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Contemporary ACHD training and the reality of the field in the United States

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ABSTRACT

Background: Care delivery for the growing population of adults living with congenital heart disease (CHD) has been met with challenges due to a shortage of physicians trained to care for this population. To meet this urgent need, restructuring and standardization of the training programs were implemented in 2015. The consequences of such a system on the graduating fellows have not been examined.
Methods: A 25-question electronic survey was distributed to early career physicians who graduated following training in adult CHD (ACHD) care between 2015 and 2017 and are currently practicing in the United States. The survey results were anonymous.
Results: Of the 30 physicians who trained in ACHD between 2015 and 2017 in the U.S., 21 (70%) responded to the survey. The majority completed a 2-year ACHD program, practice at an adult hospital, are happy with their current job, spend most of their time in ACHD-related activities, make on average around 250,000 USD for entry level positions, and prioritize supportive leadership and colleagues. Their training was adequate for their job requirements. However, the acquisition of an additional skill, in addition to clinical ACHD care, allowed them to secure a more ideal job. A sizeable number of jobs required program building or expansion with only 9.5% of trainees comfortable doing so immediately after graduation.
Conclusions: The new ACHD training curriculum successfully meets most of the needs for ACHD jobs. Integration of specialty tracks, ensuring uniformity in the quality of training between programs, and promoting leadership skills may improve career prospects.

1. Background

The number of adults with congenital heart disease (CHD) has markedly increased over the past few decades as a result of successes in pediatric cardiac care [1,2]. In high-income countries, over 85% of children with CHD now survive into adulthood [3–5]. The number of adults living with CHD has been steadily increasing, and now surpasses the number of children with CHD. There are currently 141 training positions available in pediatric cardiology [6], contrast that to only 19 positions in ACHD [7]. Training cardiologists to care for this burgeoning population became an urgent necessity. In North America, the training standards were promulgated by the Accreditation Council for Graduate Medical Education (ACGME) [8] and were endorsed by the American Board of Internal Medicine (ABIM) [9] in 2015. Trainees may apply for ACHD subspecialty training if they had completed ACGME accredited fellowship in either general adult cardiology or pediatric cardiology. After the implementation of this 2-year curriculum, and as we celebrate the second iteration of the ABIM certification exam for ACHD, it is important to gain insight from early graduates about the efficacy of this new training structure.

2. Methods

2.1. Study population

Thirty physicians graduated from ACHD training programs between 2015 and 2017. Participants were included only if their training and current practice were in the United States.

2.2. Data collection

Using information publicly available on the WorldWide Web, a current and valid email address was identified for each of the selected physicians. A 25-question electronic survey (Appendix File 1) was created using Google Forms and was sent electronically to participants on 11/02/2017. The responses were automatically collected until 11/20/2017. The drafting of the questions intentionally avoided age, gender, date of graduation, and specific location of the participants to protect the anonymity of the survey. After completion, the surveys were automatically collected by the server and logged in a Google spreadsheet with no trace of the IP address, allowing for complete anonymity.

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2.3. Ethics

The study was exempted from review by the Emory University Institutional Review Board.

2.4. Statistical analysis

Data were described as proportion (%) in the univariate analyses. Where bivariate analyses were appropriate the categorical data were analyzed using Fisher's exact test given the limited sample size. All tests were 2-tailed, and P values < 0.05 were considered statistically significant. Data were analyzed using Stata version 11.3 (StataCorp, College Station, TX, USA).

3. Results

3.1. Description of responders

Out of 30 eligible participants 21 (70%) completed the survey. Their residency training consisted mostly of either internal medicine (47.6%) or combined medicine-pediatrics (47.6%). As for background general fellowship training, there was a slight preponderance for adult cardiology over pediatrics (52.3% versus 42.9%). Most responders (71.4%) completed a 2-year curriculum in ACHD training.

3.2. Job expectations and training achievements

The survey showed that the training met the most commonly required job specifications, especially critical ones such as ACHD clinical care and the care of the pregnant ACHD/cardiac patient (Fig. 1). One third of participants did not feel comfortable performing transesophageal echocardiograms (TEEs), and 14% did not feel comfortable interpreting them. Otherwise the participants exceeded the expected requirements from their jobs in almost all modalities.

