Innovations in Surgical Oncology

Oncology Innovations Series

- Practice 1: Determine the Right Level of Investment
- Practice 2: Set Minimum Procedure Volumes
- Practice 3: Standardize Surgical Processes
- Practice 4: Ensure Equitable Access to Care
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The Clinical Innovations in Oncology Series

With increasing financial pressures, growing responsibility for costs and outcomes, and increasingly strict reimbursement requirements, cancer programs must revamp their investment strategy. It is essential that program leaders carefully weigh the benefits and risks, evaluate the evidence base, and consider the value of each investment from the perspective of their organization, payers, and community.

This four-part series will help cancer program leaders and administrators evaluate current and upcoming technology and treatment innovations in radiation, medical, surgical, and interventional oncology. Additionally, each provides guidance for creating a best-in-class program and maximizing the return on investment.

For the full series, please visit advisory.com/or/clinicalinnovations

Innovations in Surgical Oncology

Over two-thirds of cancer patients receive surgery as a component of their first course of cancer treatment; as a result, surgery is a critical component of any comprehensive cancer program. While there have been few game-changing technologies developed in recent years, evidence demonstrating that higher volumes lead to improved outcomes grows, underscoring the importance of providing patients access to specialized, high-volume surgeons and hospitals.

To develop a best-in-class surgical oncology program, leaders must seek opportunities to improve integration and coordination of surgeons with the cancer center, perform comprehensive market assessments to ensure access to the right specialists, and prioritize opportunities to reduce costs and improve outcomes. To help, this research brief contains two technology overviews and four best practices.

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Surgical Oncology Volumes Continuing to Grow

More than two-thirds of cancer patients receive surgery as a component of their first course of treatment. For half of these patients, surgery is the only type of treatment they receive for their cancer. As such, surgery is a significant component of any comprehensive cancer program.

As cancer incidence rises, inpatient and outpatient surgery volumes are estimated to grow by 7% and 12%, respectively, across the next five years. Overall volumes and growth rates will vary by tumor type.

In particular, new practice and screening guidelines may impact breast and prostate surgical volumes. For both cancers, there has been an increased focus on overdiagnosis and overtreatment. While the changes to screening guidelines will likely have the greatest impact on surgical volumes, the new practice guidelines will likely also have some impact. In 2016, three leading national cancer organizations issued a consensus guideline clarifying the margin standards for women with ductal carcinoma in situ (DCIS) treated with breast-conserving surgery. For prostate cancer, recent clinical evidence has shown that high-dose rate brachytherapy is as effective as surgery for aggressive cases. It is likely that these new developments will reduce surgical volume growth for both of these tumor sites.

First Course Treatment for All Types of Cancer

<table>
<thead>
<tr>
<th>Percentage of Patients Diagnosed in 2014</th>
</tr>
</thead>
<tbody>
<tr>
<td>n=884,768</td>
</tr>
<tr>
<td>Surgery and other treatment modality, 1</td>
</tr>
<tr>
<td>33%</td>
</tr>
<tr>
<td>Surgery alone,</td>
</tr>
<tr>
<td>34%</td>
</tr>
<tr>
<td>No surgery,</td>
</tr>
<tr>
<td>33%</td>
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</tbody>
</table>

591,629
Cancer patients received surgery as a component of their first course treatment in 2014

Estimated Surgical Oncology Volumes

<table>
<thead>
<tr>
<th>2015-2020</th>
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<tbody>
<tr>
<td>1,660,485</td>
</tr>
<tr>
<td>1,852,638</td>
</tr>
<tr>
<td>613,467</td>
</tr>
<tr>
<td>658,925</td>
</tr>
</tbody>
</table>

Major Growth Drivers
- Aging population
- Increased focus on access to care

Major Growth Barriers
- New practice guidelines for breast and prostate surgery
- Increased focus on overdiagnosis and overtreatment for breast and prostate cancers

An Essential Component of the Service Line

Historically, surgical oncology has fallen outside many cancer program leaders’ span of control, but this has changed in recent years. As shown in the graph to the right, a survey of cancer program leaders in 2008 showed that only 18% had direct oversight of surgical oncology, while 34% had indirect oversight. Nearly half of respondents had no oversight. By 2014, the percentage of cancer program leaders with direct oversight increased slightly, while the percentage with indirect oversight increased by 41%. Correspondingly, the percentage of oncology leaders with no oversight decreased by 31%. This change likely reflects growing oncology volumes, the financial importance of oncology, and the need for more coordinated care.

By expanding their purview to include surgical oncology, cancer programs are better positioned to craft and execute a comprehensive, multidisciplinary strategy for the service line. As part of that strategy, leaders need to focus on developing high-value, patient-centered surgical oncology programs.

