

# The Value of Athletic Trainers in Ambulatory Settings

*Bianca K. Frogner, PhD*  
*Beverly Westerman, EdD, ATC*  
*Loretta DiPietro, PhD, MPH*

Athletic trainers (ATs) are increasingly used in ambulatory care settings. This study piloted a new survey instrument to assess the value that ATs add to these settings. The survey collected data on six domains: 1) general facility characteristics, 2) AT staffing characteristics, 3) other staffing characteristics, 4) patient characteristics, 5) billing practices, and 6) participation in innovations. A national sample of physician practices using ATs was recruited to participate in a web-based survey. The study found that ATs were among the most common clinical occupations in the practice. Practices were almost all “very satisfied” with the services provided by ATs with equal expectations to either maintain or increase the number of ATs. While most practices invested in training and continuing education units, the larger practices were more likely to do so. Practices were more likely to bill for AT services if ATs had a national provider identifier. The mean number of clinical visits, rate of billing, patient scheduling, wait times, and participation in innovations did not vary significantly by the number of ATs employed. Overall, the study found evidence that ambulatory care practices see value in hiring ATs. *J Allied Health* 2015; 44(3):169-176.

**ATHLETIC TRAINERS** (ATs), who are certified by the Board of Certification, are actively engaged health care practitioners. Increasing the use of ATs may alleviate the growing primary care shortage, which is expected to worsen as health insurance expands under the Affordable Care Act and as the baby boomer population ages with complex health conditions. ATs are commonly perceived as only practicing in settings such as secondary schools, universities, and sports-related settings.

**Dr. Frogner** is Associate Professor and Director of the Center for Health Workforce Studies, Department of Family Medicine, School of Medicine, University of Washington, Seattle, WA; **Dr. Westerman** is Associate Professor, Department of Exercise Science, Vice Chair for Undergraduate Studies, and Director of the Athletic Training Education Program, Milken Institute School of Public Health, The George Washington University, Washington, DC; and **Dr. DiPietro** is Professor and Chair, Department of Exercise Science, Milken Institute School of Public Health, The George Washington University, Washington, DC.

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Address correspondence to: Dr. Bianca K. Frogner, Department of Family Medicine, School of Medicine, University of Washington, Box 354982, 4311 11th Ave. NW Ste 210, Seattle, WA 98105, USA. Tel 206-616-9657. [bfrogner@uw.edu](mailto:bfrogner@uw.edu).

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The National Athletic Trainers' Association (NATA) identified 45,118 certified ATS according to their membership rolls as of February 2015.<sup>1</sup> The 2013 Occupational Employment Statistics collected by the US Bureau of Labor Statistics estimates that 40% work in health care-specific settings.<sup>2</sup> Despite the growing presence of ATs in health care, a limited number of studies provide a national perspective on their role and utility in these settings.

The primary goal of this study was to assess the value that ATs bring to the delivery of primary care services. Value is a complex concept. From a patient's perspective, value from health care services could be assessed as the attainment, improvement, and maintenance of health, as well as the experience in the process of care.<sup>3</sup> From a health system's perspective, including the providers and payers, the value of health care comes from the “triple aim” of improving the quality of care, reducing costs, and improving population health.<sup>4</sup> These concepts are not mutually exclusive perspectives. Small scale studies, usually isolated to one particular practice, have evaluated the value of ATs in health care settings; however, recent evidence indicates that physicians are beginning to recognize the potential benefits and cost savings associated with hiring ATs to keep up with the growing primary care demand. This study, however, focuses on examining value from a health system's perspective, with a specific focus on the economic value of ATs within primary care settings.

This pilot study captures information on the practice characteristics, characteristics of ATs hired, use of ATs in the practice, and perceptions about the value of ATs. The results from the survey provide the first national perspective on the value of ATs in health care settings. The following sections provide a background on the role of ATs, describe the survey methodology, discuss the results, and provide concluding thoughts and recommendations for the future.

