HIV Practice Within 5 Years (N = 1234)—Medical Monitoring Project, 2013–2014 Provider Survey**

Characteristic	Stage of Clinical Practice									P Values Comparing Columns 1 and 3
	Column 1			Column 2			Column 3			
	Entered Practice Within 5 y <sup>a</sup> (n = 219)			In Practice >5 y and No Plans to Leave Practice in 5 y (n = 871)			Plans to Leave Practice Within 5 y <sup>b</sup> (n = 109)			
No.	Weighted % <sup>c</sup>	(95% CI)	No.	Weighted % <sup>c</sup>	(95% CI)	No.	Weighted % <sup>c</sup>	(95% CI)		
<b>Demographics</b>										
Age, y										<.0001
<40	152	76.9	(69.6–84.1)	48	4.9	(2.7–7.1)	3	1.1 <sup>d</sup>	(.0–2.5)	
40–49	40	13.6	(8.3–18.9)	271	28.5	(24.7–32.3)	10	7.4	(3.7–11.1)	
50–59	22	8.6 <sup>d</sup>	(2.7–14.5)	393	48.0	(41.0–55.1)	31	19.4	(10.7–28.1)	
≥60	3	0.9 <sup>d</sup>	(.0–2.2)	135	18.5	(12.1–25.0)	60	72.1	(63.1–81.0)	
Sex										.020
Male	76	37.4	(28.8–45.9)	479	61.8	(53.1–70.5)	54	58.2	(40.8–75.5)	
Female	141	62.6	(54.1–71.2)	374	38.2	(29.5–46.9)	52	41.8	(24.5–59.2)	
Race/Ethnicity										.13
White	117	50.5	(39.1–61.9)	576	64.7	(57.4–71.9)	72	71.1	(53.4–88.8)	
Black/African American	22	5.8 <sup>d</sup>	(1.7–10.0)	59	12.4 <sup>d</sup>	(3.7–21.0)	6	8.3 <sup>d</sup>	(.0–18.6)	
Hispanic	27	21.7 <sup>d</sup>	(7.6–35.8)	108	8.4 <sup>d</sup>	(1.8–15.0)	17	9.9 <sup>d</sup>	(.0–20.4)	
Other	49	22.0	(11.6–32.4)	116	14.6	(8.6–20.6)	10	10.7 <sup>d</sup>	(.4–21.0)	
Sexual orientation										.18
Heterosexual	184	91.0	(85.8–96.2)	687	83.5	(78.8–88.2)	84	86.2	(79.3–93.2)	
Gay, lesbian, or bisexual	31	9.0	(3.8–14.2)	156	16.5	(11.8–21.2)	20	13.8	(6.8–20.7)	
<b>Qualifications and experience</b>										
Provider type										.53
Infectious diseases board-certified physician <sup>e</sup>	105	42.4	(30.6–54.2)	406	46.1	(38.0–54.2)	42	37.0	(24.1–50.0)	
Other physician	53	25.6	(11.2–39.9)	289	36.9	(29.2–44.5)	30	34.1	(21.9–46.3)	