Source: 2008 Oncology Roundtable Member Survey; 2014 Oncology Roundtable Service Line Strategy Survey; Oncology Roundtable interviews and analysis.
The Technology Landscape

One critical component is making sure patients have access to cutting-edge technology. The table to the right provides an overview of surgical oncology technology and the breadth of adoption.

In contrast to medical and radiation oncology, there are significantly fewer technology innovations in this field. On the left side of the table, open and laparoscopic tumor resection are the most widespread cancer surgery techniques and are standard practice today. Moving to the right, robotic surgery is more innovative, but it is now widespread so it is unlikely to be a market differentiator. Tumor localization and optical imaging are newer technologies in surgical oncology that are less widely used. Many of the optical imaging applications are still in the research phase.

The following pages provide more detail on robotic surgery, tumor localization, and optical imaging.

Overview of Surgical Oncology Technology Adoption

<table>
<thead>
<tr>
<th>Widespread</th>
<th>Limited to Research</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tumor Resection</td>
<td>Laparoscopic Resection</td>
</tr>
<tr>
<td>Robotic Surgery</td>
<td>Tumor Localization</td>
</tr>
<tr>
<td>Optical Imaging</td>
<td></td>
</tr>
</tbody>
</table>

Source: Service Line Advisor, Oncology Clinical Technology Compendium, Washington, DC: The Advisory Board Company, 2015; Oncology Roundtable interviews and analysis.
Identifying New Ways to Use the Robot

Saturated Market Pushes Providers to Find New Applications

Since 2006, thousands of organizations have purchased surgical robots, resulting in markets that are crowded, if not saturated, with these technologies. As of June 2016, there were 2,474 robots in the United States, which is equivalent to one robot for every two hospitals.

Today, most programs use surgical robots to perform urologic and gynecologic cancer surgeries. However, innovative programs are increasingly using the robot for thoracic and gastrointestinal cancer surgeries. This helps differentiate their program from competitors, while ensuring that they are using their robot to its maximum capacity. Another strategy to make the most of this investment is to strategically place robots across a system to drive volumes, and to regularly evaluate the placement and use of the robot.

Most markets are crowded, if not saturated, [with surgical robots] in the US, so the business case for this investment is honestly old news…At the end of the day, this investment boils down to a strategic decision. The “right” answer depends on what an organization hopes to gain through the investment…What few understand, though, is how to make the most of an investment they’ve already made.”

Liz Tiernan, Senior Consultant
Service Line Strategy Advisor, Advisory Board
“Tiernan: Should You Invest in da Vinci?”

Keys for da Vinci Investment Success

- Monitor physician and patient demand for robotically performed treatment
- Look for comparative clinical research that shows advantages of robotic surgery over laparoscopic and open surgery
- Stay abreast of clinical advances in other applications for da Vinci
- Check the financial health of robotic procedures in addition to utilization
- If da Vinci is installed, ensure adequate physician access and continually assess opportunities to expand purview of robotic applications beyond initial robotic offerings
- If there are da Vincis at multiple sites in system, continually analyze utilization at each site to identify underutilization and opportunities to relocate da Vinci to maximize utilization

Growth Potential for Robotic Procedures by Tumor Site

<table>
<thead>
<tr>
<th>Tumor Site</th>
<th>Growth Potential</th>
</tr>
</thead>
<tbody>
<tr>
<td>Urologic</td>
<td>No Growth Potential</td>
</tr>
<tr>
<td>Gynecologic</td>
<td>Maximum Growth Potential</td>
</tr>
<tr>
<td>Thoracic</td>
<td>No Growth Potential</td>
</tr>
<tr>
<td>Gastrointestinal</td>
<td>No Growth Potential</td>
</tr>
</tbody>
</table>

New Technologies Focus on Surgical Guidance

Newer technologies, such as tumor localization and optical imaging, focus on improving surgical guidance. This helps surgeons better visualize tumors, resulting in improved margins, a decreased number of additional surgeries and treatments, and a better patient experience.

Tumor localization technology is used specifically for lumpectomies. Radiologists place small markers around the tumor up to 30 days before surgery so that surgeons can detect the cancerous tissue with a probe during the procedure. This can reduce surgical delays and the need for follow-up procedures, while increasing patient comfort.

In contrast, optical imaging uses molecular compounds that bind only to cancer cells, allowing surgeons to assess margins during the operation using molecular probes. Most optical imaging technologies are still in the research phase or pending FDA approval.

While exciting, cancer program leaders need to carefully evaluate the business case for their organizations, including physician comfort with the technology, potential patient volumes, reimbursement, and the evolving evidence base.