3.3. Additional skill acquisition and impact on job description

Two thirds of the survey participants were able to acquire an additional skill during their ACHD training, beyond the ones mentioned previously in Fig. 1. The two most common skills were pulmonary hypertension management (23.8%) and advanced cardiac imaging (19%) (Fig. 2A).

Most participants (57.1%) reported a positive impact from having an added skill to finding their ideal job, and 9.5% felt the lack of an additional skill made it harder to find their ideal job. (Fig. 2B).

3.4. ACHD job market

Most participants (71.4%) selected their current job after interviewing at 3–5 places and receiving 2–3 offers (66.7%), and most (75%) reported that their current job was identical or near identical to their ideal job. The majority (57.1%) practice out of a predominantly adult setting. Half of them spend >75% of their time in ACHD-related activities; the percentage rises to 90% with a cutoff of ≥50% of time spent in ACHD-related work (Appendix File 2). When asked to identify the important factors during their job selection, the availability of supportive colleagues and leadership topped the most important factor ranking, whereas the opportunity to engage in bench research was the least important (Fig. 3). Opportunities for personal advancement such as possibility to challenge oneself or leadership opportunities were also highly ranked, and the availability of mentorship ranked as the second most important factor. Salary structure was not highly ranked.

The majority of the participants (61.9%) reported an estimated initial salary offer in the 200,000–250,000 USD bracket with another third making >250,000 USD per year (Fig. 4). All of the latter were among those who acquired an additional skill during their ACHD training. With an approximate point estimate of 250,000 USD/year as an average gross annual income, ACHD physicians appear to make an intermediary income compared to their pediatric and adult (noncongenital) counterparts.

3.5. Program building

According to the survey, at least a quarter to half of the available ACHD jobs required starting a program or taking over from a retiring ACHD physician. However, when asked about how comfortable they were at assuming such a role immediately after training, only 9.4% answered "completely" (9.5%) or "somewhat completely" (33.3%) though none of them chose "not at all". Almost half (52.4%) of the participants reported that leadership training, a crucial skill for practitioners leading programs, was not available at their training program.

4. Discussion

Based on recommendations from the 32nd Bethesda Conference [10], and the 2008 guidelines [11], adults with moderate to complex CHD should be evaluated in a regional ACHD center at least once or twice yearly. The availability of well-trained physicians to care for this complex population is essential. Despite a consistent increase in the number of centers and physicians caring for this population in the

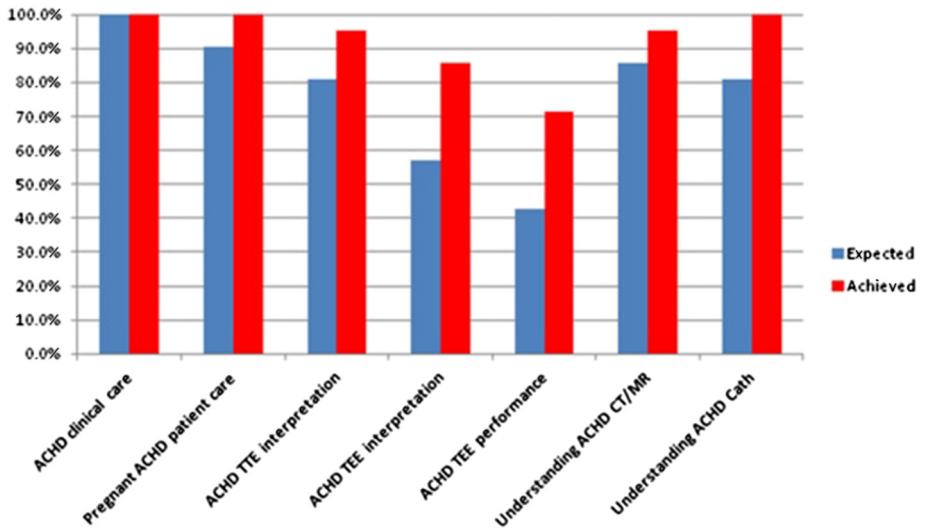

Fig. 1. Job expectations and training achievements.

