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DATA AND SURVEY REPORT

ACCF/AHA/HFSA 2011 Survey Results: Current Staffing Profile of Heart Failure Programs, Including Programs That Perform Heart Transplant and Mechanical Circulatory Support Device Implantation

A Report of the ACCF Heart Failure and Transplant Committee, AHA Heart Failure and Transplantation Committee, and Heart Failure Society of America

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Abstract

Objectives

There have been no published recommendations about staffing needs for a heart failure (HF) clinic or an office setting focused on heart transplant. The goal of this survey was to understand the current staffing environment of HF, transplant, and mechanical circulatory support device (MCSD) programs in the United States and abroad. This

The findings and conclusions in this report are those of the writing committee and do not necessarily reflect the official position of the American College of Cardiology Foundation, the American Heart Association, and the Heart Failure Society of America.

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report identifies current staffing patterns but does not endorse a particular staffing model.

Methods

An online survey, jointly sponsored by the American College of Cardiology Foundation (ACCF), American Heart Association (AHA), and the Heart Failure Society of America (HFSA), was sent to the members of all 3 organizations who had identified themselves as interested in HF, heart transplant, or both, between March 12, 2009, and May 12, 2009.

Results

The overall response rate to the 1,823 e-mail surveys was 23%. There were 257 unique practices in the United States (81% of total sites) and 58 international sites (19%); approximately 30% of centers were in a cardiovascular group practice and 30% in a medical school hospital setting. The large majority of practices delivered HF care in both an inpatient and outpatient environment, and slightly more centers were implanting MCSDs (47%) than performing cardiac transplantation (39%). Most practices (43%) were small, with <4 staff members, or small- to medium-sized (34%), with 4 to 10 staff members, with only 23% being medium (11–20 staff) or large programs (>20 staff). On average, a U.S. HF practice cared for 1,641 outpatients annually. An average HF program with transplant performed 10 transplants. Although larger programs were able to perform more transplants and see more outpatient HF visits, their clinician staffing volume tended to double for approximately every 500 to 700 additional HF visits annually. The average staffing utilization was 2.65 physician full-time equivalents (FTEs), 2.21 nonphysician practitioner (nurse practitioner or physician assistant) FTEs, and 2.61 nurse coordinator FTEs annually.

Conclusions

The HF patient population is growing in number in the United States and internationally, and the clinicians who provide the highly skilled and time-consuming care to this population are under intense scrutiny as a result of focused quality improvement initiatives and reduced financial resources. Staffing guidelines should be developed to ensure that an adequate number of qualified professionals are hired for a given practice volume. These survey results are an initial step in developing such standards.

1. Introduction

One in 8 deaths in the United States has HF listed on the death certificate. The 2010 statistics from the AHA list HF as one of the leading causes of hospitalization and death in the United States and throughout Europe. Moreover, the estimated direct and indirect cost of HF in the United States for 2010 was $39.2 billion (1). To deliver more specialized care to this patient population with unacceptably high morbidity and mortality rates, the healthcare community has responded by developing HF programs in both the inpatient and outpatient setting (2). Practice guidelines have been developed so that more standardized, evidence-based care is available to all patients (3,4). In addition, third-party payers and governmental agencies are increasingly monitoring the quality and outcomes of care, the number of hospital readmissions for HF, and the process of care in HF, transplant, and MCSD programs (5–8). More recently, standards have been published describing the necessary components to achieve training and clinical competence in the care of these patients (9). Mandatory governmental review of U.S. transplant and MCSD programs has been in place for years. Finally, the HFSA has published a consensus statement that identifies the components of an outpatient HF clinic most likely to contribute to the consistent application of the guidelines and optimal patient care (10).

Despite the above-described efforts, individual programs often struggle to find and retain qualified personnel willing to make a full-time commitment to the delivery of care to this complicated patient population. Complex decision making and clinical acumen are necessary to manage an advanced HF patient, and still more specialized knowledge is required to care for the patient following heart transplantation or implantation of an MCSD (11–15). However, there have been no published recommendations about staffing needs for an HF clinic or an office setting focused on heart transplantation or MCSD placement. Therefore, our goal with this survey was to understand the current staffing environment of HF, transplant, and MCSD programs in both the United States and abroad.

