

# WHY BUILD AN AORTIC CENTER?

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The goal of developing an aortic center is to optimize patient outcomes by providing the highest-quality care possible, ensuring the right patient gets the right care in the right place at the right time. However, advancing an entire institution toward this goal can be a significant undertaking. It requires a team commitment to the shared vision of an aortic center, leadership, and a concerted effort in relationship building among all team members and stakeholders. Internally, achieving buy-in with administration and other team members is essential, allowing team planning and personnel training to be orchestrated. The circumspect financing and sage deployment of resources is equally important to a burgeoning aortic center and its community. Overall, improving patient care and satisfaction should be the overriding motivation for developing an aortic center, but there are other benefits to consider.

## BENEFITS OF ESTABLISHING AN AORTIC CENTER

Developing an aortic center can strengthen an institution's ability to diagnose and treat all types of aortic pathology and to provide expert care in a system-based, collaborative, multidisciplinary team fashion (Table 1). This can position the center—and its health care system—as a regional leader and an attractive vehicle of high-quality health services for the patient community, referring physicians, employers, and payers. As an aortic center evolves, it can expect measurable improvements in the organization, resource allocation, utilization, and efficiency of delivering care. Improved capabilities and quality will organically grow the aortic center's reputation, with increased referrals as a result. As its reputation grows in the community and region, an aortic center should expect to attract more patients, resulting in increased income and financial performance.

In time, the program should attract additional talent to the center—including leading physicians, researchers, nurses, and administrators. Although initial capital investment is necessary, a center can realize a long-term goal of increased cost savings from quality improvement measures. An enhanced reputation would also bring opportunities to participate in industry- or system-sponsored clinical trials,

enabling an aortic center to make valuable contributions to the field, advance best practices, and serve as a host to emerging innovations. These and other benefits would build on the institution's strengths and sharpen its competitive advantage in the marketplace.

## Center of Excellence Designation

The phrase "Center of Excellence" has been used across many industries with and without sanctioning designation of the phrase from a governing body. In health care, it could mean that a given center's providers are capable of providing specialized, above-standard care in an environment with dedicated resources for that area of expertise. A "Center of Excellence" should be adequately equipped and staffed to not only provide the highest-level quality of patient care, but also capable of advancing research, informing the development of innovative techniques, and contributing to the standardization of care and what may be considered to be "best practice" in the field. An early example of such a health care program was the National Cancer Institute's (NCI) war on cancer initiative propelled by the National Cancer Act of 1971. This sweeping federal law more than tripled appropriations for the NCI in a 4-year period, particularly for its grants program,<sup>1</sup> fueling the creation of officially recognized regional cancer centers dedicated to research and quality clinical care.<sup>2-4</sup> In 2005, Birkmeyer and colleagues analyzed the national Medicare database from 1994 to 1999, finding in four of six procedures, there were significantly lower mortality rates among the 51 NCI-designated hospitals versus 51 nondesignated hospitals.<sup>2</sup> Although a government-funded designation, the NCI initiative has nonetheless demonstrated that criteria for centers of excellence could help standardize and advance a particular practice, having a positive impact on cost, outcomes, and care quality.

## Quality Care Improvement

A contemporary glimpse of what might distinguish a center of excellence and inform development of an aortic center was reported in a 2006 Centers for Disease Control–supported study that evaluated outcomes of ruptured abdominal aortic aneurysms (rAAAs) in 210 "designated" trauma centers versus 675 "nondesignated" hospitals.