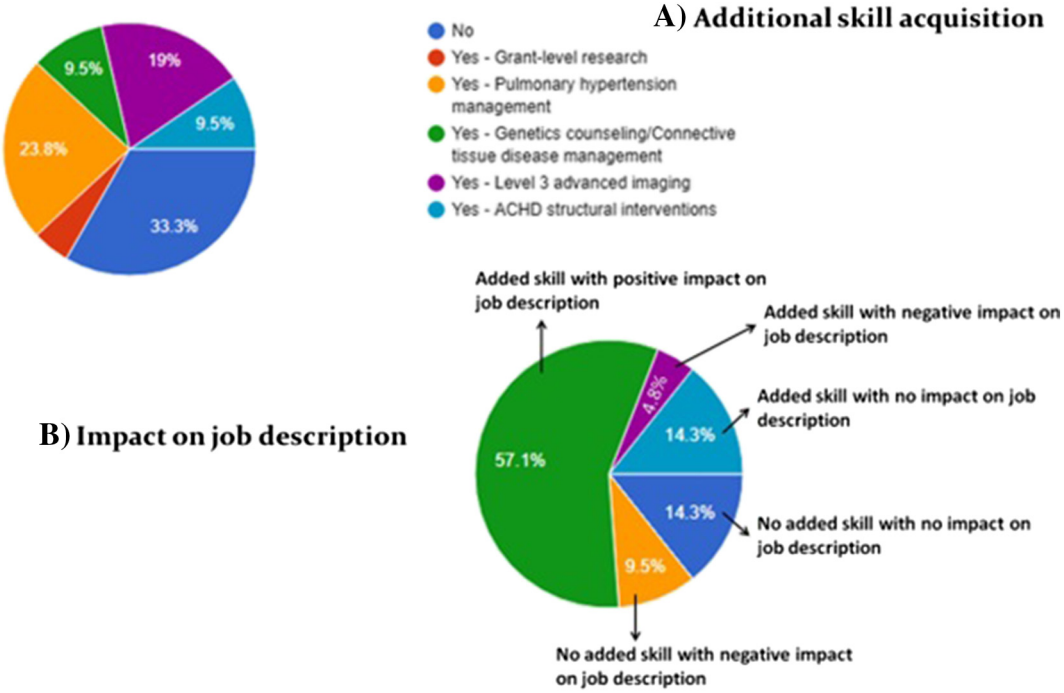

Fig. 2. Additional skill acquisition during ACHD training and impact on job.

developed world [12–14], there still continues to be a significant unmet need [15,16]. This shortage was compounded by the recent restructuring of the ACHD fellowship training from a 1-year to a 2-year track. Despite this significant shift in training structure, there has been no systematic evaluation of its repercussions on trainees as they enter the job market.

The present study captures the perspective of recent graduates on ACHD training and practice, and projects the direction the field will be taking in the near future. Jobs are predominantly at adult institutions, and the market will continue to gravitate to adult centers. Free-standing children hospitals caring for adults with CHD will likely represent a declining care model. Despite the presence of opportunities at already established programs in major academic centers, there are many jobs that require either starting or expanding an existing ACHD program. The survey demonstrates that ACHD trainees like being challenged and assuming leadership positions. Yet <10% feel completely comfortable doing so after graduating. This reflects a lack in preparedness to assume administrative and managerial responsibilities. The solution could be in integrating important skills needed to start or expand a program such as working with leadership, learning the business aspects of