## Background

While a large literature exists on ATs, only a limited set of studies examine the role of ATs in ambulatory care environments. Of the studies that do exist, many suffer from poor study design and lack of generalizability. Of the studies of ATs in health care settings, generally studies suggest

that physicians and patients had positive experiences once they encountered ATs or understood what they were capable of performing. One study found that orthopedic surgeons were more likely to hire ATs versus physician assistants (PAs) or nurse practitioners (NPs) when they had a better understanding of the qualifications of ATs.<sup>5</sup> In another study of orthopedic surgeons and primary care physicians, the physicians were “exceptionally” satisfied with the clinical skills of residency trained ATs over medical assistants (MA), and “very well” satisfied with their musculoskeletal skills compared to entry-level PAs and NPs.<sup>6</sup> The physicians also rated the AT “very well” in their satisfaction level on improving patient satisfaction and the physician’s quality of life.<sup>6</sup> From a patient perspective, patients who received treatment by a single AT across all study settings reported that their health significantly improved after treatment.<sup>7</sup>

Defining value as the increase in the volume of patient visits (or throughput), one study found that an AT increased the number of patient encounters by 15 to 30% for orthopedists and 10 to 20% for primary care providers.<sup>8</sup> Another study found a similar range of increase (15 to 30%) in physician practice productivity that employed ATs.<sup>9</sup> Compared to the use of an MA, one study reported that ATs significantly increased the number of patient encounters by three to four additional patients per clinic day in each of two primary care practices serving patients with musculoskeletal injuries.<sup>10</sup> The increase in patient encounters could in part be attributable to the higher level of education and training of an AT versus a MA (who requires only a post-secondary non-degree such as a certificate), which allows ATs to perform more complex services. The increase in throughput by hiring an AT has been translated into an increase in revenue to the practice on the order of \$200 to \$1,200 additional revenues per day, or \$123,000 revenues per year based on current Medicare reimbursement rates.<sup>9,10</sup>

In sum, the literature suggests that ATs are adding value to the health care system from the perspective of the patient, clinical process, and cost savings. The studies were conducted in only one setting, however, and so they lack the ability to generalize the results across other population or geographical regions. This study takes a national perspective by surveying ambulatory care practices around the country in order to assess the value of ATs in these environments. This study takes a wide lens approach to defining value by assessing value from the practice as well as patient perspective, and from a cost savings as well as quality of care perspective.

## Methods

### Survey Development

A survey instrument was developed using internal expert feedback among the study team as well as external

experts. The internal experts included three academics with the following expertise: extensive practice experience as a certified AT, an epidemiologist with exercise science and health education expertise, and a health services researcher/health economist with considerable survey design and analysis experience. The external experts included three academic-affiliated and practicing ATs, one of whom holds a dual degree with physical therapy.

The survey had screening questions to capture our target audience. In order to pass the screen, a practice had to be located in the US, be practicing for at least 1 full fiscal year, provide direct care to patients, and employ at least one AT who provides direct care to patients. Also, practices self-classified as a private solo practice, private group practice, health maintenance organization or other prepaid practice, hospital outpatient department pass the screening. A practice was excluded if it was a freestanding clinic/urgent care center (not part of a hospital outpatient department), community health center, non-federal government clinic, athletic training facility, school, amateur/professional/Olympic sports venue, or federal government operated clinic.

The survey captured information across six broad domains: 1) basic facility characteristics, 2) general staffing configuration, 3) AT staffing characteristics, 4) participation in innovations, 5) patient profile, and 6) billing. (The full survey instrument, the Athletic Trainers in Offices of Physicians Survey, or ATOPS, is available upon request to the authors.) The aim of the survey was to assess value from perspectives that reflect the “triple aim” as defined by the former Centers for Medicare and Medicaid Center Director, Donald Berwick, PhD<sup>4</sup>:

- Increasing access—whether ATs are associated with an increase in patient throughput defined as the number of visits, wait times to see a provider, and volume of services;
- Reducing costs—whether ATs are associated with an increase in revenue and decrease in expenses; and
- Improving quality of care—whether practices with ATs are likely to participate in innovations, investing in training of ATs, and satisfaction with ATs.

### Recruitment

Physician practice administrators were our target audience. These administrators would have access to data on the patient as well as on practice characteristics. They would also have the ability to answer questions about decisions around hiring and employing ATs. By collecting data from this perspective, this study was able to estimate value to the practice, which may motivate future decisions to hire ATs.