**TABLE 1. POTENTIAL BENEFITS OF DEVELOPING A COMPREHENSIVE AORTIC CENTER**

<b>Domains of Improvement</b>	<b>Process</b> <i>Development Investments</i>	<b>Desired Outcomes</b> <i>Desired Benefits of Investments</i>
<b>Overall Capabilities</b> <i>Big Picture</i>	Informed expansion of health service capabilities in infrastructure, personnel, technologies, and overall organization	<ul style="list-style-type: none"> <li>• Improved patient outcomes (eg, survival, reduced complications, and improved risk management)</li> <li>• Patients will receive screening and offered comprehensive treatment for all or a vast majority of types of aortic disease available, not limited to partial services or need for referral</li> <li>• Formation/optimization of outpatient aortic center clinic to provide patients with easier access to initial care, reception point for many referrals/transfers, and follow-up care; will also allow for care coordination among specialists and more standardized pre- and post-procedure surveillance</li> <li>• Improved patient satisfaction of overall care experience</li> <li>• Improved work satisfaction of physician, administrator, nurse, staff, and allied health partners</li> </ul>
<b>Subdomain</b>	<b>Process</b>	<b>Desired Outcomes</b>
Technology	Adoption of innovative technologies to diagnose and treat aortic disease	<ul style="list-style-type: none"> <li>• Patients will receive cutting-edge care in screening, diagnosis, and treatment, minimizing complications and improving care</li> <li>• Patients and providers alike will have a larger range of therapeutic options to choose from</li> <li>• Formative assessment of technologies to further advance innovation</li> </ul>
Research	Investments in research capability (including research database development and standardization, investigator expertise, and dedicated on-the-ground research staff)	<ul style="list-style-type: none"> <li>• Greater involvement in clinical trials (including new device trials) and registries</li> <li>• Expert-authored publications shared with the field to share aortic center experience and voice in advancing best practices</li> <li>• Grow expert and organization reputation and demonstrate willingness to collaborate</li> </ul>
Quality care improvement/planning	Identify need, plan for, and inculcate aortic disease-specific quality care initiatives	<ul style="list-style-type: none"> <li>• Identify opportunities to further optimize protocols to treat and streamline aortic disease diagnosis and treatment</li> <li>• Creation of or refinements to existing institutional policies and protocols</li> <li>• Optimize reimbursement of aortic disease interventions (eg, pay for performance with CMS and relationships with managed care)</li> <li>• Identify opportunity</li> </ul>
Team integration	Invest in the multidisciplinary team (obtain buy-in to aortic center vision, build and sustain relationships with other departments (intra-organizational) and allied health partnerships (outside organization))	<ul style="list-style-type: none"> <li>• Improve patient's quality of care and outcomes by allowing the expertise of each respective health specialist to do their part at any given point of the care continuum</li> <li>• Optimize reimbursement of aortic disease interventions (eg, CMS pay for performance)</li> </ul>
Team training	Devotion of resources to training of physicians and personnel, including use of simulators and relationships with third parties	<ul style="list-style-type: none"> <li>• Improved provider skill of techniques to improve health outcomes and minimize complications</li> </ul>
Planning	Perform organizational inventory and market research to identify gaps in care; consider all stakeholder perspectives; identify aortic center strengths, weaknesses, and opportunities	<ul style="list-style-type: none"> <li>• Prepare a strategic business plan based on needs identified to plan investments and tactics needed for organizational growth and scale up</li> </ul>
Outreach	Market aortic center and identify/establish/renew relationships with referrers and patients	<ul style="list-style-type: none"> <li>• Raise aortic center visibility, increase referrals, and become the go-to aortic center in the region</li> </ul>

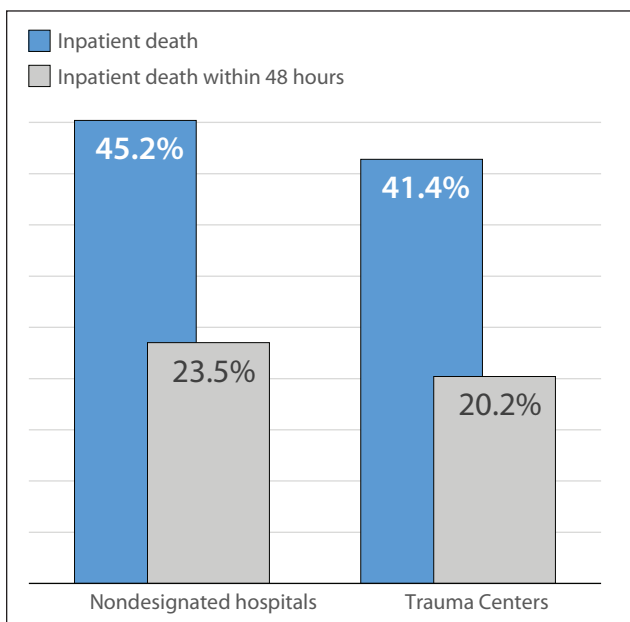
**A “Center of Excellence” should be adequately equipped and staffed to not only provide the highest-level quality of patient care, but also capable of advancing research, informing the development of innovative techniques, and contributing to the standardization of care and what may be considered to be “best practice” in the field.**