2. Methods

This 50-item survey was a jointly sponsored effort of the ACCF, AHA, and HFSA. An online survey request (Survey Instrument available online with this article), signed by the president of each organization, was sent to the members of these organizations who had identified themselves as interested in HF, heart transplant, or both. The survey was live from March 12, 2009, to May 12, 2009, for ACC and HFSA members and from March 16, 2009, to May 12, 2009, for AHA members. It was possible for an individual to receive duplicate e-mails about the survey if he or she belonged to more than one of the organizations.

A reminder was sent to ACC and HFSA members on March 19, 2009, and again on April 14, 2009. AHA members received additional reminders on March 23, 2009, and April 14, 2009. Unique identifiers of each program were ascertained, so that duplicate information was not collected. If >1 staff member responded to the survey from an individual site, the responses were averaged for that site.

When the results of the survey were analyzed, we thought it would be useful to characterize the practices into different-sized staffing groups. Thus, all data were grouped

Table 1. U.S. Average Program Volume

	Total	Small Program (<4 staff) n=107	Small-Medium Program (4–10 staff) n=86	Medium Program (11–20 staff) n=45	Large Program (>20 staff) n=14
Destination MCSDs implanted per year	4.59	0.32	4.88	10.07	9.26
Heart transplants in 2007	10.31	1.17	8.94	18.42	41.75
Heart transplants in 2006	10.20	0.92	8.35	18.34	43.85
Heart transplants in 2005	9.85	1.06	8.20	17.95	40.18

Note: Data are grouped according to the number of clinical staff (i.e., physicians, nurses, and other professional staff). Staff size does not include nonclinical administrative assistants, secretaries, laboratory technicians, or information specialists.
MCSDs indicates mechanical circulatory support devices.

according to the number of clinical staff, that is, physicians, nurses, and other professional staff. Staff size does not include nonclinical administrative assistants, secretaries, laboratory technicians, or information specialists, however much these staff members may be useful to individual programs.

A writing group consisting of representatives from ACCF, AHA, and HFSA was formed to analyze and report survey results. Disclosure information showing authors' relevant relationships with industry to this document is included in Appendix 1. Appendix 2 lists peer reviewers for this document, their affiliation in the review process, and relationships with industry relevant to this topic.

3. Results

The overall response rate to the 1,823 e-mail invitations to participate in the survey was 23%. From the ACCF members, 125 (28%) respondents replied to a total of 450 invitations; the HFSA had 200 (32%) respondents of 616 survey invitations, and the AHA had 90 (12%) respondents to 757 requests. After adjudication of duplicate site responses, there were 257 unique practices in the United States (81% of total sites) and 58 international sites (19%) from which the results were derived. As one measure of the overall validity of our results, we calculated that 2,210 heart transplants were performed in the United States in 2007 and 2,192 transplants in 2006. Assuming the accuracy of the centers' self-reporting of their annual transplant numbers, these survey results represent approximately 88% to 90% of the programs performing transplants in the United States (see Table 1).

Although 19% of respondents were from centers outside the United States, in general, these sites were smaller and had a more narrow diversity of professional roles within their centers; advanced practice nurses, social workers, and pharmacists were less likely to be employed. Most of these centers felt compelled to make an observation about their smaller staff sizes compared with their perceptions of U.S. programs. Our international respondents included Japan, Canada, Spain, the Netherlands, Indonesia, Greece, Australia, and China to name just a few. However, there were no major differences when the international centers' data were combined with the U.S. data compared with the U.S. data alone. We did not make statistical comparisons of the international centers' responses against the U.S. results.

Interestingly, 67% of the respondents identified themselves as physicians, 20% as nurse practitioners, and 3% as nurses or nurse specialists. Nurses or clinical nurse specialists each accounted for 3% of the overall response, whereas pharmacologists, physician assistants, and practice administrators each represented 1% of respondents. The remaining 4% of respondents classified themselves as "other." Irrespective of the professional role of the clinician who completed the survey, there were an overwhelming number of additional comments on the majority of the completed responses. The survey appeared to elicit impassioned descriptions about the complicated nature of most of the patients treated in these settings, and many voiced a need for "more help"; many comments included a paraphrase of "We are grossly understaffed!" Budgetary constraints on expansion of services were likewise a major recurring theme in the comments section.