Multiple approaches were used to recruit participants to the survey given that a national list of ambulatory care practices is not readily available, let alone a list that identifies practices that use an AT as a physician extender.

**TABLE 1.** Characteristics of Facilities Employing ATs as Physician Extenders

Facility Profile	Mean	Patient Profile	Mean
Type of practice (%) (n=36)		Women (%) (n=19)	49.8
Private solo practice	11.1		
Private group practice	52.8	Age (%) (n=20)	
Hospital outpatient department	36.1	17 or younger	36.6
Years in practice (n=29)	29.1	18–44	17.9
Owner of reporting location (%) (n=35)		45–54	15.1
Physician or physician group	57.1	55–64	11.7
Hospital	37.1	65–74	9.7
Medical/academic health center	5.7	75 and older	9.1
Single (vs multi) specialty facility (%) (n=35)	40.0	Race/ethnicity (%) (n=20)	
Single specialty area (%) (n=14)		White, non-Hispanic	65.0
Orthopedic sports medicine	35.7	African-American, non-Hispanic	14.2
Orthopedic (all other)	57.1	Hispanic	11.9
All orthopedic issues	7.1	Asian	5.2
Multispecialty area (%) (n=21)		Native Hawaiian/Other Pacific Islander	0.4
Primary care*	27.8	Other	3.3
Orthopedic sports medicine	41.7	New patient referrals (%) (n=19)	55.8
Orthopedic (all other)	30.6	Source of referral (n=13)	
Pediatrics	16.7	Primary care office	63.9
Other	19.4	Specialist office	50.0
		Rehabilitation facility	41.7
		Other	36.1

\*Includes family practice and internal medicine

The NATA provided a list of 121 ATs from their membership roster who were serving as administrators in ambulatory care environments. To this list, the authors sent a personalized email with a link to the survey, which was hosted on the NATA Physician Extender Setting website and conducted via SurveyMonkey. The study investigators followed up multiple times by phone and email. A call for participants and a link to the survey was posted on a LinkedIn site called “Athletic Trainers Working as Physician Extenders” with a membership count of over 1,500 members. A call for participants was also sent out to three professional associations with close ties to NATA and through targeted social media.

The survey link was opened on November 4, 2013 through January 31, 2014. Due to concerns about completeness of surveys and duplicate responses, the survey was re-opened from March 20, 2014 through May 5, 2014. A subset of original survey respondents was called and then emailed a new link to the survey. All participants who passed the screening questions were entered into a random drawing for a \$100 Amazon.com gift card conducted by an independent party identified by SurveyMonkey.

## Survey Results

### Sample Size

The study had 84 unique responses that passed our screening questions. The response rate is not possible to

calculate given that the universe of physician practices using ATs is unknown, which was the universe targeted for this pilot survey. Forty-eight respondents, however, did not report any data on the number, characteristics, or use of ATs. The final sample size was the remaining 36 respondents who passed the screening questions and reported at least some details on ATs. Three practices that passed the screening questions attempted the survey multiple attempts and provided some details on ATs, which were then reconciled by the authors. Coincidentally, each set of respondents had either an AT or a person in an administrative position answer the questions. After reviewing the consistency and completeness of the answers, the responses of the person in the administrative position were kept.

### Descriptive Statistics: Practice Environment

The mean age of a practice was about 30 years (Table 1). A little over half of the respondents were private group practices, 36% were hospital outpatient settings, and 11% were private solo practices. Forty percent of practices were single specialty practices with most being an orthopedic practice (either sports medicine or “other”); the share of single specialty practices was on par with a national sample of ambulatory medical settings.<sup>11</sup> The other 60% were multispecialty practices, with the most common specialty being orthopedic sports medicine (42%), followed by “other” orthopedic practice (31%). Single specialty practices were more likely to be owned