Nurse practitioner or physician assistant	61	32.0	(20.7–43.4)	176	17.0	(12.4–21.6)	37	28.8	(13.3–44.3)	
Physician board certification										.81
Infectious diseases	105	63.8	(46.1–81.5)	406	58.5	(49.0–68.0)	42	56.6	(41.7–71.5)	
Internal medicine	19	10.9 <sup>d</sup>	(2.2–19.5)	130	22.0	(16.2–27.8)	12	17.0	(7.6–26.4)	
Family medicine	20	22.0 <sup>d</sup>	(3.9–40.1)	72	15.3	(10.1–20.5)	8	24.2 <sup>d</sup>	(8.9–39.6)	
Pediatrics	7	2.4 <sup>d</sup>	(.4–4.4)	24	1.6	(.7–2.4)	2	0.9	(.4–1.3)	
Other or not board certified	3	1.0 <sup>d</sup>	(.0–2.1)	24	2.6 <sup>d</sup>	(1.0–4.2)	2	1.3 <sup>d</sup>	(.0–3.2)	
HIV specialist (HIVMA criteria or AAHIV-S)	142	47.0	(31.7–62.3)	639	60.8	(53.5–68.1)	67	52.6	(38.6–66.7)	.48
HIV patients for whom you provide continuous and direct care										.41
0–20	30	28.2	(14.8–41.6)	60	11.7	(6.8–16.5)	9	16.6 <sup>d</sup>	(4.1–29.2)	
21–50	42	14.4	(7.5–21.2)	123	21.4	(15.2–27.6)	15	15.2	(7.4–22.9)	
51–200	88	39.1	(25.6–52.6)	343	39.3	(34.7–43.9)	42	41.2	(30.1–52.3)	
≥200	50	18.3	(10.5–26.1)	337	27.6	(21.5–33.7)	40	27.0	(13.8–40.2)	
Provides primary care <sup>f</sup>	187	77.2	(65.9–88.5)	782	83.0	(77.2–88.7)	97	89.8	(83.4–96.2)	.02
Provides care in language other than English	92	43.9	(31.8–56.1)	371	37.4	(29.3–45.5)	38	28.3	(14.4–42.2)	.06
<b>Care delivery</b>										
Accepting new patients	205	88.5	(76.5–100.0)	822	96.1	(94.3–97.8)	93	78.8	(62.0–95.7)	.30
<b>Comanagement of patients with other HIV care providers</b>										
Provides expert assistance to less experienced providers	69	18.7	(11.8–25.6)	407	42.1	(34.9–49.3)	45	31.2	(21.3–41.2)	.05
Receives assistance from HIV experts	65	35.4	(24.7–46.0)	140	21.4	(14.9–27.9)	26	30.4	(16.8–44.0)	.56
<b>Facility type where provider works</b>										
RWHAP-funded	152	49.2	(29.7–68.8)	547	45.6	(34.3–56.9)	62	54.2	(36.3–72.2)	.68
Private practice	47	33.8	(17.6–50.0)	223	47.1	(37.9–56.2)	22	24.6	(10.5–38.7)	.34

