



## Society for Cardiovascular Angiography & Interventions Think Tank Proceedings

### Regionalization of Care in Congenital Interventional Cardiology

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Each year at the Society for Cardiovascular Angiography & Interventions (SCAI) Annual Scientific Sessions meeting, collaborative think tanks involving interventional cardiologists, administrative partners, and members of industry are convened for each SCAI clinical practice area to discuss topics of particular interest to the group. This document presents the proceedings of the 2022 Congenital session, which focused on regionalization of care.

Regionalization of cardiac care has been a much-debated topic with regard to surgical outcomes. It has been argued that higher volume centers have better outcomes and that increased volumes in a regional center can reduce mortality. Data from the National Cardiovascular Data Registry (NCDR) IMPROving Pediatric and Adult Congenital Treatments (IMPACT) registry reveal that between 27,000 and 30,000 diagnostic cases are performed nationally each year. The NCDR also reports another ~11,000 interventional cases per year, comprising atrial septal defect closures, coarctation procedures, valvuloplasties, patent ductus arteriosus closures, pulmonary artery procedures, and transcatheter pulmonary valves. There is wide variation among volume in centers, and these cases mentioned are not equally distributed. Much of these data on regionalization originate from outside the United States,<sup>1</sup> and in models based on US data, this beneficial effect is not seen when only high-risk procedures are regionalized. Moreover, the concept of regionalization has not been adequately addressed as it pertains to congenital interventional cardiology. During the SCAI 2022 Scientific Sessions, SCAI member representatives of congenital heart disease and members of industry convened to discuss this important topic for interventional cardiology. This group performed a “strength-weakness-opportunity-threat” analysis of the issue at hand (Table 1 and Figure 1).

#### Strengths in favor of regionalization or centralization of care

Several strengths were identified as it pertains to regionalization of complex congenital cardiology care. The standardization of processes and procedures has proven in other arenas, such as single-ventricle outcomes, to improve survival in high-risk situations. The benefit to centralization of care for high-risk disease may be improved communication with a dedicated and specialized team who are well versed in caring for these patients and with increased volumes leading to overall increased experience. The concentration of experts in a single region may lead to innovation in postoperative care and may reduce overall length of stay. Some studies point to improved surgical mortality rates in certain case types.<sup>2</sup> It is uncertain, however, how surgical mortality directly relates to outcomes in interventional cardiology. Although value is shown in outcomes for salvage and rescue procedures, the quantification of the value is difficult to ascertain. The overall rates of mortality as a marker in congenital interventional cardiology are remarkably low (ranging from 0.08% to 7.2%) and are therefore difficult to find value as an outcome measure.<sup>3,4</sup> Centralization of care may potentially improve revenue if a center can successfully negotiate with the potential payer with proof of improved outcomes and reduced morbidity. In addition to outcomes, centralization of training efforts may improve and standardize education. Currently, congenital interventional cardiology training remains without regulated standardization as there is no standardized curriculum or board certification. However, having fewer centers could ensure more rapid dissemination of device training by industry.

Keywords: centralization of care; think tank; adult congenital heart disease.

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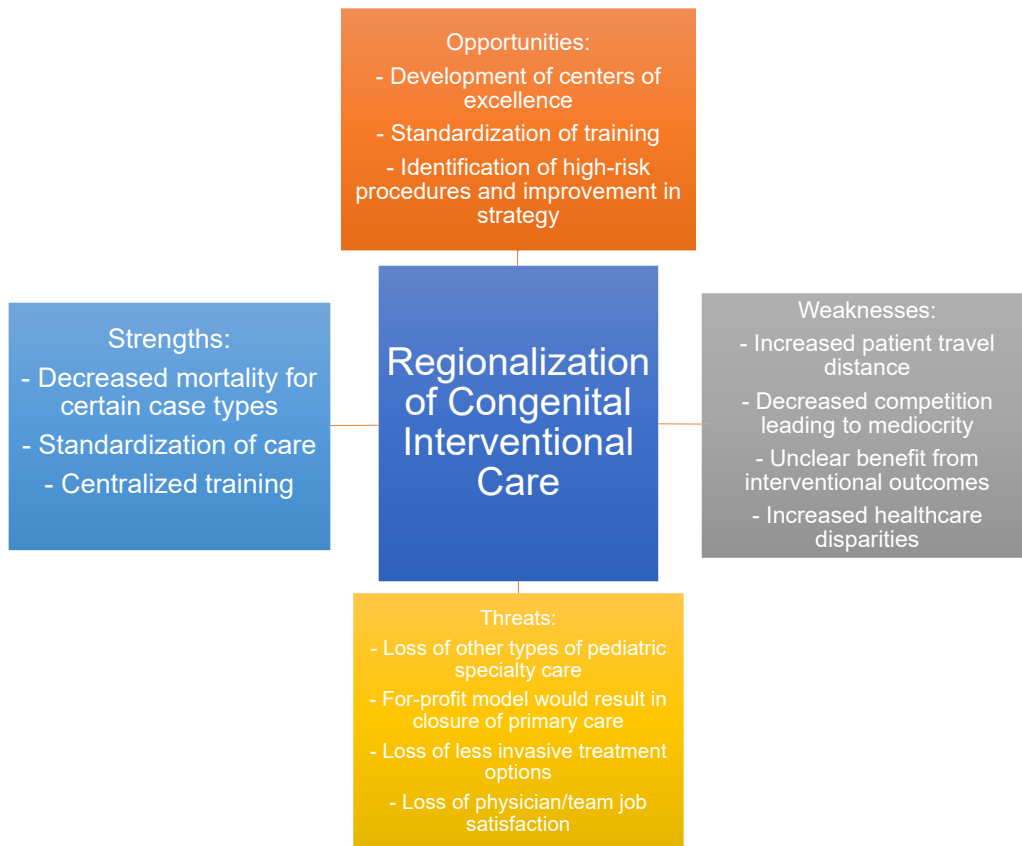
**Table 1.** SWOT Analysis of Regionalization of Care in Congenital Interventional Cardiology

