

FELLOWS-IN-TRAINING & EARLY CAREER PAGE

# A Hybrid Model for Advanced Structural Heart Disease Training Programs



## The Attending-Fellow-in-Training Model

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Structural heart disease (SHD) fellowship programs in the United States are growing, but they are still not accredited by the Accreditation Council for Graduate Medical Education. This results in a lack of standardized curriculum and complicates funding for a dedicated fellowship, as Medicare and other federal funding agencies only support accredited graduate medical education training programs (1,2). The ideal path to reach proficiency in advanced SHD procedures remains through a formal SHD fellowship (3,4). Proper training in all aspects of this field cannot be adequately incorporated into a single interventional cardiology (IC) fellowship year, demanding a separate year of training. As a result, the number of SHD fellowship programs across the country has grown to support the high demand of well-trained SHD interventionalists (5-7).

However, these programs have struggled to secure funding. Although some SHD programs have been able to fund fellowships through institutional funding, industry training grants (8), or research training grants such as the National Institutes of Health T32 grant (9), these options are not available for all training centers. An additional unaccredited fellowship year, after several years of training, can be onerous. Current SHD fellows are typically in their post-graduate year (PGY) 8 or 9. In contrast, trainees graduating from cardiothoracic surgery training programs are usually at the PGY 7 or 8 level (10). This is a time when many trainees are starting or growing families. Extending their training for an SHD fellowship can therefore be especially challenging

financially and personally. In addition, SHD fellows are usually recent graduates of IC fellowships who are eager to maintain their coronary and peripheral endovascular skills during that extra year of training. As a solution, the authors propose the adoption of a hybrid attending-fellow-in-training (AFIT) training model, allowing SHD fellows to function as part-time IC attendings to fund their training.

### THE HYBRID AFIT MODEL

The AFIT model (Figure 1) offers a viable solution to secure funding when otherwise not available, and is uniquely advantageous in allowing SHD trainees to maintain their interventional skills. The AFIT's clinical time is divided into 2 major categories: SHD fellowship training and IC attending responsibilities. The AFIT model may offer a unique solution to these problems. Given that some training programs may not have the volume to employ a 1.0 full-time equivalent SHD fellow, the remainder of the fellow's time can be assigned to non-SHD tasks that will help fund his or her salary. Even if SHD volume or funding is not an impediment, the maintenance of previously acquired coronary and peripheral endovascular procedural skills is highly desired to prepare AFITs for a successful independent practice after completion of their SHD fellowship (11).

### ADVANCED SHD FELLOWSHIP TRAINING TIME

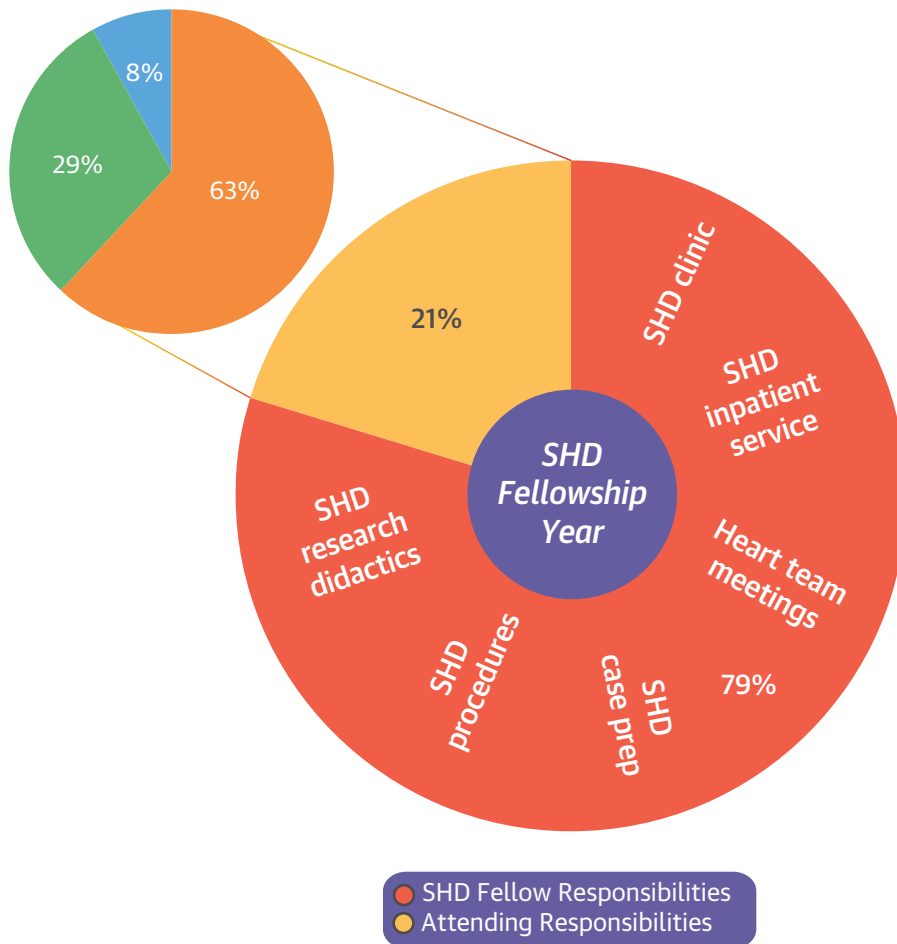
We propose allocating  $\geq 80\%$  of nonvacation time from the academic year to SHD fellowship training. Based on our experience, this time allocation maximizes SHD training time while allowing adequate maintenance of non-SHD skills. We estimate that it is also sufficient time for the AFIT to generate revenues that would support a typical advanced