Predischarge in-hospital mortality was 41.4% at designated centers compared with 45.2% at nondesignated centers (unadjusted odds ratio [OR], 0.85; 95% confidence interval [CI], 0.71–1.02; Figure 1). After adjusting for the presence of a vascular surgery fellowship, hospital beds, annual admissions, comorbidities, and other covariates, the mortality rate was still lower in the designated centers (OR, 0.72; 95% CI, 0.55–0.93; Figure 2). The authors described this as a so-called halo effect due to the ability of the designated centers to systematically mobilize resources, as well as their greater commitment to surgical procedures and intensive care.<sup>5</sup>

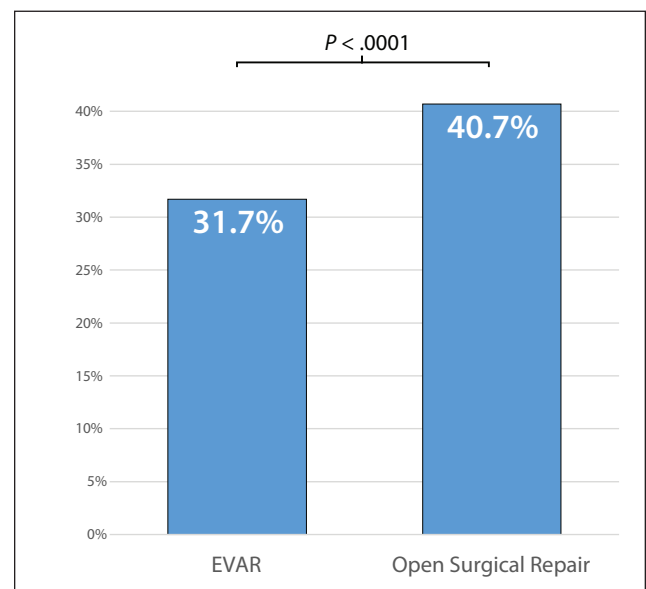
Other studies have correlated increases in physician and hospital volume with improved patient outcomes.<sup>6–8</sup> In 2009, McPhee and colleagues used the Healthcare Cost and Utilization Project’s (HCUP) Nationwide Inpatient Sample to assess outcomes of patients with rAAAs treated with

endovascular aneurysm repair (EVAR) versus open surgical repair. The authors reported lower mortality in patients treated with EVAR compared with open surgical repair (31.7% vs 40.7%;  $P < .0001$ ). Most importantly, the survival advantage with EVAR was independently associated with high-volume centers and teaching institutions.<sup>9</sup> In 2011, the same authors reported that the primary determinant for decreased in-hospital mortality after open elective AAA surgery was higher surgeon volume rather than institution volume. With elective EVAR, however, there was no difference in mortality rate between surgeon or institution volume, both universally low at  $\leq 2\%$ .<sup>10</sup>

The results of these two studies emphasize that, for different procedures, both institution volume and surgeon volume can be important predictors of successful outcomes that support regionalization and potential development of high-volume aortic centers. Innovations in surgical safety have prompted the question of whether there is still a survival benefit based on volume or whether it has diminished. However, a 2014 mortality analysis of Medicare claims data from more than 3.2 million patients undergoing gastrointestinal, cardiac, or vascular surgery showed



**Figure 1.** Predischarge in-hospital mortality, nondesignated centers versus designated trauma centers (unadjusted odds of inpatient death: OR, 0.85; 95% CI, 0.71–1.02; unadjusted odds of inpatient death within 48 hours: OR, 0.81; 95% CI, 0.64–1.02; adjusted odds of inpatient death: OR, 0.95; 95% CI, 0.77–1.17; adjusted odds of inpatient death within 48 hours: OR, 0.86; 95% CI, 0.66–1.12).