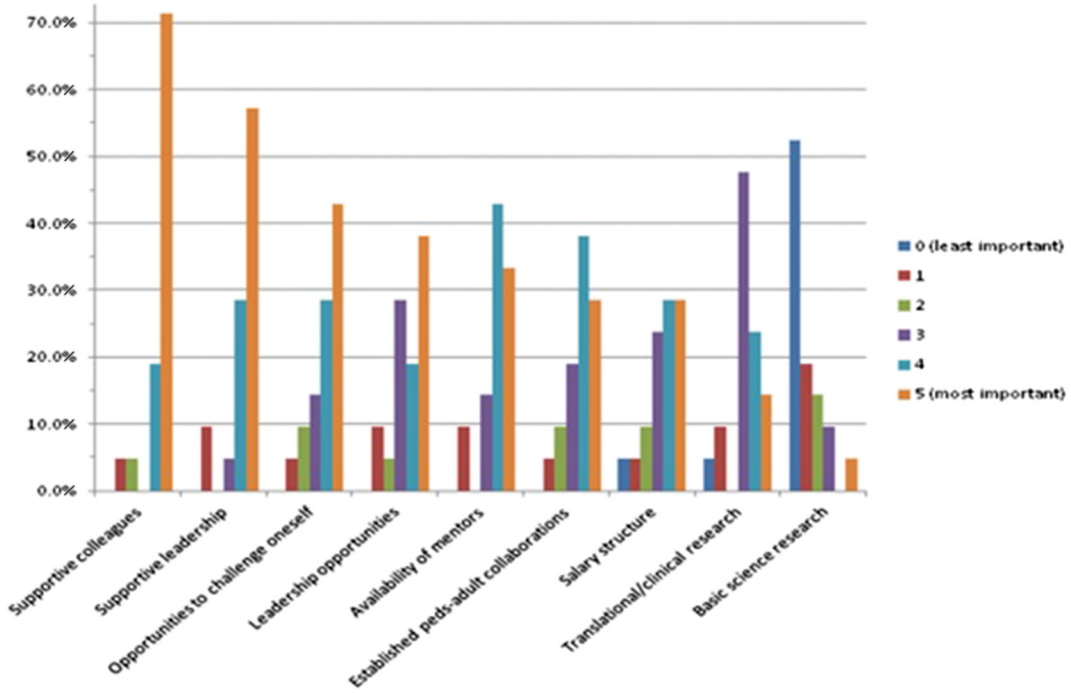

Fig. 3. Important factors in job selection.

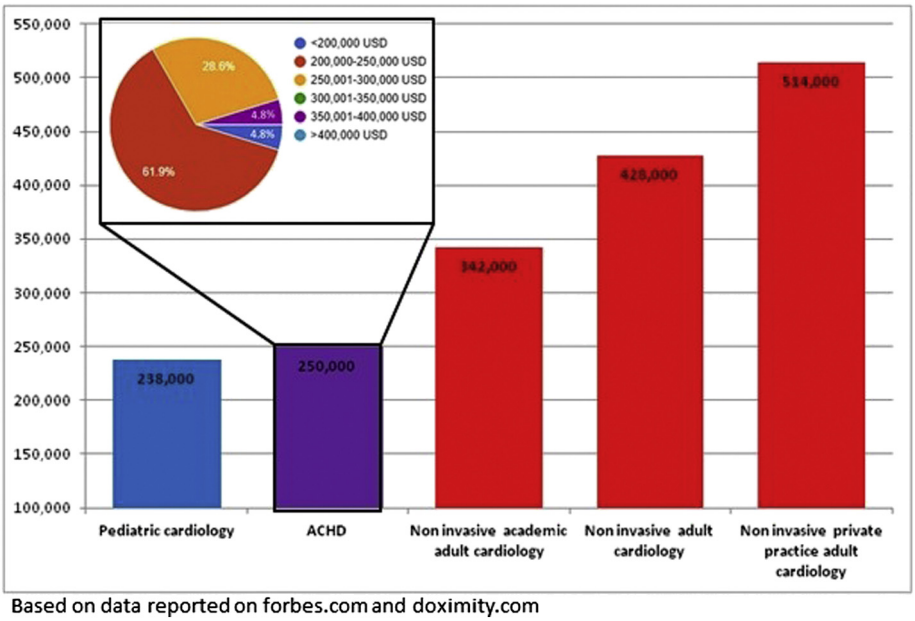

Fig. 4. Estimates of average annual income in the US (USD).

directing a program, and cultivating collaborations into the training curriculum.