4. Types of Practice Settings

Table 2 depicts a general description of the types of practice settings. Cardiovascular group practices or a medical school–affiliated practice were the most common settings, each representing about a third of centers. The remainder of respondents practiced in hospitals or other practice settings. Each center chose from a variety of possible answers to the question: "Does your practice have any or do any of the following?" Most centers had both an inpatient and outpatient HF service, and almost half were implanting MCSDs. Approximately 40% of centers had a heart transplant program. The survey also asked centers to choose the single best answer to: "When patients with HF are hospitalized for acute decompensation, who takes care of them at your primary hospital?" A quarter of the centers had HF cardiologists following these types of patients in hospital, and another 40% had general cardiologists performing this duty.

5. Practice Clinical Volume

For most of the analyses, centers were divided into small practices, with a staff size of <4 clinicians, small to medium

Table 2. U.S. and International Practice Descriptors

Descriptor	%
Primary Practice Setting	
Cardiovascular group	28
Government hospital	14
Non-government hospital	18
HMO group/staff model	2
Medical school	31
Solo practice	1
Other	6
Services Performed by Practice	
Outpatient HF program	88
Inpatient HF service	72
Implant MCSDs	47
Perform permanent MCSDs (i.e., destination VADs)	29
Heart transplant program	39
Relate to a heart transplant program and follow transplant patients	41
Physician Type Caring for Acute HF Patients	
Hospitalist	11
Cardiologist	40
HF cardiologist	24
Primary care or other physician type	4
Varies by floor/unit to which patient is admitted	15
Varies by admitting diagnosis	5
Practice Size by Clinical Staff	
Small (<4)	43
Small-medium (4–10)	34
Medium (11–20)	18
Large (>20)	6

HF indicates heart failure; HMO, health maintenance organization; MCSDs, mechanical circulatory support devices; and VADs, ventricular assist devices.

practices, with a staff of 4 to 10 members, medium practices, with 11 to 20 clinicians, and large centers, with >20 clinicians (Table 2). The majority of practices were small, and only 8% of practices were classified as large. Table 1 shows an analysis of procedures performed according to

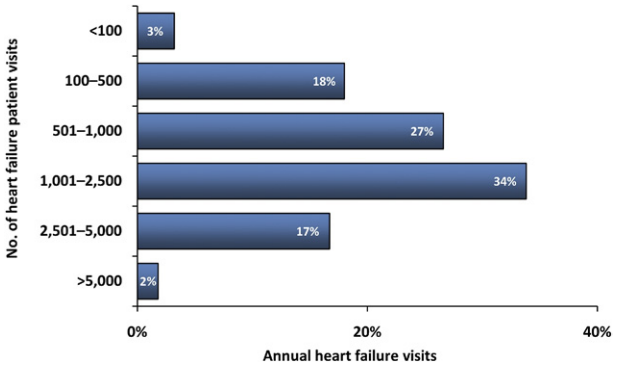

Figure 1. Distribution of Centers According to the Number of Heart Failure Visits

center staff size, indicating that, on average, U.S. HF practices perform approximately 10 transplants on an annual basis. It is not surprising that larger programs (with >20 staff) perform significantly more transplants. Nevertheless, the higher number of small-medium and medium programs, as defined by staff size, leads to a higher number of transplants, as shown in Table 3.

Although the data regarding destination MCSD should be viewed as preliminary because of the developing nature of this part of the field, it is interesting to note that the relationship between practice size and number of visits by patients undergoing destination therapy with MCSD does not appear to be parallel. Specifically, the average number of MCSD destination patient visits per year is similar between medium and large programs (Table 1).