Abbreviations: AAHIV-S, American Academy of HIV Medicine Practicing HIV Specialist; CI, confidence interval; HIV, human immunodeficiency virus; HIVMA, HIV Medicine Association; RWHAP, Ryan White HIV/AIDS Program.

<sup>a</sup> Excludes 9 providers who plan to leave practice within 5 years.

<sup>b</sup> Excludes 9 providers who have been in practice 5 years or less.

<sup>c</sup> Values exclude “don’t know” responses.

<sup>d</sup> Coefficient of variation is >.30; estimate may be unreliable.

<sup>e</sup> Physicians (Doctor of Medicine [MD] and Doctor of Osteopathic Medicine [DO]) who were board certified in infectious diseases and another specialty were classified as infectious diseases physicians.

<sup>f</sup> Defined as point of first contact and comprehensive care, with emphasis on prevention and coordination of care.

**Table 4. Professional Satisfaction of Providers Who Entered Human Immunodeficiency Virus (HIV) Practice and Providers Who Plan to Leave HIV Practice Within 5 Years (N = 1234)—Medical Monitoring Project, 2013–2014 Provider Survey**

Response	Stage of Clinical Practice									P Values Comparing Columns 1 and 3
	Column 1			Column 2			Column 3			
	Entered Practice Within 5 y <sup>a</sup> (n = 219)			In Practice >5 y and No Plans to Leave Practice in 5 y (n = 871)			Plans to Leave Practice Within 5 y <sup>b</sup> (n = 109)			
No.	Weighted % <sup>c</sup>	(95% CI)	No.	Weighted % <sup>c</sup>	(95% CI)	No.	Weighted % <sup>c</sup>	(95% CI)		
Satisfied or very satisfied with area of practice <sup>d</sup>										
Salary and reimbursement	75	38.7	(28.7–48.7)	295	34.9	(28.4–41.4)	52	51.8	(32.0–71.7)	.18
Amount of time required and available for documentation/administrative work	79	32.2	(23.8–40.7)	252	30.8	(22.9–38.7)	46	47.2	(37.6–56.7)	.02
Work schedule/on-call responsibilities	155	62.6	(50.9–74.2)	513	55.1	(50.7–59.6)	72	69.2	(58.4–80.0)	.40
Supportive services to assist with patient management	128	51.6	(41.2–62.1)	470	49.2	(42.2–56.2)	60	58.6	(45.2–72.0)	.42
Support and coverage from other HIV care providers	158	61.6	(50.0–73.2)	645	67.5	(63.2–71.8)	85	83.3	(75.0–91.6)	<.0001
Availability of specialists for consultation and referral	137	58.6	(44.1–73.2)	578	65.6	(59.9–71.4)	81	73.9	(57.4–90.4)	.10
Effort required to keep up with clinical and/or pharmaceutical advances	125	53.6	(41.9–65.4)	527	58.5	(51.6–65.5)	65	60.0	(47.8–72.2)	.48
Always or usually has sufficient time to provide HIV care to:										
Patients entering care for the first time <sup>e</sup>	149	69.0	(55.6–82.5)	624	77.1	(72.3–81.8)	81	78.6	(68.9–88.2)	.24
Established patients <sup>e</sup>	154	59.1	(46.1–72.1)	631	77.5	(72.0–83.0)	85	80.7	(70.7–90.6)	.006

Abbreviations: CI, confidence interval; HIV, human immunodeficiency virus.

<sup>a</sup> Excludes 9 providers who plan to leave practice within 5 years.

<sup>b</sup> Excludes 9 providers who have been in practice 5 years or less.

<sup>c</sup> Values exclude “don’t know” responses.

<sup>d</sup> Each item was rated by respondents on a 5-point scale ranging from very unsatisfied to very satisfied.

<sup>e</sup> Both questions were rated by respondents on a 4-point scale ranging from never to always.

expert assistance relatively infrequently; providers are generally dissatisfied with salary/reimbursement and time available for documentation/administrative work; and the expected increase in workforce size and patient care capacity over 5 years will likely not keep up with increased demand [2, 3]. Providers at RWHAP-funded facilities are generally highly qualified and are more likely than those in private practice to report having plans to leave HIV practice.

Although blacks and Hispanics represent 41% and 20% of HIV-infected persons in care, respectively [4], these groups each accounted for only 11% of the HIV care provider workforce. Increasing the number of underrepresented minorities in the health professions might improve clinical outcomes and delivery of culturally competent care [16]. A nationally representative race concordance study, performed within 2 years of the introduction of protease inhibitors, found that black patients with white providers were first prescribed protease

**Table 5. Estimated Number of Full-time Equivalent Human Immunodeficiency Virus (HIV) Care Providers Who Entered Practice or Plan to Leave Practice Within 5 Years at All Healthcare Facilities and Providers Only at Ryan White HIV/AIDS Program–Funded Facilities—Medical Monitoring Project, 2013–2014 Provider Survey**

Provider	FTE Providers <sup>a,b</sup> Who Entered Practice Within 5 y (n = 216)		FTE Providers <sup>a,b</sup> Who Will Leave Practice Within 5 y (n = 109)		Difference Between Weighted Estimates	(95% CI)	P Value <sup>c</sup>
	Weighted Estimate	(95% CI)	Weighted Estimate	(95% CI)			
All providers	443	(322–564)	253	(173–334)	190	(50–330)	.007
Providers at RWHAP-funded facilities	268	(192–343)	148	(72–223)	120	(18–222)	.02

Abbreviations: CI, confidence interval; FTE, full-time equivalent; n, calculated number of FTEs in sample; RWHAP, Ryan White HIV/AIDS Program.

<sup>a</sup> Full-time equivalent defined as 40 hours of patient care performed per week by 1 or more persons.