**TABLE 2.** Staffing Pattern in Facilities Employing ATs as Physician Extenders

	Median	Mean	SD	No.
Full-time equivalents, clinical	25	41.5	59.9	27
Full-time equivalents, nonclinical	13	24.3	29.4	27
Head counts by occupation				
Athletic trainers	3.0	6.5	9.2	32
Occupational therapists	0	1.2	2.8	19
Physical therapists	2.0	5.4	8.1	20
Physician assistants	2.0	4.8	6.6	26
Nurse practitioners	1.0	2.9	7.0	21
Registered nurses	1.5	4.6	10.7	22
Licensed vocational/practical nurses	0	0.9	1.6	19
Certified nursing assistant and other	0	0.1	0.5	16
Medical assistant	4.0	7.4	8.8	26
Nurse, medical, and other aides	0	1.5	2.9	15
Orthopedic technicians	1.0	3.6	5.4	20
Primary care physicians	1.0	5.6	11.8	20
Specialist physicians	1.0	12.0	22.5	28

by a solo or group physician practice. The multispecialty practices were about equally likely to be owned by a solo or group physician practice, or a hospital; a small percentage was owned by a medical or academic center. Almost all of the practice (84%) had their own Medicare identification number to do their own billing.

The staff size varied considerably across respondents (Table 2). The mean clinical staff size was 42 full-time equivalents (FTEs) with a standard deviation (SD) of 60 FTEs and median of 25 FTEs. The mean nonclinical staff size was 24 FTEs (SD 29, median 13). Multispecialty facilities reported having twice the number of clinical staff FTE, but only two-thirds the number of non-clinical FTE compared with practices that were not multispecialty (Table 3). ATs were among the most common type of clinical staff member in the reporting practices (Table 3). Based on the mean head count, ATs were the third most common clinical staff member (12%) after specialist physicians (21%) and medical assis-

tants (13%). Based on the median, ATs were the second most common clinical staff member (18%) after medical assistants (24%).

The mean number of patients served was 8,700 (SD 13,342, median 2,500). The mean number of clinical visits was 25,792 (S 47,974, median 14,000). Comparing staffing to patient panel size and clinical visits, multi-specialty practices appeared to have an increasing economy of scale, whereby a two-fold increase in the number of clinical staff FTE was associated with a four-fold increase in throughput (versus constant returns to scale whereby double the clinical staff FTE would be associated with double the throughput). The most common reasons that respondents listed for patient visits included (in descending frequency): joint pain (in the knees, hips, shoulders, or ankles), back pain, and osteoarthritis.

### Patient Profile and Billing

The patient profile of the responding facilities had an even gender mix and similar racial/ethnic profile as the general population (Table 1). Compared with the general population, the responding facilities had a slightly higher share of patients 17 yrs or younger (37% vs 24%) and patients 65 yrs or older (19% vs 13%); the facilities had considerably fewer patients between 18 to 44 yrs old (18% vs 36%).<sup>12</sup> Compared with a sample of other physician offices and outpatient departments of hospitals, the reporting facilities saw more male as well as younger patients.<sup>13,14</sup>

The proportion of respondents on financial and insurance questions was low (about 25%). Among those who responded, the payer mix was 35% self-pay, 31% private commercial insurance, 17% Medicare, 7% Medicaid, and 5% worker's compensation. Reflective of the age distribution, the responding facilities received slightly less pay from Medicare compared with other physician

**TABLE 3.** Share of Each Occupation by Facility Specialty (Single vs Multi)

	All	Single	Multi	Private, Solo	Private, Group	Hospital Outpatient
Full-time equivalents, clinical	41.5	23.1	49.7	22.0	43.3	38.4
Full-time equivalents, nonclinical	24.3	29.0	19.3	30.5	29.1	10.9
Athletic trainers	12%	9%	11%	5%	12%	13%
Occupational therapists	2%	5%	1%	12%	1%	1%
Physical therapists	10%	20%	4%	21%	4%	14%
Physician assistants	8%	10%	7%	7%	9%	8%
Nurse practitioners	5%	1%	6%	0%	4%	8%
Registered nurses	8%	3%	8%	7%	4%	14%
Licensed vocational/practical nurses	2%	2%	1%	0%	1%	3%
Certified nursing assistant and other	0%	1%	12%	0%	0%	0%
Medical assistant	13%	15%	11%	10%	18%	8%
Nurse, medical, and other aides	3%	5%	2%	5%	3%	1%
Orthopedic technicians	6%	3%	7%	3%	9%	4%
Primary care physicians	10%	5%	10%	15%	5%	14%
Specialist physicians	21%	21%	19%	16%	30%	11%