In addition to the care of patients who have undergone the above surgical procedures, U.S. HF practices reported an average of 1,641 outpatient HF visits per year for a total of 366,117 overall visits, as shown in Figure 1 and Table 3. This average number falls slightly when the international site data are combined with the U.S. center data; the average

Table 3. U.S. Program Volume: Number of Cases

	Total	Small Program (<4 staff) n=107	Small-Medium Program (4–10 staff) n=86	Medium Program (11–20 staff) n=45	Large Program (>20 staff) n=14
HF visits per year	366,117	107,926	121,290	99,425	37,476
% of total		29%	33%	27%	10%
Average HF visits per year per program	1,641	1,008	1,410	2,209	2,676
Destination MCSDs implanted per year	868	23	302	423	120
% of total		2%	35%	49%	14%
Heart transplants in 2007	1,991	84	590	774	543
% of total		4%	30%	39%	27%
Heart transplants in 2006	1,938	65	551	752	570
% of total		3%	28%	39%	29%
Heart transplants in 2005	1,832	75	517	718	522
% of total		4%	28%	39%	28%
MCSDs/HF visits per year	1:422	1:4,692	1:402	1:235	1:312
Heart transplants/HF visits in 2007	1:184	1:1,285	1:205	1:128	1:69

HF indicates heart failure; and MCSDs, mechanical circulatory support devices.

Table 4. Average U.S. Staffing by Practice Clinician Role

	Total	Heart Failure Program	Transplant Program
MD/DO FTEs	2.65	1.84	1.40
NP/PA FTEs	2.21	1.68	1.03
RN coordinator FTEs	2.61	1.93	1.32

DO indicates doctor of osteopathy; FTEs, full-time equivalents; MD, medical doctor; NP, nurse practitioner; PA, physician assistant; and RN, registered nurse.

number of HF outpatient visits is 1,544 per center annually worldwide.

Table 3 depicts the number of HF visits as a ratio to a single heart transplant or MCSD performed for each practice size. Although larger programs perform more transplants than programs with less staff, the higher number of small-medium and medium programs (as defined by staff size) leads to a higher volume of transplant cases. Again, we see that irrespective of the size of the practice, many HF patients visit the clinics in relationship to the implantation of a single MCSD. In contrast, larger programs appear to see fewer HF visits per transplant performed, suggesting that perhaps larger programs are seeing a more focused patient population.

6. Staff Description

Table 4 shows the overall number and role of the clinicians in U.S. HF and transplant programs. In general, the average number of FTEs for MDs (2.65), nonphysician practitioners (2.21), and nurse coordinators (2.61) were similar, reflecting similar ratios of overall providers. Thus, U.S. centers appeared to hire a core team of physicians, nonphysician practitioners, and nurse coordinators almost in parallel numbers. Adding the data from the international sites changes the averages slightly, so that the overall staffing was 2.54 physician FTEs, 2.49 nonphysician practitioner FTEs, and 2.20 nurse coordinator FTEs. A greater percentage of practice FTEs are allocated to HF, with fewer positions allocated to transplant. Many respondents commented that it was often difficult to ascribe the physician role to either HF or transplant work, but the remaining nonphysician clinicians in most centers tended to focus on either HF or transplant. Likewise, many physicians are increasingly being trained to care for MCSDs in addition to transplant, and our survey may not have accurately captured the number of physicians who are performing both tasks.

To illustrate the variety of providers utilized in the HF and transplant programs in the United States, Table 5 shows the types of professionals in programs grouped according to practice size, as in previous tables. The average number of outpatient HF visits is shown on the first line as 1 measure of activity for the staff. A very rough approximation suggests that as 500 to 700 more HF patients are added to the annual visit schedule, there is a doubling of physician, nonphysician practitioner, and nurse coordinator FTEs in the United States. Furthermore, large programs had twice as many social workers as small programs. Interestingly, the addition of the international sites did not change this overall trend. In contrast, the number of FTEs for ancillary support such as financial consultants, nutritionists, and psychologists did not increase appreciably as the program's volume grew. Thus, large programs, defined by staffing size, perform more transplants and see more HF outpatient visits but require twice as many physicians, nonphysician practitioners, and nurses as medium- and small-sized programs. Nevertheless, as depicted in Table 6, there is a relatively static percentage of healthcare professionals across all practice sizes. Programs grow by the addition of all 3 professionals: a physician, a nonphysician practitioner, and a nurse.

The survey included a specific question about the staffing needs for an MCSD program: "Does your MCSD program involve additional personnel other than what you recorded?" Half of the U.S. programs, as well as half of the international centers, answered affirmatively, reporting a mean of 3.26 additional FTE staff required for centers with MCSD capabilities.

