



Technology Insights (TI)

Growth Acceleration Solutions and Technology Assessment

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Technology Insights Member Services

TI offers customized, project-based analyses of service line growth opportunities and clinical technology investments for hospitals. On a membership basis, TI offers institution-specific, on-demand support with optimizing existing investments, redesigning technology evaluation processes, and scanning future technology innovation across hospital service lines.

- **Identifying “Right-Fit” Growth Opportunities**
Master Opportunity Plans; Disease State Gap Analyses, Service Line Gap Analyses, Innovation Horizon Scans, Clinical Conference Round-up Teleconferences
- **Determining Growth Opportunity Viability**
360-degree Analyses, Technology Fact Briefs, Growth Opportunity Business Plans, Technology Cheat Sheets
- **Rationalizing Service Line Strategy**
Service Line Strategy, Service Line Prioritization, System-Wide Service Line Rationalization, Technology Evaluation Process Re-Design, Capital Prioritization
- **Optimizing Investment Decisions**
Investment Decisions, Implementation Guides, Retrospective Analyses, Growth Action Plans, Fellowships, Physician Preference Item Savings Opportunity Audits

Hybrid Cardiovascular Facility 360° Assessment

Technology Insights’ Hybrid Cardiovascular 360-Degree Assessment is an in-depth investment guide for the evaluation of a Hybrid Cardiovascular Facility, including up-to-date information regarding the clinical, facility and financial implications of this space. Technology Insights routinely consults with the following experts in order to provide hospitals with the most appropriate sources of information.

Resources include:

- **Hospital Administrators**
Heart and vascular administrators across the country share their perspective of the hybrid OR build out from a capital purchasing and logistics perspective.
- **Physicians**
Progressive physicians provide TI with their clinical experiences and perspective of their room, defining what procedures were most appropriate for this space.
- **Architecture & Construction Firms**
Architecture and construction firms assist TI in understanding the nuances that distinguish this room from a cath lab or operating room including room specifications, construction challenges, and timelines.
 - Mahlum Architects
 - HDR Incorporated
 - Thomas Miller & Partners
 - Roebuck Buildings Company
- **Imaging Vendors**
Imaging vendors provide a breakdown of their angiography systems best suited for placement in a hybrid facility and regularly update researchers on new systems.
 - Siemens
 - GE
 - Phillips
 - Toshiba



Technology in Brief

What Is It?

Hybrid Operating Rooms (Hybrid ORs) add a ceiling-mounted C-arm to a traditional OR for angiography and catheterization procedures. These multipurpose spaces, priced at nearly \$2 million, include a fixed C-arm fluoroscopy unit for ongoing catheter visualization, as well as a sterile field, anesthesia equipment, and other components found in typical OR spaces.

How Does It Work?

A fixed angiography system allows the sterile OR to be utilized for more advanced imaging procedures. The imaging system is either used before or after an open surgical procedure, to image a fully interventional procedure, or to allow for combined open/interventional procedures.

What Problem Does It Solve?

The combination of cath lab-quality imaging capabilities and operating room amenities allows for optimum versatility, providing the flexibility to perform hybrid procedures and to easily transition between surgical and catheter-based therapies.

Service Line	Cardiovascular
Applications	Endovascular (Catheter-based) & Surgical Procedures
Current Standard of Care	Separate spaces for open and interventional procedures
Principal Vendors	Siemens, Philips
Competing Technologies	N/A
Risk of Obsolescence	Low-Medium
Adoption Status	Early Adopters
Key Considerations	Square footage of 800-1,000 ft ²
Projected Cost	\$1.9-\$2.3M
Reimbursement Status	No incremental reimbursement for procedures done in a hybrid facility

Technology Insights Take

Hybrid OR Mainly a Physician Preference for Vascular Surgeons Looking to Expand Endovascular Practice

- Initially, interventional radiologists and vascular surgeons at many institutions banded together to block cardiologists' advances, but now vascular surgeons are becoming more aggressive in their attempts to take over a significant share of the business. As advances in catheter-based technologies continue, vascular surgeons increasingly view endovascular procedures as the future of their practices.
- As vascular surgeons look to expand their practices into the endovascular terrain, the hybrid OR becomes a premium location that allows the surgeon the flexibility of performing both sets of their procedures in one space. The hybrid OR also may help to alleviate turf battles over shared spaces.

Hybrid ORs May Allow for Growth in More Complex Procedures on the Horizon

- Procedures most likely to benefit from the room are high-end vascular procedures (AAAs, carotid stenting), percutaneous valve procedures, and hybrid cardiac procedures involving minimally-invasive CABG and stenting through the same procedure.