<sup>b</sup> Includes face-to-face contact, documentation, phone calls/emails to patients, educating families, reviewing tests, and consulting with other providers.

<sup>c</sup> P value obtained using lincom postestimation command in STATA.

**Table 6. Estimated Number of HIV-Infected Patients Who Received Medical Care From All HIV Care Providers Who Entered Practice or Plan to Leave Practice Within 5 Years and From Providers Only at Ryan White HIV/AIDS Program–Funded Facilities—Medical Monitoring Project, 2013–2014 Provider Survey**

Provider	Patients Who Received Medical Care From Providers Who Entered Practice Within 5 y (n = 219)		Patients Who Received Medical Care From Providers Who Will Leave Practice Within 5 y (n = 109)		Difference Between Weighted Estimates	(95% CI)	P Value <sup>a</sup>
	Weighted Estimate	(95% CI)	Weighted Estimate	(95% CI)			
All providers	175 306	(119 816–230 796)	109 992	(70 969–149 015)	65 314	(–1031 to 131 658)	.05
Providers at RWHAP-funded facilities	100 469	(66 620–134 319)	65 986	(28 667–103 305)	34 483	(–13 746 to 82 713)	.16

Abbreviations: CI, confidence interval; n, weighted estimate of number of FTEs; RWHAP, Ryan White HIV/AIDS Program.

<sup>a</sup> P value obtained using *lincom* postestimation command in STATA.

inhibitors significantly later than black patients with black providers or white patients with white providers, after adjusting for patient and provider factors [17]. The IOM, HRSA, and AA-HIVM/HIVMA have advocated increased racial and ethnic diversity in the HIV care provider workforce. However, blacks and Hispanics each accounted for only 7% of medical school graduates in 2014 [18], so achieving this objective will be challenging and may require the structural changes recommended by IOM [19] and others [6, 7].

About one-third of providers cared for  $\leq 50$  patients with HIV. It is well documented that providers with HIV caseloads in this range are less likely to follow antiretroviral treatment guidelines [20–22]. Among providers with caseloads of 21–50 patients, only 1 in 5 received assistance from an HIV expert, and of providers with the smallest caseloads ( $\leq 20$  patients), just half received assistance from an HIV expert. Particularly in areas with limited access to HIV specialists [23, 24], support for low-volume providers may increase adoption of HIV treatment recommendations. Pairing of providers who care for  $< 20$  patients with highly experienced providers to foster professionally supportive connections is a service of the AAHIVM Clinical Consult Program [25]. Another resource for supporting low-volume providers is the AIDS Education and Training Center Program—the training arm of the RWHAP—which is a national network of HIV experts providing education, clinical consultation, and technical assistance [26].

Only one-third of HIV care providers were satisfied with salary/reimbursement and the time for documentation/administrative work. In contrast, an American Medical Association–sponsored survey of a broad range of physicians found that few were dissatisfied with their current income [27]. Among starting salaries for medical specialties nationally in 2015, those for infectious disease specialists ranked lowest, below those of family physicians, general pediatricians, and general internists [28]. For nurse practitioners and physician assistants, obtaining HIV expertise is not associated with financial rewards [5].

RWHAP-funded outpatient facilities provide care for 73% of HIV-infected patients, many of whom are affected negatively by social determinants of health [29]. More than two-thirds of

providers at RWHAP-funded facilities were HIV specialists and three-quarters had caseloads of  $> 50$  patients. Almost all provided primary care and half provided care in a language other than English. Providers at RWHAP-funded facilities and in private practice expressed low satisfaction with time for documentation/administrative work or with salary/reimbursement, but RWHAP providers were nearly 3 times as likely to report planning to leave practice in 5 years. A survey of Ryan White Part C–funded clinics found that two-thirds had difficulty recruiting HIV clinicians and cited financial compensation as a leading cause [30], which raises concerns about the potential difficulty of replacing providers who leave these practices. Structural changes recommended by HRSA [13] to increase providers' remuneration and time to complete documentation/administrative work may be needed to sustain RWHAP's highly qualified workforce.