### Improving Margins and Reducing Follow-Up Surgeries

#### Tumor Localization

**Standard:** Surgical guide wire needles that protrude from breast are inserted around tumor by radiologist

**Often leads to:** Patient discomfort, surgical delays, inaccurate localization, follow-up surgery

**New:** Non-radioactive markers and detection probe are used to identify target tissue for surgical removal

**Potential to:** Optimize surgical planning, reduce surgical delays, improve patient satisfaction

**Examples:** SAVI SCOUT (approved 2014), Sentimag Magseed (approved 2016)

#### Optical Imaging

**Standard:** Surgeons lack real-time method to assess tumor resection margins, and must rely on post-operative pathology testing

**Often leads to:** Follow-up surgery

**New:** Molecular imaging techniques are used to intra-operatively visualize remaining cancer cells in real time via molecular probes targeting tumor markers

**Potential to:** Reduce need for follow-up surgery for breast, brain, and other cancers

**Examples:** MarginProbe (radiofrequency technology approved 2012), LightPath Imaging System (pending approval)

### Related Resource

Find more information on these technologies in the following Oncology Roundtable resource, available on advisory.com:

Tumor Localization and Optical Imaging Technology Overview

Source: Oncology Roundtable interviews and analysis.
Elevating Surgical Oncology

To differentiate themselves in their market, cancer programs should follow the four practices listed to the right to develop a comprehensive, high-quality surgical oncology program.

First, program leaders need to make strategic decisions about where to invest limited resources. Next, organizations must commit to delivering high-value care by setting minimum procedure volumes and standardizing care across surgeons and hospitals. Lastly, program leaders need to ensure all patients in their community can access their services.

Four Practices to Develop a Best-in-Class Program

1. Determine the Right Level of Investment

2. Set Minimum Procedure Volumes

3. Standardize Surgical Processes

4. Ensure Equitable Access to Care

Source: Oncology Roundtable interviews and analysis.
Surgical oncology programs look vastly different across organizations, both in terms of integration, types of surgeons, and services. Basic programs use general surgeons who are loosely affiliated with the cancer program. The most comprehensive programs have access to subspecialists, such as breast surgeons and surgical oncologists, who are dedicated to cancer care, often take on leadership roles, and help transition patients across providers. However, most programs fall somewhere in between these two extremes.

Given limited resources, program leaders need to be strategic about the level of investment in their surgical oncology programs, including the type of expertise needed and the procedures offered.

First, programs need to conduct a thorough market assessment, taking into account cancer incidence and the competitive landscape. Next, evaluate existing internal resources, the financial outlook, and alignment with the organization’s strategic priorities.

Assess the Opportunity

Four Elements of a Comprehensive Opportunity Assessment

- **Market Assessment**
  - Current incidence by tumor site
  - Future growth in incidence
  - Competition
  - Market share

- **Internal Evaluation**
  - Physician leadership
  - Required and existing resources
  - Capacity
  - Relationships with referring physicians

- **Financial Analysis**
  - Inpatient, outpatient profitability
  - Operating margins
  - Anticipated reimbursement changes

- **Organization Strategy**
  - Community need
  - Clinical quality
  - Research
  - Market differentiation

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Related Resource

Learn more about how to conduct a market assessment in the following Oncology Roundtable resource, available on advisory.com:

*The Eight-Step Oncology Market Assessment*
Get the Right Person for the Job

Once programs understand the opportunities within their market, the next step is to recruit or gain access to the necessary surgical expertise to perform the procedures, recognizing that strategies will likely vary by tumor site.

First, consider the level of expertise that is needed. Next, evaluate the best way to access that expertise. For example, a community program may have the volumes to support a dedicated breast surgeon, but it might be a better use of resources to lease a gynecologic oncologist part-time rather than hiring one.

Lastly, consider the most effective strategies to engage surgeons and integrate them into the larger cancer program. At a minimum, cancer programs should invite surgeons to attend tumor boards and multidisciplinary conferences. Many programs also ask surgeons to serve in leadership roles in the cancer program, actively participating in strategic planning and serving as a champion for quality initiatives.