**Figure 2.** Overall in-hospital mortality for rAAAs by type of procedure. EVAR was independently associated with high-volume centers and teaching institutions.

**TABLE 2. PROFILES OF SELECT HEALTH SYSTEMS WITH AORTIC CENTER INSTITUTIONS**

Health System	System Characteristics	Type	Delivery Characteristics
<b>Carolinas HealthCare System</b> Charlotte, North Carolina	<ul style="list-style-type: none"> <li>• 900 care locations, including Sanger Heart &amp; Vascular Institute</li> <li>• 7,460 licensed beds</li> <li>• Budget of \$7.7 billion</li> </ul>	Multispecialty medical groups and physician-hospital organizations (PHOs)	<ul style="list-style-type: none"> <li>• Alliance between a physician group/network and one or more hospitals, that sell services to managed care providers</li> <li>• PHO organization contracts for physician and hospital services</li> <li>• Physicians employed by hospitals</li> </ul>
<b>Baylor Scott and White Health</b> Dallas, Texas	<ul style="list-style-type: none"> <li>• 42 hospitals</li> <li>• 600 care locations</li> <li>• 3,781 licensed beds</li> <li>• \$5.9 billion in total assets</li> <li>• 3,392 active physicians</li> <li>• 22,000 employees</li> <li>• 127,693 inpatient admissions</li> </ul>	Managed independent practice associations (IPAs)	<ul style="list-style-type: none"> <li>• Association of independent physicians in private practice and physicians who are part of a PHO (physician group/hospital alliance)</li> <li>• Provides services to managed care organizations</li> <li>• Provides clinical education and training to future and current physicians and other medical professionals</li> <li>• Often have research programs</li> </ul>
<b>Intermountain Healthcare</b> Salt Lake City, Utah	<ul style="list-style-type: none"> <li>• Three operating groups with 22 hospitals and &gt; 185 clinics</li> <li>• &gt; 34,000 employees</li> <li>• Serves Utah and Idaho</li> </ul>	Hybrid PHO/ IPA	<ul style="list-style-type: none"> <li>• Care is provided by a collaboration of physicians who are a part of an IPA (association of independent physicians in private practice) and physicians who are part of a PHO (physician group/hospital alliance contracts services to managed care providers)</li> </ul>
<b>Stony Brook Medicine</b> Stony Brook, New York	<ul style="list-style-type: none"> <li>• Seven hospitals and institutes</li> <li>• Five health sciences schools</li> <li>• &gt; 50 community-based health care settings</li> <li>• 603 beds</li> <li>• 1,095 physicians</li> <li>• 5,777 employees</li> <li>• 31,964 inpatients (excluding newborns)</li> </ul>	Academic/ teaching hospital/institution	<ul style="list-style-type: none"> <li>• Provides clinical education and training to future and current physicians and other medical professionals</li> <li>• Affiliated with medical schools or universities</li> <li>• Often have research programs</li> <li>• Physician employees of academic institution</li> </ul>
<b>Kaiser Permanente</b> Oakland, California	<ul style="list-style-type: none"> <li>• 38 hospitals</li> <li>• 618 medical offices</li> <li>• Revenue \$56.4 billion</li> <li>• 9.6 million members</li> <li>• 17,000 physicians</li> <li>• 174,415 employees</li> <li>• Serves eight states and Washington, DC</li> </ul>	Organized/ integrated delivery systems (IDSs) <sup>23</sup>	<ul style="list-style-type: none"> <li>• Organized, coordinated, collaborative network linking various health care providers</li> <li>• Provide coordinated, vertical continuum of services to a specific patient population</li> <li>• Clinically and fiscally responsible for clinical outcomes and health status of population served</li> <li>• Systems in place to manage and improve outcomes</li> </ul>

that the inverse relationship between mortality and institutional volume remains strong across surgery types.<sup>11</sup>

In 2001, the Leapfrog Group, a national nonprofit advocacy group for employers proposed standards including volume in high-risk surgical procedures, computerized order entry, and fully staffed intensive care units. These

recommendations were based on the Institute of Medicine health care safety report, data from the Nationwide Inpatient Sample, and other sources. Although controversial,<sup>12-14</sup> the Leapfrog Group's analysis found a correlation between mortality and higher-volume centers in five procedures, resulting in an estimated 2,581 lives saved. Lives