**TABLE 4.** Characteristics of and Facility Investment in Athletic Trainers as Physician Extenders

Athletic Trainer Characteristics	Mean	Use of Athletic Trainers	Mean
Women (%) (n=32)	63.9	Bills for AT services (%) (n=18)	61.1
Age (%) (n=30)		Years employing ATs (n=30)	6.6
25 or younger	18.6	On the job training (%) (n=33)	78.8
26–35	49.9	Financial support for continuing education units (%) (n=33)	72.7
36–45	26.5		
46–55	4.9	Satisfaction with ATs (%) (n=31)	
White, non-Hispanic (n=30)	97.7	Very satisfied	83.9
ATs, Full time (%) (n=34)	77.2	Satisfied	16.1
ATs w/ National Provider Identifier (%) (n=33)	59.9	Future plans (%) (n=33)	
ATs w/ dual credential (%) (n=33)	29.0	Maintain number of ATs	48.5
		Increase number of ATs	51.5

offices (25%) and outpatient departments of hospitals (20%).<sup>13,14</sup> The reporting facilities also had a considerably lower proportion of self-pay (4% in physician offices, and 7% in outpatient departments) and had fewer Medicaid patients (25% in physician offices, and 35% in outpatient departments) compared with other physician offices and outpatient departments of hospitals.<sup>13,14</sup>

### Profile of Athletic Trainers

Two-thirds of ATs were women (Table 4). Half of the ATs were between the ages of 26 to 35 yrs, followed by 26.5% between the ages of 36 and 45 yrs, and 18.6% age 25 or younger. Almost all (98%) of the ATs were reported white and non-Hispanic. About 30% of ATs reported having dual credentials, with orthopedic technologist (OTC) and PT as the most commonly listed dual degrees. Over three-quarters of ATs worked full-time.

Clinical practices had a mean of 6.6 yrs of experience employing ATs (Table 4). The mean headcount of ATs reported in physician practices was 6.5 (SD 9; median 3), but ranged from 1 to 43 ATs. Multispecialty practices employed a mean of 8 ATs, while single specialty prac-

tices employed, on average, 4. The number of ATs varied by type of practice setting such that hospital outpatient departments had the highest headcount of ATs (mean 8.4; SD 9.3); followed by private group practice (mean 6.3; SD 10.0); and private solo practice (mean 2.5; SD 2.5). These numbers did not vary significantly across settings or by whether the practice was owned by a solo or group physician practice versus a hospital.

The respondents were split into three equal-size categories to identify significant differences by AT staffing patterns: 1) practices employing only 1 AT (n=10), 2) practices employing 2 to 5 ATs (n=9), and 3) practices employing more than 5 ATs (n=12). The number of clinical staff FTE significantly varied across these three categories (p=0.04). The result that practices with more FTEs also had more ATs on staff was not surprising. The patient size and volume also greatly varied across respondents (Table 5). Neither number of patients nor number of clinical visits varied significantly by the number of ATs in the practice.

About 80% of practices reported providing on-the-job training for ATs (Table 4). About three-quarters reported providing financial support for continuing

**TABLE 5.** Facility and Patient Characteristics by AT Characteristics

	All	No. of ATs as Physician Extenders in Practice			Bills for AT Services	
		1 AT	2 to 5 ATs	6+ ATs	No	Yes
Clinical FTE	39.4	15.8	17.5	74.5*	22.9	40.7*
Total clinic visits	25,792	59,800	11,183	21,000	10,325	14,640
Clinic visits incident to ATs	1,876	60	315	5,167	190	4,030
Patients panel	8,701	2,078	13,143	7,933	3,280	12,501
Patients scheduled per day	108	103	114	109	154	98
Hours open per week	58.7	44.0	67.3	67.4	54.9	69.1
Wait for appt, new patient (days)	4.2	5.5	3.3	3.3	5.6	4.3
Wait time upon arrival (min)	20.2	24.6	18.8	15.8	25.7	12.7
Appt length, est. patient (min)	20.0	23.5	16.4	15.6	17.9	20.5
Appt length, new patient (min)	31.9	32.5	28.6	34.3	28.6	32.3

\*Significant difference across means at p<0.05 using analysis of variance (ANOVA).