Table 5. Average U.S. Staffing by Practice Staff Size

	Total	Small Program (<4 staff) n=107	Small-Medium Program (4–10 staff) n=86	Medium Program (11–20 staff) n=45	Large Program (>20 staff) n=14
Patient office visits	1,641	1,186.31	1,555.46	2,425.53	3,123.67
MD/DO FTEs	2.65	0.82	2.26	5.41	10.13
NP/PA FTEs	2.21	0.81	2.09	3.78	8.55
RN coordinator FTEs	2.61	0.60	2.17	5.39	11.79
Financial consultant	0.47	0.01	0.47	0.78	1.14
Social worker	0.75	0.17	0.75	1.03	1.81
Exercise physiologist	0.37	0.20	0.44	0.42	0.67
Nutritionist	0.55	0.28	0.63	0.71	0.89
Psychologist	0.45	0.18	0.48	0.67	0.70
Pharmacologist	0.59	0.31	0.74	0.70	0.75

DO indicates doctor of osteopathy; FTE, full-time equivalent; MD, medical doctor; NP, nurse practitioner; PA, physician assistant; and RN, registered nurse.

Table 6. Average U.S. Staffing by Practice Size: Role Composition

	Total (%)	Small Program (<4 staff) n=107 (%)	Small-Medium Program (4–10 staff) n=86 (%)	Medium Program (11–20 staff) n=45 (%)	Large Program (>20 staff) n=14 (%)
MD/DO FTEs	28.0	29.6	25.5	29.4	28.4
NP/PA FTEs	23.3	29.2	23.6	20.6	24.0
RN coordinator FTEs	27.6	21.4	24.4	29.3	33.0
Financial consultant	3.1	0.2	3.6	3.9	2.7
Social worker	5.2	2.8	6.1	5.4	5.1
Exercise physiologist	2.2	3.2	2.9	1.8	1.3
Nutritionist	3.8	5.1	4.9	3.3	2.1
Psychologist	2.7	2.8	3.2	3.0	1.5
Pharmacologist	4.1	5.6	5.8	3.3	1.8
Total no. of staff	2,386	298	762	826	500

DO indicates doctor of osteopathy; FTE, full-time equivalent; MD, medical doctor; NP, nurse practitioner; PA, physician assistant; and RN, registered nurse.

7. Practice Staff Activities

The survey also explored the daily responsibilities of the staff with respect to remote monitoring of HF patients, as shown in Figure 2. The majority of practices conduct telephone (82%) or internal cardiac device (75%) monitoring. Fewer practices monitor electronic home systems, weight, blood pressure, hemodynamics, or real-time assessment. A large majority of centers have the capability to perform more than telephone triage with patients, which is done in >80% of all centers in the United States and internationally. Most centers are downloading information from implanted cardiac devices such as defibrillators or biventricular pacemakers. At least half of all responding centers are using an electronic home monitoring system that reports data through a telephone or an Internet connection. Figure 3 depicts the frequency of these activities in U.S. centers.

A full 84% of practices have staff available for monitoring anticoagulation parameters (e.g., international normalized ratio) and non-device data. Nonphysician practitioners such as nurse practitioners or clinical nurse specialists are more likely to perform this duty. More than half (58%) of the nonphysician practitioners who monitor this type of data follow written algorithms to make treatment decisions; these percentages did not change substantially when adding the international center data.

8. Discussion

8.1. General Observations

Acknowledging the increased focus on optimal care of HF patients in both the inpatient and outpatient arenas, this staffing survey sought to investigate the number and roles of