Strategy to Acquire Expertise May Vary by Tumor Site

Three Questions Cancer Program Leaders Should Consider

1 What types of surgeons do we need?
   • General surgeon
   • Surgical oncologist
   • Breast surgeon
   • Plastic surgeon
   • Plastic surgeon
   • Thoracic surgeon
   • Colorectal surgeon
   • Gynecologic oncologist

2 How do we access that expertise?
   • Develop a process to refer to regional academic medical centers or partners
   • Lease a specialized surgeon from another organization
   • Share a specialized surgeon across multiple sites
   • Hire or partner with a specialized surgeon

3 How do we engage those surgeons?
   • Invite to attend tumor board and multidisciplinary conferences
   • Include in quality improvement projects
   • Appoint to leadership role in cancer program
   • Restructure surgeon compensation to incentivize alignment

Related Resources

Find more information about integrating physicians into the cancer program using the following Oncology Roundtable resources, available on advisory.com:

• Multidisciplinary Care in Cancer Programs
• Achieving Sustainable Hospital-Physician Alignment in Oncology

Source: Oncology Roundtable interviews and analysis.
Making the Right Choice for Their Needs

Advocate Evaluates How to Provide Expertise Across the System

Advocate Health Care considered all of these factors when it made a system-level commitment to develop a hepatobiliary (HPB) center of excellence. Oncology leaders started by analyzing their market share. They found that the Good Samaritan site had significant outmigration of hepatobiliary patients, which was not surprising since there was not a surgical oncologist on staff at that site. The assessment also showed that the majority of hepatobiliary patients in that area had to travel long distances for surgery with 82% of patients receiving care outside of their primary service area (PSA).

When evaluating volumes and capacity, leaders realized that surgeons treating hepatobiliary cancers at other sites across the system had excess capacity. Rather than hiring a new surgeon, they took the more cost-effective route of developing a hepatobiliary surgery outreach clinic at Good Samaritan Hospital.

Advocate's Assessment of Hepatobiliary Surgery at Good Samaritan Hospital

- **Market Assessment**
  - Reviewed current HPB market share
  - Found no HPB patients in market went to Good Samaritan; 18% of patients went elsewhere in PSA, 82% went outside PSA

- **Internal Evaluation**
  - Attributed outmigration to lack of HPB surgeons at Good Samaritan Hospital
  - Determined HPB surgeons at other hospitals in system had excess capacity

- **Financial Analysis**
  - Calculated lost revenue from outmigration, cost of hiring HPB surgeon for Good Samaritan, and cost of HPB surgeons from other sites traveling to Good Samaritan

- **Organization Strategy**
  - Weighed options to stem outmigration against system goal to develop comprehensive and centralized HPB program

Develop Outreach Clinic at Good Samaritan Hospital

- **Providers**
  - Staffed by hepatobiliary surgeons from other sites within the system

- **Operations**
  - Surgeons travel to clinic weekly to conduct patient consults and follow-up appointments; patients travel to surgeon’s main hospital site for surgery

- **Marketing**
  - Meet with providers and administrators involved in referral process to inform them about clinic

Case in Brief: Advocate Health Care

- 12-hospital health system based in Downers Grove, Illinois
- Reviewed outmigration data from Advocate Good Samaritan Hospital and found no hepatobiliary patients received care there; attributed outmigration to lack of hepatobiliary surgical expertise at Good Samaritan Hospital
- Evaluated lost revenue from outmigration, cost of hiring hepatobiliary surgeon, relationship with referring physicians in community, location and capacity of existing hepatobiliary surgeons in system, and organizational goals for hepatobiliary surgery program
- Started weekly hepatobiliary outreach clinic at Good Samaritan; two hepatobiliary surgeons from other sites in system alternate doing patient consults and follow-up appointments in clinic but perform surgeries at their main site
- Promoting clinic by meeting with key stakeholders involved in referral process

Source: Advocate Health Care, Downers Grove, IL; Oncology Roundtable interviews and analysis.
Surgical Oncology Requires a Team

Once surgical expertise is in place, programs need to invest in the infrastructure to support those surgeons and the patients they will be treating. From an organizational perspective, program leaders must determine who the surgeons will report to and ensure that the right support staff are in place. Programs also need to consider additional technology investments given the surgeon’s expertise. It may also be necessary to invest in specialized support services for surgical oncology patients.

Need the Right Infrastructure for a Successful Program

Four Key Infrastructure Considerations for Surgical Oncology Programs

- **Governance**
  - Determine optimal reporting structure for surgeons, such as:
    - Department of surgery
    - Cancer program
    - Dual reporting

- **Staff**
  - Secure buy-in from existing staff
  - Provide clinical education and support for existing staff
  - Evaluate additional staffing needs (e.g., advanced practitioners)

- **Technology**
  - Evaluate necessary technology investments
  - Determine best site to place technology
  - Assess technology utilization after purchase to maximize use

- **Support Services**
  - Ensure access to cancer program support services
  - Hardwire referrals to support services
  - Identify unique support services for surgery patients (e.g., ostomy clinic, post-surgery pain management)

Pain management is especially important because many cancer patients experience prolonged pain after surgery, leading to a poor quality of life.