Note: Sample size varies for each variable due to differences in response rates.

education units (AT). All respondents were satisfied or very satisfied with ATs, with most of the respondents (84%) being very satisfied. Slightly less than half of the practices planned to maintain the number of ATs in the future, while the other half of practices planned to increase the number of ATs. None of the practices reported plans for decreasing the number of ATs. If a practice billed for AT services, they were more likely to invest in training and continuing education units for ATs (data not shown in tables).

Sixty percent of ATs had a national provider identifier (NPI), which is required in order for practices to bill for services (Table 4). Consistent with this reported trend, about 60% of practices billed for services delivered by ATs. The rate of billing for AT services and number of clinical visits incident to ATs was not significantly different by the number of ATs employed by the facility.

### Productivity of Practices

Medical facilities employing ATs reported being open for business for 57 hrs/wk on average (SD 33, median 50) (Table 5). Facilities scheduled a mean of 105 patients/day (SD 104; median 58). New patients waited for a mean of 4.2 days (SD 4.3; median 2). The wait time appears to be on par or even a little lower than what has been reported for patients scheduling a routine medical exam with a generalist or a specialist, where 55% of patients seeing a generalist wait less than a week for a routine medical exam (43% for specialists).<sup>15</sup> The wait time observed in the study was considerably lower than the average wait time of 18.5 days for a physician or 19.5 days for a family physician.<sup>16</sup>

Upon arrival to the facility, patients waited a mean of 20 minutes (SD 22; median 15). The wait time observed in the study was slightly less than the mean wait time of 26 minutes, although the wait time varies across the country ranging from 16 to 41 minutes.<sup>17</sup> New patients were scheduled for a mean of 31 minutes (SD 19; median 30), while established patients were scheduled for a mean of 19 minutes (SD 11; median 15). Perhaps due to the nature of the visits to the facilities in the sample, these visits were slightly longer on average (though shorter than the median) compared with one study measuring the length of a visit among the elderly (17.4 min).<sup>18</sup>

None of these factors (hours open, patients per day, or wait time) varied significantly by the number of ATs employed by the facility. Also, practices with ATs appeared to be on par in terms of productivity with other physician practices.

### Participation in Innovations

The majority of facilities (90%) employing ATs actively used electronic health records, most of which were installed over 1 year prior to the survey period (Table 6).

**TABLE 6.** Facility Participation in Innovations

	Mean
Electronic health record (EHR) adoption (n=33)	
We do not have an EHR system	15.2
We are not actively using an EHR system but have one installed	—
We are actively using an EHR that was installed in the past 12 months	12.1
We are actively using an EHR system that was installed more than 12 months ago	72.7
Pay for performance (n=17)	
Yes, we participate	29.4
No, but we plan to participate	11.8
No, but we don't plan to participate	58.8
Unknown status	—
Medicare/Medicaid Accountable care organization (n=24)	
Yes, we participate	29.2
No, but we plan to participate	12.5
No, but we don't plan to participate	—
Unknown status	58.3
Private Accountable care organization (n=23)	
Yes, we participate	17.4
No, but we plan to participate	13.0
No, but we don't plan to participate	—
Unknown status	69.6
Bundled payment (n=23)	
Yes, we participate	26.1
No, but we plan to participate	4.4
No, but we don't plan to participate	—
Unknown status	69.6
Patient centered medical home (n=21)	
Yes, we participate	19.1
No, but we plan to participate	14.3
No, but we don't plan to participate	—
Unknown status	66.7
Other centers for Medicare/Medicaid innovation (n=21)	
Yes, we participate	4.8
No, but we plan to participate	—
No, but we don't plan to participate	—
Unknown status	95.2

This trend was only slightly higher than other physician offices (75%).<sup>19</sup> Participation or even knowledge about participation in other innovations was low across the facilities. About 30% of facilities reported participating in a pay-for-performance innovation, with another 12% planning to participate in the future. About two-thirds of the reporting facilities did not know their status in the participation of an Accountable Care Organization (ACO) (either private or Medicare/Medicaid), bundled payment, or patient centered medical home (PCMH). Of the remaining facilities who did know their status, a little over half were participating in these innovations. A reason for the high proportion of those not knowing their status might be the complexity of the arrangements between facilities involved in the innovations, such as the very new innovation of the ACO model or the slowly spreading PCMH model.<sup>20,21</sup>