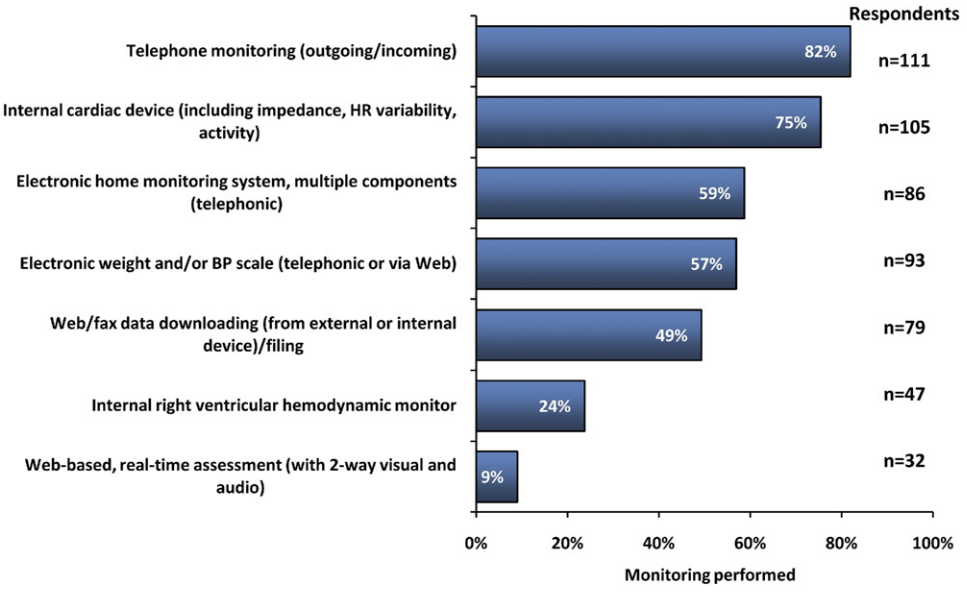

Figure 2. U.S. Site-Monitoring Activities

BP indicates blood pressure; and HR, heart rate.

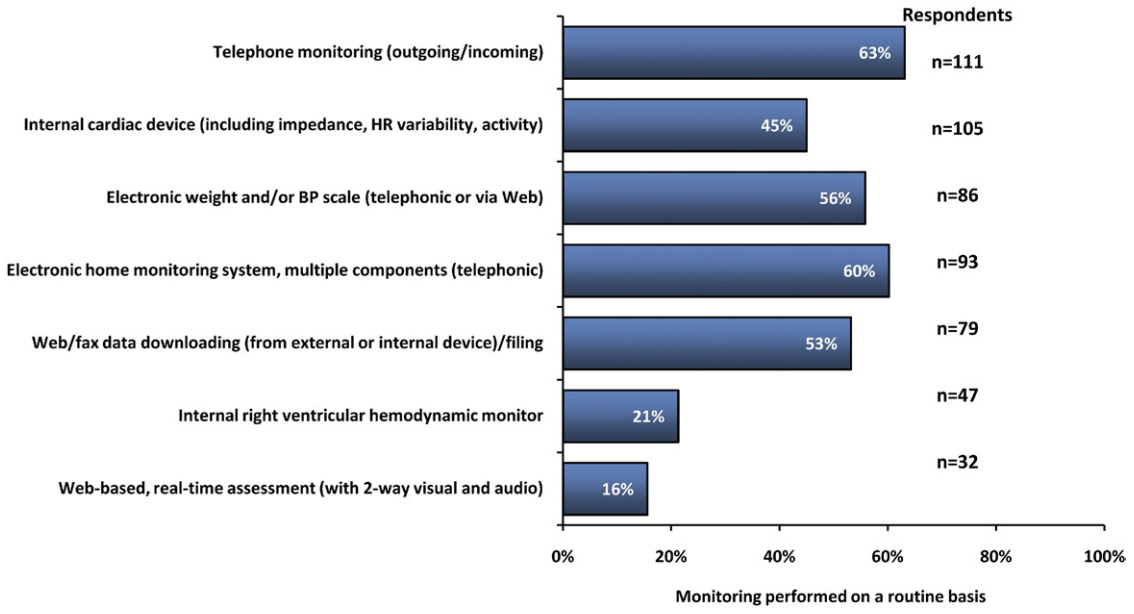

Figure 3. U.S. Site-Monitoring Activities Frequency

BP indicates blood pressure; and HR, heart rate.

staff in HF, transplant, and MCSD programs. From a total of 257 unique practices in the United States, and 58 additional international centers, several insights about staff requirements can be summarized. The majority (77%) of HF centers is small or small-to-medium practices with <10 total clinical staff members; most of these practices are within a medical school hospital environment or in a cardiovascular group setting. More of these sites are performing MCSDs than they are participating in cardiac transplantation, an observation that has not previously been appreciated.