In recognition of this, OSUCCC-The James Cancer Hospital paired thoracic surgeons with members of the pain and palliative medicine team to help surgeons identify patients who would benefit from a palliative care consult and learn how to develop pain management plans themselves. At the end of the eight-month training, the program saw improved patient satisfaction with pain control, reduced length of stay, and an increase in appropriate referrals to hospice.

Doubling Down on Pain Management

**Training Surgeons in Pain Management**

- Thoracic surgeons paired with members of hospital’s pain and palliative medicine team
- Pain and palliative medicine specialists worked alongside surgeons, training them to:
  - Recognize patients in need of consult with pain and palliative medicine service
  - Develop pain management plans themselves

**Intervention led to:**

- Greater patient satisfaction with pain control
- Reduced length of stay
- Increased appropriate referral to hospice for inoperable cases

**Case in Brief:**

The Ohio State University Comprehensive Cancer Center: The James Cancer Hospital, and Solove Research Institute

- NCI-designated comprehensive cancer center located in Columbus, Ohio
- Eight-month program paired thoracic surgeons with pain and palliative medicine team
- Compared to usual care, program resulted in improved pain control, increase in appropriate referral to hospice for inoperable cases, shorter length of stay, and lower treatment cost when surgery was not required; improvements in patient care sustained at six months after completion of training

Practice 2: Set Minimum Procedure Volumes

Safety in Numbers

Another way to ensure high-quality surgical care is by setting minimum procedure volumes.

There is a significant and growing body of literature tying hospital and surgeon procedure volumes to patient outcomes across many different types of cancer surgeries. Despite this evidence, a recent study of California hospitals found that many cancer patients still receive surgeries at low-volume facilities despite living within 50 miles of a high-volume hospital.

Despite Evidence, Patients Still Go to Low-Volume Sites

Clear evidence tying volumes to outcomes...

<table>
<thead>
<tr>
<th>Increase in post-operative mortality for patients who received rectal cancer surgeries at LVHs¹ compared to HVHs²</th>
<th>Decrease in five-year survival for patients who received esophageal resections at LVHs compared to HVHs</th>
<th>Higher odds of readmission for patients who received lung cancer resection at a LVH compared to a HVH</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>133%</strong></td>
<td><strong>48%</strong></td>
<td><strong>18%</strong></td>
</tr>
</tbody>
</table>

...but patients still receive surgeries at low-volume hospitals

<table>
<thead>
<tr>
<th>Of California hospitals performed less than three of at least one type of cancer surgery in 2014</th>
<th>Of California cancer patients who received surgery at a low-volume hospital in 2014 lived within 50 miles of a high-volume hospital</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>73%</strong></td>
<td><strong>70%</strong></td>
</tr>
</tbody>
</table>


¹ Low-volume hospitals, not defined consistently across studies.
² High-volume hospitals, not defined consistently across studies.
Putting Volumes in the Spotlight

To help patients make informed decisions about where to go for cancer surgeries, California has created a free public website, Cal Hospital Compare. On this website, the state publishes data on cancer surgery volumes for all of its hospitals. The website includes data for eleven tumor sites and highlights the connection between volumes and patient outcomes. Patients can use the database to compare tumor site-specific surgical volumes for up to three hospitals at a time, in addition to seeing the statewide range.

California Publishes Surgery Volumes for All Hospitals

Cancer Surgery Volume Data on Cal Hospital Compare Website

Notes
implications
of volumes

Allows comparison of up to three hospitals

Breaks volumes out by tumor site

Provides range of volumes in the state for comparison

Technology in Brief: Cal Hospital Compare

- Free online public database with quality information for all California hospitals; funded by grant from California HealthCare Foundation to help consumers make smarter and more informed medical decisions
- Allows users to compare up to three hospitals’ quality ratings for patient experience, mother and baby, hip and knee, patient safety, health care-acquired infections, cancer surgery, emergency department care, heart and lung conditions, stroke, surgeries/other conditions
- Includes information on number of cancer surgeries performed at each hospital for 11 different tumor sites along with detailed explanation of correlation between volumes and outcomes

Source: Cal Hospital Compare, http://calhospitalcompare.org;
Oncology Roundtable interviews and analysis.
Taking a Pledge to Promote High-Quality Care

To address this at a system level, Johns Hopkins has partnered with Dartmouth-Hitchcock Medical Center and the University of Michigan to set procedure volume minimums within their organizations. Together, they started the “Take the Volume Pledge” campaign to encourage other hospitals to do the same, as well as the “Take the Volume Transparency Pledge” campaign to encourage hospitals to publish their procedure volume data.