## Conclusions

This study provides the first detailed national scope of the practice information concerning the work of ATs. The sample of ambulatory care practices that were captured in this pilot study serviced patients who were slightly younger, male, and privately insured compared to all ambulatory care practices in the US. ATs have the skills, however, that may be valuable for treating an older population, especially those on Medicare who may have mobility-related health problems. The current practices that employ ATs, and the patient population seen in those practices, may be reflective of the current reimbursement structure. ATs currently are not billable providers under Medicare. Until reform is made to allow ATs as a recognized provider under Medicare, the use of ATs in the treatment process for the elderly may be limited.

The results of this study are consistent with the previous literature that physicians have a positive perception of the value of ATs to the practice. The positive perception is even further emphasized as practices in this study expect to at least maintain their level of ATs if not hire more ATs in the future. Another sign that ambulatory care practices receive positive value from ATs is the commitment of dollars to their training and education. While orthopedists and other sports medicine specialists have an understanding of the AT's education and skills, other mainstream health care providers may not know or understand the role an AT can play on the health care team. If ATs are to be primary contributors in the traditional health care world, it is necessary to educate other medical professionals about the capabilities of ATs. This understanding could benefit the physician, the other health care team members, and, most importantly, the patient.

This study supports prior evidence that ATs increase throughput of patients. The study findings find that patients wait fewer days for an appointment when seen in ambulatory care practices with ATs compared to patients nationally. The wait time upon arrival to a facility was also generally lower for patients seen in ambulatory care practices with ATs compared to the national average. Having more ATs on staff, however, did not translate to any significant economies of scale in the throughput. Given the sensitive nature of financial information, this study was not able to specifically address cost savings or revenue generation from hiring ATs. One can only infer that these improvements in throughput translate to more revenue.

As the Affordable Care Act increases access to care for previously uninsured patients and places emphasis on the use of primary care, this increase in demand puts pressure on practices to see more patients. With reports of primary care provider shortages, the health care system needs to find creative ways to use the health

workforce to manage the increase in patient load.<sup>22,23</sup> Our study suggests that the use of ATs may help alleviate the pressure to see more patients in ambulatory care settings. Also, given that ATs may be contributing to revenue generation for a practice while also being a lower cost provider to employ relative to other non-physician clinicians, ATs may contribute to cost savings in a practice.

The survey has two important limitations to acknowledge. First, the universe remains unclear and the sample size was small. The NATA does not track the specific setting in which an AT works. According to the 2013 Occupational Employment Statistics from the US Bureau of Labor Statistics, 9,310 athletic trainers worked in the health care sector, of which one-third were in general medical and surgical hospitals, one-third were in offices of physical, occupational, and speech therapists, and audiologists, and the remaining were in offices of physicians (20%), outpatient care centers (5%), chiropractor offices (1%), and other miscellaneous health care settings.<sup>2</sup> The Bureau of Labor Statistics does not distinguish the type of care provided in these settings or how many ATs may be employed in a setting, so the true size of the target population is not clear. Better tracking of ATs and their work settings is necessary for improved sampling.

Second, the respondents were based on a convenience sample, so the results cannot be generalized. A randomized trial was not possible since this study cannot control which settings hire ATs or where ATs choose their employment. A future study could include a comparison group of randomly identified practices that do not employ ATs, ideally with similar characteristics as the practices that employ ATs. Third, the survey had a high number of missing answers, especially on sensitive questions such as financial questions. An alternative to collecting financial data is to merge the survey responses with another source with detailed practice information such as Medicare claims files.

This study adds to that growing body of literature by providing detail on the work environment of ATs and the perceptions concerning hiring ATs. ATs may help ambulatory care practice meet the "triple aim." ATs could be used to increase access to care by improving the throughput in a practice at a low cost while maintaining, if not improving, the quality of care for patients. In conclusion, our findings suggest that ATs add value in ambulatory care settings.

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