Due to High Cost of Build-out, Hybrid OR Not a Panacea for Capacity Constraints

- Because of the significant cost of hybrid ORs, they are most useful not as a near-term solution for capacity constraints but as a medium- to long-term opportunity to grow volumes by adding hybrid procedures, attracting innovative physicians, promoting the hospital as a provider of cutting-edge care, and preparing for further shift from surgical to endovascular treatments.

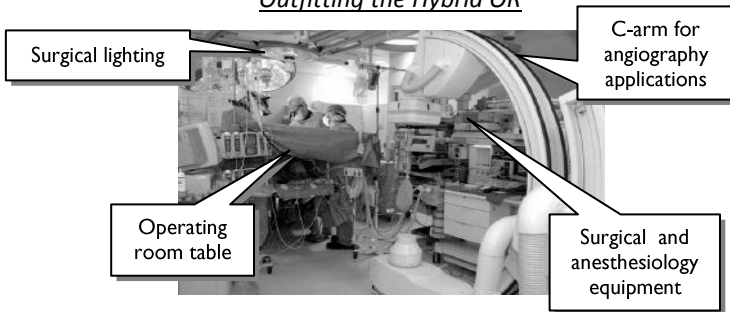




Clinical Considerations

- Hybrid ORs include a fixed C-arm fluoroscopy unit for ongoing catheter visualization, as well as a sterile field, anesthesia equipment, and other components found in typical OR spaces
- Both Siemens and Philips are directly marketing angiography systems to surgical suites, and have designed cath lab tables that are able to pivot and function as an operating room table
- Procedures most likely to benefit from the room are AAAs & TAAs, carotid stenting, percutaneous valve procedures, and hybrid CABG/stent procedures

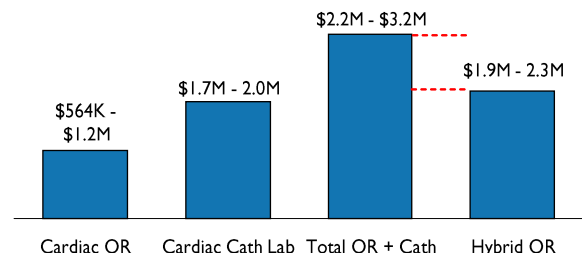
Outfitting the Hybrid OR



Financial Considerations

- Given the many additional features included in a hybrid OR, including sterile flow and both cath lab and OR equipment, build-out costs are higher than either a normal cardiac OR or a cardiac cath lab
- This high cost may preclude the use of the room as a nice-to-have investment unless there are clear capacity opportunities, turf issues, or procedure growth opportunities that require this space
- The necessity of this room will vary from institution to institution depending on internal dynamics; institutions should carefully assess the motivation for moving forward with this expensive high-end facility

Build-out Cost of Hybrid OR vs. Cath and OR



Strategic/Operational Considerations

- While cath labs and ORs can usually be comfortably outfitted in 500 to 600 square feet of space, hybrid ORs require additional floor space to accommodate all of the components; between 800 to 1,000 square feet is typically allocated to these spaces, although a hybrid OR can be built in as little as 650 square feet if necessary
- State regulations set lighting requirements for OR spaces. Ensuring adequate lighting is provided in hybrid ORs is particularly difficult given the addition of the ceiling-hung angiography equipment
- Typical ORs employ a curtain of air that descends from the ceiling to ensure sterility. Hybrid ORs cannot use this system given the quantity of ceiling-hung equipment used; an alternative air flow system is necessary. Most institutions place vents in opposite corners of the room, one for removal and one for return, creating a uniform flow of air capable of ensuring sterility

Next Steps

- #1—Assess Strategic Priorities for Growth in Vascular Services**
- #2—Understand Internal Physician Dynamics and Risk/Reward of Moving Forward with Hybrid OR**
- #3—Track Design Developments in Angiography Systems, Air Flow Requirements, Lighting and Room Dimensions for Hybrid Rooms**
- #4—Establish Clear Protocols for Room Sharing Between Specialties**

How Tech Insights Can Help

- **360 Report:** Includes a technology overview for hybrid OR, latest clinical data, build-out considerations, and experiences from early adopters
- **Vascular Services Business Plan:** Comprehensive overview of local and national vascular market, including profitability analysis for vascular lab and capacity analysis of current lab space
- **Cardiovascular Gap Analysis:** Assessment of current cardiovascular services and facilities in comparison to national technology adoption and volume trends