Senior leaders from these three systems started by identifying ten surgeries, including four cancer surgeries, with strong evidence demonstrating an increased risk of negative outcomes when performed at low-volume hospitals and/or by low-volume surgeons. They then set the volume thresholds for hospitals and surgeons at the 20th percentile of hospital and individual surgeon volumes, adjusting these marks afterward based on surgeon input.

To enforce the minimums, leaders at Hopkins tie volumes to credentialing requirements. Individual surgeons who fall below the threshold are not granted privileges to perform that procedure. Similarly, hospitals in the system that fall below the facility volume threshold are not allowed to perform that procedure.

Hopkins Ties Volume Minimums to Credentialing

Johns Hopkins’s Process to Implement Surgical Volume Minimums

1. Identify Eligible Procedures
   - Senior leaders compiled list of procedures with evidence of relationship between volumes and outcomes
   - Prioritized 10 procedures with strongest evidence

2. Determine Volume Thresholds
   - Identified volume minimum as the lowest 20th percentile of hospital and individual surgeon volumes for each procedure
   - Verified clinical validity of cutoff as threshold with surgeons and adjusted as needed

3. Tie to Credentials
   - Hospitals in system below hospital volume threshold will not perform that procedure
   - Surgeons below individual surgeon volume threshold will not be granted privileges to perform that procedure

Hopkins, Dartmouth-Hitchcock, and University of Michigan’s Hospital and Surgeon Volume Yearly Minimums for Cancer Surgeries

<table>
<thead>
<tr>
<th>Procedure</th>
<th>Hospital Minimum</th>
<th>Surgeon Minimum</th>
</tr>
</thead>
<tbody>
<tr>
<td>Esophagus cancer resection</td>
<td>20</td>
<td>5</td>
</tr>
<tr>
<td>Lung cancer resection</td>
<td>40</td>
<td>20</td>
</tr>
<tr>
<td>Pancreatic cancer resection</td>
<td>20</td>
<td>5</td>
</tr>
<tr>
<td>Rectal cancer resection</td>
<td>15</td>
<td>6</td>
</tr>
</tbody>
</table>


1) Excludes six non-cancer surgeries also included in the “Take the Volume Pledge” campaign: carotid artery stenting, complex aortic surgery, mitral valve repair, hip replacement, knee replacement, and bariatric surgery.

Case in Brief: The Johns Hopkins Health System

- Six-hospital health system based in Baltimore, Maryland
- Partnered with Dartmouth-Hitchcock Medical Center and the University of Michigan to set volume minimums for certain surgical procedures
- Senior leaders from all three systems agreed on list of 10 procedures with significant literature linking volumes to outcomes; collected data and surgeons’ input to set the annual minimum volume for each procedure at a hospital and surgeon level
- Hopkins decided that hospitals in its system below hospital volume minimums will not perform that procedure; enforced surgeon volume minimums by tying them to credentialing requirements for new appointments and re-appointments
Room for Improvement

In addition to setting minimum procedure volumes, organizations can increase quality and decrease costs by standardizing surgical processes.

Organizations have significant room for improvement in this area. Costs and outcomes vary substantially across hospitals. For example, for major small and large bowel procedures (MS-DRG 331), length of stay varies by 3.5 days across top- and low-performing hospitals, and the cost per case varies by almost $6,000. Reducing this variation is critical to controlling costs and succeeding under risk-based contracts.

Focus on Areas to Improve Quality, Decrease Costs

Variation in National Benchmarks for Colorectal Surgery\(^1\) Outcomes

### Length of Stay

3.5 days
Difference in length of stay between 10th and 90th percentile hospitals

### Cost per Case

$5,910
Difference in direct cost per case between 10th and 90th percentile hospitals

### Readmission

33%
Point difference in 30-day raw readmission rates between 10th and 90th percentile hospitals

Related Resource

Find additional national benchmarks using the following Health Care Advisory Board resource, available on advisory.com:

Hospital Benchmark Generator

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1) Benchmarks for MS-DRG 331 (major small and large bowel procedures without complication or comorbidity or a major complication or comorbidity), includes cancer and non-cancer surgeries.
Focus on Big-Ticket Items

In an effort to reduce cost variation across surgeons, Tesla Health System (a pseudonym) analyzed colorectal surgery data for seven common procedures. They immediately identified two opportunities: switching from open to minimally invasive techniques and reducing variation in surgical supply kits.

In response, the chief medical officer (CMO) is working with the colorectal surgeons to use minimally invasive techniques for these procedures. They are also in the final stages of standardizing the surgical supply kit, specifically the three most expensive items. For lower anterior resections, the organization estimates that it can save more than $1,500 per procedure just by standardizing trocars, staplers, and the energy source. Altogether, Tesla Health System predicts that these efforts will reduce unnecessary costs by millions of dollars.