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**FIGURE 1 The AFIT Training Model for SHD Fellows**

The AFIT training model for structural heart disease fellows:  
 Breakdown of the training year to yield approximately an 80% SHD training : 20% service time ratio

COMPONENTS OF THE AFIT TRAINING MODEL	DAYS	%*
1. Time available for SHD training (365 days - #2 - #3 - #4 - #5)	265	79%
2. Non-SHD catheterization laboratory time: 1 day/week; no "lab" days during "service days"	45	21%
3. Cardiology consultation service or cardiac care unit total "service days" & not in "cath lab"	21	
4. Non-SHD clinic: one half-day per month	6	
5. Vacation: four weeks (not part of fellow or attending role time in our calculation)*	28	-
<b>Total days</b>	<b>365</b>	



Our proposed model allows for structural heart disease (SHD) fellowship funding by having SHD fellows be part of the interventional cardiology service schedule. Each fellow is therefore considered a part-time attending in the department, and the revenues generated from clinical activities can be used to finance the SHD training year. This model also has the important added benefit of allowing trainees to maintain their interventional and general cardiovascular medicine skills (inpatient and outpatient), while learning new SHD skills.

fellow-in-training stipend including benefits. The fellow's role to acquire and master new SHD skills is the most important aspect of the AFIT. Every effort should therefore be made to prioritize SHD procedures and other related learning opportunities.

Although not standardized among existing SHD programs, an overview of typical SHD fellow responsibilities is shown in **Figure 1**. A call for action from professional societies to standardize SHD fellowships has already been advocated (12).

## IC ATTENDING TIME (~20%)

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The attending clinical time should be further divided into 3 categories: IC attending in the catheterization laboratory, service time, and an optional outpatient clinic.

1. *IC attending in the catheterization laboratory.* SHD fellows should maintain their coronary and peripheral endovascular skills during this additional year of training. Physicians starting an SHD fellowship are typically recent graduates from IC fellowship programs with skills that can and should be put into practice. This model requires that the AFIT be licensed and credentialed to independently perform most aspects of coronary and peripheral endovascular procedures, which they have learned during their IC training, in the state and the institution where they are training. The revenues generated from these procedures can be used toward supporting their fellowship. A typical schedule would include on average 1 day/week as an independent operator in the catheterization laboratory, except when on service (see the following text). Care should be taken to avoid scheduling conflicts with SHD procedure days. If such conflicts are unavoidable, then flexibility should be built into the schedule to arrange suitable coverage for the AFIT to be able to participate in the SHD procedures. Partnering with senior colleagues on challenging cases can be a very rewarding professional experience for the SHD fellows in the AFIT model.