Participants were also given the option of submitting comments in a free text format. Common themes emerged in these comments: There is a general perception of being second to the subspecialty fellows even when the procedures are performed on adults with CHD. As one participant clearly stated it, "ACHD fellows must be regarded as part of the general training panel of the institution, not an addition. They should get to be the first assistants for cardiac caths, TEEs, and other procedures". Per the ABIM sample curriculum [17], there is enough time carved out in the core curriculum for mastery of TTE and TEE to be an integral part of the ACHD learning, not an additional skill that requires investing elective time. Another theme is the challenge of having a pediatric-trained fellow at an adult-based program or vice versa. A great deal of heterogeneity in training across different programs of similar backgrounds (i.e. adult or pediatric centers) is another common theme. This has substantial impact on job compatibility in the future for the trainee considering ACHD fellowship. Finally, very few participants were interested in basic or translational research. Such career paths require prolonged years of training in research that may not be appealing in a system where one must spend at least 8 years in training before becoming an ACHD physician. To ensure a future generation of ACHD physician scientists, a training pathway should be developed to accommodate those who are interested in basic and translational science.

The general impression is that the current training structure is broad in scope, but could benefit from fine-tuning. It is only just however to acknowledge its successes: a) all participants felt comfortable independently caring for adults with CHD and for pregnant women with CHD; b) most participants dedicate most of their time to ACHD care; c) 81% of graduates receive 3+ interviews and a third of graduates get 3+ job offers; and d) a third of graduates are at their ideal job setting with three quarters at least close to their ideal job. Having committed to the 2-year model, perhaps the best way forward for ACHD fellowship training would be to emulate the electrophysiology curriculum by allocating a first year for comprehensive and intensive clinical competency and a second one for additional skill acquisition such as advanced imaging, cardiac catheterization, research, heart failure, education, or administration. This would immensely help trainees though it would still fall upon them to pay attention to the nuances and limitations of training at an institution that does not match their training pathway or career plan.

Unmet ACHD workforce needs are present in non-academic community centers as well [18]. Community-based programs may not have the resources to gain a designation of ACHD Comprehensive Care Center (an accreditation granted by the Adult Congenital Heart Association) but could potentially provide adequate care for a majority of patients with simple to moderate defects in collaboration with comprehensive centers. This entails an effort at increasing ACHD education among cardiac care providers [19,20]. Yet another consideration would be for the ABIM or the American Board of Pediatrics (ABP) to allow for an ACHD "focus" as an option during pediatric or adult cardiology fellowship training. Such a suggestion has been described in the literature [21]. It would basically consist of 6 months dedicated for intensive ACHD clinical care that would qualify the trainee to care for the overwhelming majority of simple to moderate CHD while referring the more complex cases to comprehensive care centers. This would undoubtedly disseminate a great degree of ACHD savoir-faire in areas that would not have proper access to it otherwise despite genuine outreach efforts.

The present findings should be examined in the context of the study limitations. The lack of a standardized database of ACHD trainees may have led to having missed potential participants. But the process included sources such as the ACHD clinic directory [22], the American College of Cardiology directory of ACHD training programs [7], and a familiarity with the training patterns of the key institutions. Therefore the authors do not expect a significant number of subjects missed by the screening process. The sample size is relatively limited but one has to account for the relatively small size of the ACHD community, especially for early career physicians. It still represents 70% of the recently graduated workforce which allows for adequate generalizability with regard to contemporary training and job market. Finally, the survey did not capture gender and type of practice (academic versus community). This was intentional in order to allow maximal anonymity of the process.

5. Conclusions

The increasing number of adults with CHD has called for a new paradigm in ACHD clinical care. Most notably has been a migration of this care to adult centers with a need for specialized care givers and leaders who are capable of starting or expanding programs, and preferably with skills above and beyond clinical ACHD care. The newly

founded ACHD accredited training pathway successfully meets the majority of these needs but would gain by addressing the aforementioned limitations into an upcoming version of its current sample curriculum. Additional efforts from the cardiology fellowship training programs, whether adult or pediatric, will be needed to meet the needs in the non-academic community centers.

Supplementary data to this article can be found online at https://doi.org/10.1016/j.ijcard.2018.08.086.

Conflict of interest

The authors have no relevant funding, financial relationships, or conflicts of interest to disclose.

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