Prioritizing Minimally Invasive Surgery, Supplies

Tesla Health System’s Steps to Standardize Colorectal Surgeries

1. **CMO and data analyst evaluated colorectal surgery data to identify areas for cost savings.**
2. **Identified two biggest opportunities:**
   - Switching from open to minimally invasive procedures
   - Reducing variation in surgical supplies
3. **Standardized procedure techniques and three most expensive supply kit items: trocars, staplers, energy source.**

<table>
<thead>
<tr>
<th><strong>Lower Anterior Resection Supply Costs</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>Current supply cost/case…………………..$2,923</td>
</tr>
<tr>
<td>Standardized supply kit cost/case………..$1,370</td>
</tr>
<tr>
<td><strong>Savings/case…………………..$1,553</strong></td>
</tr>
<tr>
<td><strong>Projected annual total savings………..$245,374</strong></td>
</tr>
</tbody>
</table>

**Case in Brief: Tesla Health System**

- 2,200-bed health system located in the Midwest
- Chief medical officer and data analyst evaluated colorectal surgery data for seven common procedures to identify areas for cost savings
- Identified switching from open to minimally invasive colorectal surgeries and reducing variation in surgical supplies as biggest opportunities for cost savings
- Currently working with colorectal surgeons to switch from open to minimally invasive technique, and deciding protocol for surgeons not trained in minimally invasive techniques
- Colorectal surgeons are currently reviewing proposed supply kit that standardized three most expensive supplies: trocars, staplers, and the energy source
- Estimated $1,553 in savings per procedure, and $245,374 annual savings system-wide, by standardizing supply kit for lower anterior resections and millions of dollars in total savings by switching to minimally invasive procedures, positioning the organization for success under value-driven reimbursement

Source: Oncology Roundtable interviews and analysis.
Improving the Colorectal Surgical Pathway

To standardize the care delivered before, during, and after surgery, Johns Hopkins used national standards and clinician and patient feedback to develop standardized treatment protocols. These protocols are compiled into an Integrated Recovery Pathway (IRP).

The IRP also serves to engage patients through standardized education and encourages them to move soon after surgery to prevent blood clots. Johns Hopkins has integrated the IRP into their EHR to create visibility and accountability. As a result, they have seen significant improvements in outcomes, including decreased infection rates, length of stay, and cost of treatment.

Key Elements of Johns Hopkins’s Integrated Recovery Pathway

› **Communication**
  Foster collaboration between entire team, spanning senior leaders to frontline staff

› **Standardization**
  Establish practices based on past experience to be followed before, day of, and after surgery

› **Participation**
  Engage patients in IRP development and treatment decision making

Outcomes After Implementing Integrated Recovery Pathway

- 12% Decrease in surgical infection rates
- $2,000 Decrease in average total cost of treatment
- 2 days Decrease in average length of stay

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**Case in Brief: The Johns Hopkins Hospital**

- 1,056-bed academic medical center located in Baltimore, Maryland
- Created teams across the hospital to develop special protocols, called Integrated Recovery Pathway (IRP), to improve colorectal surgery patient outcomes and experience using clinician and patient feedback
- Integrated IRP into EMR to create visibility and accountability
- IRP established practices such as educating patients about procedure before it occurs, using antibiotics before surgery to prevent infection, and encouraging patient to move soon after surgery to prevent blood clots
- Observed improved patient satisfaction as well as improved outcomes in surgical infection, average length of stay, urinary tract infection, average cost of treatment, and deep vein clots

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To take an even more comprehensive approach, Advocate Health Care has standardized the entire care pathway for breast surgery. Over the course of seven months, leaders convened a group of breast surgeons from multiple sites across the system to develop guidelines that cover treatment, continuing medical education (CME) requirements, tumor board attendance, and referral protocols. Once completed, the system’s health outcomes council voted to adopt the guidelines as the standard of care across all sites.

The leaders of the breast surgery group at Advocate are currently working to identify metrics that will allow them to measure individual surgeon compliance. In the future, the system is hoping to determine if the guidelines significantly impact patient care and, if so, to encourage referrals to compliant surgeons.