- The AFIT should occasionally take interventional/STEMI calls off hours and on weekends. The AFIT should not be integrated into the regular call schedule, but could be encouraged to take 10% to 15% of the annual IC calls to maintain their skills. The absolute number will vary depending on the size of the group practice and volume of percutaneous coronary interventions performed in the specific institution. Also, a senior colleague should be available for “backup” until the new physician is comfortable with the catheterization laboratory equipment and staff.
2. *Clinical service time.* As trained cardiologists, AFITs can generate revenue to fund their fellowship by rounding on the consultative cardiology service or in the cardiac intensive care unit. Based on our experience, a total service time of 3 weeks per academic year, in addition to the catheterization laboratory responsibilities, could be sufficient.
3. *Optional non-SHD outpatient clinic.* Having a limited independent outpatient general/IC clinic

once per month is another option to further fund SHD fellowship for programs with lower catheterization laboratory or service volume. It also allows the AFIT to follow his or her patients post-procedure in the clinic. Moreover, by continuing to practice general cardiology, the AFIT maintains skills necessary for a successful practice after graduation from his or her SHD fellowship.

In the AFIT model, responsibilities such as research, teaching, and administrative tasks do not have protected time and must be integrated into either role of the AFIT.

We propose that the AFIT spends 1 day/week in the catheterization laboratory, as the attending doing non-SHD procedures, except when on service (3 weeks/year). One half-day/month is reserved for non-SHD clinic. After accounting for 4 weeks of vacation, 265 days are left for SHD training. Although it is difficult to predict compensation by work relative value units (wRVUs), as there is regional variation in the relative value units multiplier value, a conservative estimate would be  $\geq 1,500$  annual wRVUs target with a \$50 wRVU multiplier would yield a \$75,000 target stipend.

## ADVANTAGES OF THE AFIT MODEL

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SHD fellows gain independence as attendings in general cardiology and IC, while having protected time to learn SHD interventions. Such independence is fostered gradually in an environment of mentorship with senior colleagues across multiple disciplines, including interventional cardiologists, general cardiologists, heart failure specialists, cardiac imaging specialists, and electrophysiologists.

SHD fellows can serve as mentors to IC fellows in the catheterization laboratory, as well as to general cardiology fellows and residents while rounding on the consultative service, in the cardiac intensive care unit, or in clinic, thus fulfilling a unique educational role. The training program also benefits from having a new junior faculty member. The procedure load in the catheterization laboratory, the service weeks, and the ST-segment elevation myocardial infarction call volume can be alleviated by the involvement of the new physician. The new attending also can bring clinical or technical expertise to the center from his or her training at other institutions.

The AFIT training model prepares fellows well for both academic and private practices, as trainees will have been able to maintain and improve their other cardiovascular medicine skills.

## CONSIDERATIONS FOR IMPLEMENTATION OF THE AFIT MODEL

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Service time requirements should be carefully allocated to allow the AFIT to generate just enough revenue to fund his or her fellowship and maximize time spent learning SHD procedures. The AFIT model time distribution (**Figure 1**) should allow most institutions to reach that goal, while minimizing the time taken away by SHD training. The AFIT's salary should be at least a PGY 8 level, or ideally higher, similar to a chief resident's salary model.

Participation in scholarly activities is mandated in many SHD fellowship programs (13-15). Service obligations should be carefully implemented to leave time for participation in research, journal clubs, quality improvement projects, networking, and local, regional, or national presentations. If feasible for the program, at least one-half-day of protected time per week should be reserved for such pursuits, especially for fellows pursuing in an academic career track.

## LIMITATIONS OF THE AFIT MODEL

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1. Attending responsibilities can potentially interfere with the SHD fellowship training. Despite the programs' best efforts to protect SHD procedural time, trainees are at risk of missing some precious educational opportunities when unavoidable scheduling conflicts arise. It is crucial for programs to be flexible and prioritize the SHD fellow's responsibilities.
2. The addition of service obligations to SHD fellowship, if not carefully planned, can lead to burnout and exhaustion. Therefore, particular attention should be made to the SHD training schedule when integrating attending service. Ultimately, it remains the SHD program director's responsibility to ensure a fair balance between training and clinical duties. Feedback from SHD fellows should be solicited by the program director and an independent institutional oversight organization, such as the office of graduate medical education, on a biannual basis for a corrective course in case the education-to-service ratio needs to be rebalanced.
3. Patients seen in continuity clinics will be unable to establish a long-term relationship with the AFIT due to the nature of the training duration. This can complicate follow-ups and decrease patient satisfaction with the practice.
4. The AFIT model may be inapplicable in some institutions due to their local administrative policies, clinical practice patterns, or procedural case volumes.
5. Physician restrictive covenants (or "noncompete agreements") must be completely avoided in AFIT

contracts to prevent limitations in job search after training. Like graduates of traditional fellowship training programs, SHD fellows must not be restricted from joining local practices once they graduate.