We found no difference in HIV expertise between providers entering and leaving the field of HIV medicine, but fewer entering providers provided primary care, which is of concern considering the increasing prevalence of chronic comorbidities among HIV patients [31]. Entering providers were less satisfied with the amount of time required for documentation/administrative work and were less likely to report having sufficient time to provide HIV care for established patients. This is noteworthy, as barriers to providing quality care are a major source of physician dissatisfaction [27].

We project that the HIV care provider workforce will increase modestly over 5 years, assuming that the stable number of infectious disease and primary care postgraduate positions in the past decade is maintained [32–34]. The expected net gain of providers may add capacity to care for up to 65 000 additional patients over 5 years. However, this additional capacity will likely be outpaced by an increase in HIV prevalence of 30 000 annually if current incidence and death rates continue [2, 3], along with improvements in diagnosis and engagement in care. Even if the rate of the annual increase in HIV prevalence is reduced by one-third, this source of demand for care will still exceed the increased capacity to provide care. In addition, an estimated 124 000 people not receiving regular medical care may be newly eligible for coverage either

through Medicaid or in the health insurance marketplace [35]. While 60% of providers expect to be able to care for more patients in 5 years, there are limits to providers' ability to expand their practices. Three-quarters of HIV care providers reported already devoting at least 30 hours per week to patient care.

Our analysis was subject to limitations. First, the rate of influx of providers into the field of HIV medicine during the past 5 years could increase if provider salary/reimbursement rises or administrative burden decreases relative to other fields of practice. However, these changes may take several years to implement and would therefore be unlikely to affect our calculations.

Second, estimates of the number of patients currently cared for by providers were based on self-report. To address potential bias in our estimates, we computed a weighted estimate of the total number of patients under the care of all providers; this total estimate was >1.3 million, which is substantially higher than any estimate of the in-care population in the United States [5]. This discrepancy may be due to providers counting the number of patients under their care over a period of time rather than currently, or to counting patients who are under the care of multiple providers, have transferred to another provider, or have dropped out of care. We think it likely that this inflation of caseload affects providers entering and leaving the workforce equally. Our projection that the workforce will have the capacity to provide care for an estimated 65 000 additional patients over 5 years may therefore be high, which would further support our assertion that the expected increase in provider capacity will be insufficient to accommodate the anticipated increase in demand for care.

Third, our projection of the increase in HIV prevalence in the next 5 years was based on the assumption that HIV incidence and death rates would remain stable. If newer strategies to prevent HIV transmission and improve outcomes are effective, both incidence and mortality may decrease, having a mixed effect on HIV prevalence. However, even if the near-term increase in prevalence were one-third less than what is expected, need for care would still outpace capacity.

## CONCLUSIONS

The modest growth in the HIV care provider workforce capacity projected to occur by 2019 will be insufficient to meet the needs of the increased number of HIV-infected persons expected to require care. RWHP-funded facilities may be at particular risk for inadequate capacity due to attrition of highly qualified providers. Provider dissatisfaction with salary/reimbursement and administrative burden are substantial, and racial/ethnic minority providers are underrepresented in the workforce relative to the disproportionate burden of HIV among black and Hispanic Americans.

## Supplementary Data

Supplementary materials are available at <http://cid.oxfordjournals.org>. Consisting of data provided by the author to benefit the reader, the posted

materials are not copyedited and are the sole responsibility of the author, so questions or comments should be addressed to the author.

## Notes

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**Author contributions.** J. W. contributed to study conception and data analysis, wrote the article, had full access to all of the data in the study, and takes responsibility for the integrity of the data and the accuracy of the data analysis. L. B. and J. S. contributed to study conception and edited the article. G. W. G. contributed to data analysis and writing, and edited the article. B. T. W. contributed to survey weighting, data analysis, and writing, and edited the article. C. C. D. contributed to data analysis and writing, and edited the article.

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