The average number of outpatient HF visits per U.S. heart failure practice is 1,641 patients annually. In addition, the average practice performs approximately 10 heart transplants/year and between 4 and 5 MCSDs implanted as destination therapy. These averages do not change appreciably when adding the international data to the American results. Larger programs perform substantially more heart transplants on average compared with medium programs, but the average number of patients referred for MCSD destination therapy is essentially equivalent. From our data, it is not possible to know whether surgical procedures increase first with a subsequent growth of clinical staff in the larger programs, or that larger programs have the capacity to undertake the care of more patients following transplantation or MCSD implantation. The current staffing profile of the HF program averaged 2.65 physician FTEs, 2.21 nonphysician practitioner FTEs, and 2.61 nurse or nurse coordinator FTEs annually. Half of the programs reported an additional 3.25 FTE staff were needed for their MCSD programs beyond HF and transplant activity. As program volume increases, there appears to be a relatively fixed ratio of staffing roles, so that physicians, nonphysician practitioners, and nurses are hired in equivalent numbers to account for the increased patient activity. A wide range of practice activities beyond telephone triage is done within most centers to follow HF patients, with variability in the frequency of each type of monitoring capability between practices. Treatment decisions are guided by written algorithms in more than half of practices.

This staffing survey provides an interesting snapshot of the professionals who are delivering care to our HF patients and the environment in which they practice. The intensity of care required by this patient group is underscored by the fact that at least 6 to 7 clinicians are needed, on average, to deliver care to 1,641 outpatients with HF, which is roughly 140 patients per month, and <1 new heart transplant recipient per month. Clearly, all innovations in monitoring HF patients will need to carefully assess whether staff time can be utilized more efficiently, or whether monitoring can be completed independent of personnel interface or done with personnel other than nurses or nonphysician practitioners. Moreover, with an increased focus on physician productivity and shorter duration of overall office visits, the subsequent impact on the number of ancillary professional personnel to deliver optimal care must be carefully tracked. From our survey data, it appears that larger volume necessitates both an increased utilization of nurses, as well as an increased number of all clinicians.

Although only half of the respondents indicated that additional staffing was required for their MCSD programs, the average number of FTEs, 3.25, for the MCSD personnel is high. Reimbursement models for destination therapy MCSD will need to account for these supplementary professionals, placing hospital resources under further strain. Indeed, we believe this survey only begins to explore

the full implications of the number of staff needed to deliver quality care, with all potential options for care (e.g., transplant, MCSDs, and device monitoring) in a timely manner to all patients. Moving forward, we hope that individual centers will analyze in depth their practice requirements for staff as the types of procedures performed varies, practice volume changes, or reimbursement models evolve.

8.2. Limitations

These survey results are limited by our inability to ascertain the validity or the completeness of the data reported. Practices of large- or small-sized staff may have neglected to answer the survey; we estimate that about 10% of data from U.S. transplant centers is missing. Respondents may have exaggerated their actual staff numbers, their transplant numbers, or other practice activity. Nevertheless, the respondents indicated a particular enthusiasm for completing the survey. Almost all supplied additional remarks and comments where none were required. We believed that we had unearthed a topic of particular importance to the professionals who completed the survey, two thirds of whom were physicians.

9. Conclusions

This joint survey by the ACCF, AHA, and HFSA was undertaken to determine the current staffing utilization of HF and transplant programs in the United States and in international respondents. The majority of HF centers has small- or small-to-medium–sized staff working within a cardiovascular group practice or at a medical school hospital setting. The average practice receives 1,641 outpatient HF visits, and performs 10 transplants annually. For this clinical volume, which encompasses a wide variety of patient monitoring activity, >6 FTEs are currently utilized, including, on average, at least 2 to 3 physicians, 2 nonphysician practitioners, and 2 nurses. Reimbursement models to account for these staffing needs must be developed as healthcare strategies evolve for the HF patient population.

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Key Words: ACCF/AHA/HFSA Survey Report ■ heart failure ■ heart transplant ■ mechanical circulatory support device ■ staffing profile.