6. In the coming years, SHD training program standardization from cardiology societies is expected. This may or may not secure funding for this training. Regardless, the AFITs should continue to have opportunities to independently perform interventional procedures to maintain and develop their procedural skills.
7. Both authors have recently completed an SHD fellowship where they were the first AFIT in their respective programs. The main challenge for the AFIT is to avoid missing SHD procedures while performing non-SHD cases, while being on the inpatient clinical service or being in non-SHD clinic. Communication with the catheterization laboratory staff and clinical operations leadership was helpful in preventing overlaps in most cases. Flexibility from other IC attendings was extremely helpful as well for coverage, when rare or more-complex SHD procedures were scheduled at the same time as other non-SHD responsibilities.
8. Dedicated studies are necessary to determine if graduates of AFIT model programs garner sufficient SHD skills compared with graduates of traditional non-AFIT model SHD fellowships.

## CONCLUSIONS

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Formally trained SHD interventionalists are needed to join existing SHD programs and train the next generation of experts in this field. However, funding for these programs that are not accredited by the Accreditation Council for Graduate Medical Education currently remains difficult to secure. The AFIT model offers an excellent way to fund this additional year of training and has the added benefit of allowing SHD trainees to maintain and improve their non-SHD endovascular skills. Careful planning, flexibility, and continuous self-assessment are integral to successfully make this training experience a professionally rewarding one for both the trainee and the program.

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## RESPONSE: AFIT Is a Fit, for Now

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Structural heart disease (SHD) training programs generally entail an additional year of training following completion of an Accreditation Council for Graduate Medical Education (ACGME)-accredited interventional cardiology (IC) fellowship, but as highlighted by Hafiz and Poulin, this additional training is outside of the auspices of the ACGME, which creates challenges for trainees and programs alike. Newly minted interventional cardiologists need to continue to develop and refine their procedural skills and experience in the context of a transition to independent practice. External funding for nonaccredited positions is limited, as these positions are not supported via the Centers for Medicare & Medicaid Services (CMS). Hafiz and Poulin propose a hybrid AFIT model to address these challenges. We also have employed this model in our SHD training experience.

The AFIT model is attractive in that it allows for the continued development and maintenance of coronary skills while engaging in SHD training. This enables a transition to independent practice with regard to the procedures and other clinical activities for which the trainee is already qualified, and this transition can occur

within the context of oversight and support from clinical mentors. In allowing for independent practice and attendant billing, the AFIT model also provides a potential mechanism for self-funding.

The disadvantages of the AFIT model are inextricably linked to its duality. Scheduling conflicts are unavoidable. Although SHD procedures are mostly elective and can allow for coordination of scheduling, urgent cases invariably arise and are often important learning opportunities. It can prove difficult to arrange coverage for scheduled case or call coverage on short notice, and many faculty groups are already strained from providing coverage across multiple hospital sites. Non-SHD training-related clinical duties can also consume additional time that detracts from scholarly and research pursuits related to SHD.

Perhaps the most significant disadvantage of the AFIT model lies in the proposed mechanism for self-funding. If SHD training programs become ACGME accredited and receive funding from the CMS, they will be subject to CMS regulations that prohibit trainees from working as independent billing providers for inpatient services within the same facility of the SHD training program (1). This will

preclude the ability of SHD trainees from working as independent ICs within their own institution, hence rendering it difficult for these trainees to maintain their non-SHD interventional skills.

We have experimented with alternative models: 1) the SHD trainee only engages in SHD-related activities within the training institution but is allowed to engage in extramural moonlighting activity to maintain coronary/percutaneous coronary intervention experience; and 2) all IC trainees participate in a 2-year program that combines coronary and SHD training over this duration, with 1 year designated as ACGME accredited and 1 year

nonaccredited at present. This latter model, akin to that proposed by Kalra et al. (2), allows for trainees to maintain and develop coronary/percutaneous coronary intervention skills throughout their interventional training, but funding challenges still apply until both training years are ACGME accredited.

Over the coming years, fundamental questions regarding SHD training will need to be addressed. Ultimately, we must develop a sustainable training model that allows for rigorous SHD training while balancing the maintenance of non-SHD interventional skills. In the meantime, the AFIT may be a fit.

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