Strengths	Opportunities	Weaknesses	Threats
<ul style="list-style-type: none"> <li>• Decreased mortality for certain disease types</li> <li>• Standardization of care</li> <li>• Centralized training</li> </ul>	<ul style="list-style-type: none"> <li>• Development of centers of excellence</li> <li>• Standardization of training</li> <li>• Identification of high-risk procedures and improvement in strategy</li> </ul>	<ul style="list-style-type: none"> <li>• Increased patient travel distance; increased health care disparities</li> <li>• Experience and outcomes not always correlate to institutional volume because of job movement among interventionalists</li> <li>• Decreased competition leading to status quo and stagnation of research and development</li> <li>• Unclear benefit from interventional outcomes</li> </ul>	<ul style="list-style-type: none"> <li>• Loss of other pediatric subspecialty care outside of centralized centers of excellence</li> <li>• Without financial support of cardiology, primary care may not be able to be supported at a noncentralized center</li> <li>• Loss of training opportunities and invasive treatment options in centers outside of centralized centers of excellence</li> <li>• Loss of physician/team job satisfaction</li> </ul>

**Weaknesses against regionalization or centralization of care**

The group considered the weaknesses of a proposal for regionalization and identified several weakness. The measurement of improved mortality outcome potential in surgical specialties may not apply to the specialty. Mortality associated with interventional procedures is overall very low, and the direct measurements of success laid forth in the argument for surgical regionalization would not be directly applied. In addition, the purported improvement of surgical mortality depends on the proceduralist skill. The regionalization of talented physicians performing the majority of the difficult cases allows for precision care; however, it is not understood how these individuals are identified or how these individuals are distributed. Experienced interventionalists from high-volume programs may be recruited to smaller programs to take on higher administrative responsibilities. Hence, some smaller programs may actually have excellent operator talent and not require referral of local complex and challenging procedures to a centralized institution.

Volume or size of program alone may not reflect true proceduralist talent, but rather opportunity. As competition is decreased, outcomes may suffer secondary to acceptance of institutional status quo. Training of medical students, residents, and fellows, and therefore exposure to the specialty, would be compromised, leading to only regional centers recruiting doctors involved in specialty care. The training and development of junior interventional faculty would undoubtedly be compromised. Communication between centralized hospitals and community care providers would be compromised. The discussion of distance from the center is perhaps one of the most important considerations as this may lead to increased disparities based on socioeconomic class. Families may not have the resources for travel or lodging.<sup>5</sup> In addition, the current insurance infrastructure with a non-single-payer system may lead to various payers allowing travel to a regionalized area where public payers may not. In addition, families with lower health care literacy may not understand the nuances of need for patient transfer, and those with lower socioeconomic status may not



**Figure 1.** Strength-weakness-opportunity-threat (SWOT) analysis on regionalization of care in congenital interventional cardiology.

have the resources to travel long distances or take time off work to obtain care.<sup>6</sup> This, singly, would increase disparate outcomes based on insurance type and or socioeconomic status.

### Opportunities and other considerations

In addition to strengths and weaknesses, opportunities exist that may improve the infrastructure in congenital interventional cardiology. The current model of centralization of heart transplantation has been rather successful, where government regulatory guidance promotes best practice. This type of regionalization could serve as a potential model for improvement and regulation of specialized care. Another model for regionalized care is that seen with adult congenital heart disease accreditation as a means to improve centralized care. Official accreditation, while not required to provide adult congenital heart disease care, provides standardization and certification of care. Possible identification and process for high-risk procedures may be conducted more easily with a regionalized care model, and this risk assessment may optimize preparation and planning to improve overall care.

This concept may also have several threats. Currently, medicine is a for-profit entity, and regionalization would compromise the health care system in this regard. Congenital interventional cardiology, as an entity, supports other specialties in pediatric institutions.<sup>7</sup> Regionalization of such care would inevitably compromise noncardiac care provided outside of the primary center. In addition, the identified center may be overloaded, overwhelmed, and simply unable to care for the increased volume of complex patients. An element of restriction of treatment may also occur as institutions outside of the regionalization may opt toward more invasive procedure as less invasive (interventional) procedures may not be available. Lastly, there may be a significant change in job satisfaction of interventionalists, leading to loss of the field of specialists.

### Consensus

After prolonged discussion, it is the consensus that while regionalization of interventional care may have several potential advantages with increased quality of care and possible cost savings, the disadvantages and threats outweigh these benefits. In the current state of public and private insurance providers, regionalization of congenital interventional cardiology is not feasible nor is it proven advantageous. As anticipated changes occur in reimbursement and health care, this topic will need to be revisited frequently. At this time, rather than mandated regionalization of care, it is the expert opinion of the SCAI Congenital Think Tank Group

that it remains the interventionalist's responsibility to seek the best center for the patient to optimize care.

### Peer review statement

Given his role as Associate Editor, Frank F. Ing had no involvement in the peer review of this article and has no access to information regarding its peer review. Full responsibility for the editorial process for this article was delegated to Anita Asgar.

### Declaration of competing interest

Holly Bauser-Heaton, Frank Ing, Howaida El-Said, Ziyad Hijazi, Robert Vincent, and Thomas Zellers reported no financial interests. Margaret LeVasseur is an employee at Medtronic.

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### Ethics statement and patient consent

The research reported has adhered to the relevant ethical guidelines.

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