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saved in each procedure were estimated to be 1,486 for coronary artery bypass graft, 464 for AAA repair, 345 for coronary angioplasty, 168 for esophagectomy, and 118 for carotid endarterectomy.<sup>15</sup> These results have been repeated in recent years, with evidence supporting the notion that fewer complications may be a factor in high-volume center success.<sup>16</sup> However, another analysis failed to find a similar correlation.<sup>14</sup>

But volume is likely only part of the equation. The Centers for Medicare and Medicaid Services (CMS) has taken action to promote a value-based system predicated on quality, not quantity. The CMS national imperative has set three overall goals for this paradigm: better health, better care, and lower costs. To this end, CMS and the National Quality Strategy of the US Department of Health and Human Services have outlined six measures of quality for improving outcomes for its beneficiaries. An aortic center should be proactive in striving to improve in all these areas, and its collaborative, multidisciplinary environment offers ample opportunity to implement changes to improve the quality of patient care.

- Safety
- Patient- and caregiver-centered experience and outcomes
- Care coordination
- Clinical care
- Population or community health
- Efficiency and cost reduction

### Incentives for Reimbursement

The health care system is in a state of crisis,<sup>17</sup> currently undergoing a transformation to a value-based insurance design (VBID) payment system<sup>18-20</sup> driven by the Affordable Care Act.<sup>21</sup> Such a transition cannot be ignored, especially since Medicare payments for health services will be tied to productivity in the economy. It is a crucial reality for hospital systems, because many receive more than 70% of their reimbursement from Medicare and Medicaid. CMS has proposed a set of rules for voluntary “Accountable Care Organizations” (ACOs), designed to reward systems that put the patient first. This model will incentivize care of an individual patient across multiple settings and health

care providers (HCPs). CMS is also rewarding the reduction of unnecessary readmissions attributable to infection (one source of complication in aortic procedures), preventive services, and use of electronic health records (EHRs), all of which should also be criteria for aortic centers. Organizations can obtain program details directly from CMS. An important point regarding such details is that CMS hospital incentives can be attained by relative improvement over a system’s own baseline or reaching a CMS-established benchmark and that no low-performing system would be “left to sink or swim.”<sup>19</sup>

Several institutions have undertaken the upscaling of their aortic programs, but few have reported on the vision and strategy that formed the foundation of their programs. In 2015, Schanzer and colleagues at the University of Massachusetts<sup>22</sup> reported on the feasibility and practicality of developing an aortic center program. The study team cited several key elements that fueled the growth of its aortic center:

- On-site formal training at already-established centers of excellence
- Industry partnerships to improve access to innovative devices
- A fully integrated team approach, with the referring surgeon included throughout the course of care
- The prospective collection of clinical outcomes data approved by its Institutional Review Board, and
- The testing of new physician-modified devices to advance the field

The authors were keen to emphasize that administrative buy-in was a must and acknowledged that every institution has difference strengths, weaknesses, and opportunities. Strengthening weaknesses and building upon existing strengths unique to their organization reportedly provided direction early in the strategic planning process, then helped them to identify and seize opportunities.

### SUMMARY

The field of interventional vascular care is positively rippling with innovation and change. In an evolving, multifaceted health care delivery system, many centers have yet to realize the benefits of continual innovation of diagnostic and interventional devices to meet patient needs. Institutions and teams play a key role in leveraging these technologies to improve the timeliness and quality of patient care. It is the responsibility of all health care team members to translate advances in health intelligence via personal, professional, and institutional commitment to improving patient care. Harnessing these advances is a challenge because of the barriers at the system, team, and individual level. A strong institutional commitment to develop an aortic center should acknowledge, anticipate,

and address these barriers. This level of anticipatory planning, dedication of resources, and organizational focus can help build and support the multidisciplinary team. This collaborative, collective synergy of expertise may then optimally deploy a range of diagnostic and device innovations to meet the needs of patients, improving health care delivery and outcome. ■

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