APPENDIX 1. AUTHOR RELATIONSHIPS WITH INDUSTRY AND OTHER ENTITIES—ACCF/AHA/HFSA 2011 SURVEY RESULTS: CURRENT STAFFING PROFILE OF HEART FAILURE PROGRAMS, INCLUDING PROGRAMS THAT PERFORM HEART TRANSPLANT AND MECHANICAL CIRCULATORY SUPPORT DEVICE IMPLANTATION

Committee Member	Employer/Title	Consultant	Speakers' Bureau	Ownership/ Partnership/ Principal	Personal Research	Institutional, Organizational, or Other Financial Benefit	Expert Witness
Mariell Jessup *(Chair)*	University of Pennsylvania—Professor of Medicine	• Medtronic	• Boston Scientific	None	None	• Amgen • Celladon	None
Nancy M. Albert	Cleveland Clinic—Director, Nursing Research–Nursing Institute; Kaufman Center for Heart Failure—Clinical Nurse Specialist	• Impedance Cardiology Systems • Medtronic	None	None	None	None	None
David E. Lanfear	Henry Ford Health System—Senior Staff	• Thoratec	None	None	• Johnson & Johnson* • Sanofi-aventis*	None	None
JoAnn Lindenfeld	University of Colorado—Professor of Medicine	• Boston Scientific* • Medtronic • Merck • Novartis • Pfizer • St. Jude	None	None	• Medtronic* • Somalogic	None	None
Barry M. Massie	San Francisco VAMC, UCSF—Professor of Medicine, UCSF	• Boehringer-Ingleheim • Boston Scientific • Cytokinetics • Gilead • Merck • Nile Therapeutics • NovaCardia • Novartis • St. Jude • Travena	None	None	• Biotronik (DSMB) • Corthera (DSMB) • Takeda* (DSMB)	• Merck-NovaCardia • Novartis*	Defendant, Cox II inhibitor liability, 2009
Mary Norine Walsh	The Care Group LLC—Medical Director Cardiac Transplantation	• ARCA • BioControl • Boston Scientific • Emerge • Medtronic • United Health Care	None	None	None	None	None
Mark J. Zucker	Newark Beth Israel Medical Center	• Circulite • Thoratec	None	None	• Duraheart† • Heartware • Novartis	• ACORN CV† • Expression Diagnostics† • Impulse Dynamics† • Scios†	None

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*Significant relationship. †No financial benefit.

DSMB indicates Data Safety Monitoring Board; and MCSDs, mechanical cardiac support devices.

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APPENDIX 2. PEER REVIEWER RELATIONSHIPS WITH INDUSTRY AND OTHER ENTITIES—ACCF/AHA/HFSA 2011 SURVEY RESULTS: CURRENT STAFFING PROFILE OF HEART FAILURE PROGRAMS, INCLUDING PROGRAMS THAT PERFORM HEART TRANSPLANT AND MECHANICAL CIRCULATORY SUPPORT DEVICE IMPLANTATION

Peer Reviewer	Representation	Consultant	Speakers' Bureau	Ownership/ Partnership/ Principal	Research	Institutional, Organizational, or Other Financial Benefit	Expert Witness
Robert C. Bourge	AHA Reviewer	• Gilead* • Medtronic • United Therapeutics*	None	None	• Actelion* • Bayer* • CardioMEMS* • Gilead* • Medtronic* • Novartis* • Pfizer* • Thoratec* • United Therapeutics*	None	None
Biykem Bozkurt	HFSA Reviewer	None	None	None	None	None	None
Maya E. Guglin	ACCF Reviewer	None	None	None	None	None	None
Eldrin F. Lewis	AHA Reviewer	None	None	None	• Amgen* • NIH* • Novartis* • Robert Wood Johnson Foundation* • Sanofi-aventis*	None	None
Wayne L. Miller	ACCF Reviewer	None	None	None	None	None	None
Sean Patrick Pinney	ACCF Reviewer	None	None	None	None	None	None
Hector O. Ventura	ACCF Reviewer	None	• Actelion • Gilead	None	None	None	None
Mark A. Winchester	HFSA Reviewer	None	None	None	None	None	None

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*Significant relationship.

ACCF indicates American College of Cardiology Foundation; AHA, American Heart Association; HFSA, Heart Failure Society of America; and NIH, National Institutes of Health.