Advocate Develops System-Wide Practice Guidelines

Convened group of breast surgeons interested in developing guidelines

Adopted guidelines as standard for breast surgery across the system

Working to attach metrics to guidelines to measure compliance and align with financial incentives in the future

Drafted surgical guidelines covering treatment, CME requirements, tumor board attendance, and referral processes to medical and radiation oncology

Presented finalized guidelines approved by all breast surgeons to health outcomes council

Sample Guideline Topics
- Core needle biopsy expectations
- Assessing high-risk patients
- DCIS treatment
- Management of benign and high-risk lesions

Case in Brief: Advocate Health Care

- 12-hospital health system based in Downers Grove, Illinois
- Administrators organized team of breast surgeons from across the system to develop surgical practice guidelines for breast cancer based on recommendations from various quality associations
- Developed seven-page set of breast-specific surgical guidelines covering treatment, CME requirements, tumor board attendance, and referral processes to medical and radiation oncology
- Presented guidelines to system health outcomes council, which decided to adopt guidelines as system standard
- Currently working to attach metrics to each standard to measure individual surgeon compliance and potentially tie financial incentives to performance in the future

Source: Advocate Health Care, Downers Grove, IL; Oncology Roundtable interviews and analysis.
New National Effort to Standardize Care

External organizations and accrediting bodies are also focusing on improving surgical care. One example is the National Accreditation Program for Rectal Cancer (NAPRC), a collaboration between the Commission on Cancer (CoC) and the Consortium for Optimizing the Treatment of Rectal Cancer (OSTRiCh).

The groups started developing NAPRC in 2015 and completed six pilot surveys in spring of 2016. They finalized the standards manual, quality of care metrics, and survey process in early 2017, and are accepting applications at the time of this publication. The core elements of program evaluation include: program leadership, clinical services, treatment planning and time to treatment, and quality improvement.

Whether through participation in national accreditation programs or through internal efforts, program leaders should focus on opportunities to standardize surgical processes with the goals of increasing quality and reducing unnecessary costs.

Partnership to Start Rectal Cancer Accreditation Program

Program Elements Evaluated by NAPRC Standards

- **Program Leadership**
  Ensures the program and multidisciplinary team is overseen by an appointed and qualified rectal cancer program leader

- **Clinical Services**
  Confirms rectal cancer patients receive appropriate care based on diagnosis

- **Treatment Planning and Time to Treatment**
  Verifies treatment begins within specified time frame

- **Quality Improvement**
  Utilizes data to improve efficiency, standardize care, and improve outcomes

Organization in Brief: OSTRiCh Consortium

- Started in 2011 with purpose of improving the quality of rectal cancer care through advocacy, education, and research
- 144 members, including academic and community cancer centers
- Provides transanal total mesorectal excision and rectal cancer registries
- In early 2015, proposed National Accreditation Program for Rectal Cancer to CoC; completed six pilot surveys by spring 2016
- They finalized the standards manual, quality of care data measures, and survey process in early 2017, and are currently accepting applications from programs interested in pursuing accreditation

Practice 4: Ensure Equitable Access to Care

If You Build It, Can They Access It?

As programs develop best-in-class surgical programs, they need to make sure all patients in their community can access these services. While timely access to surgeries is a priority for all patients, many populations are disproportionately affected.

For example, one study found that black patients with pancreatic cancer are 43% less likely to undergo evaluation by a surgeon compared to white patients. Another study found that breast cancer patients who have a mastectomy and live 20 or more miles from a plastic surgeon are 27% less likely to receive breast reconstruction than patients who live within 10 miles of a plastic surgeon.

<table>
<thead>
<tr>
<th>Sample Disparities</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Race</td>
<td>43%</td>
</tr>
<tr>
<td>Insurance</td>
<td>42%</td>
</tr>
<tr>
<td>Geography</td>
<td>27%</td>
</tr>
<tr>
<td>Gender</td>
<td>25%</td>
</tr>
</tbody>
</table>

Lower odds of **undergoing evaluation by a surgeon** for black patients with pancreatic cancer compared to white patients.

Lower odds of **receiving breast reconstruction** for breast cancer patients with Medicaid compared to women with private insurance.

Lower odds of **receiving breast reconstruction** for breast cancer patients who live 20 or more miles from a plastic surgeon compared to women who live within 10 miles of a plastic surgeon.

Lower odds of **receiving timely surgical resection** for NSCLC for women compared to men.

### Related Resources

Learn strategies to increase access to cancer care with the following Oncology Roundtable resources, available on advisory.com:

- Elevating Oncology Referral Strategy
- Online Cancer Program Marketing
- Timely Care for Oncology Patients
- Six opportunities to get the most out of your patient navigation program
- Cancer Patient Financial Navigation

Find studies documenting disparities in surgical care using the following resource, available on facs.org:

American College of Surgeons Surgical Disparities Research Database

To overcome racial disparities in the treatment of early-stage lung cancer, Cone Health developed the Accountability for Cancer Care Through Undoing Racism and Equity (ACCURE) program. The program takes a multipronged approach, including missed appointment alerts for providers, nurse navigator training to deal with race-related barriers, and race-specific treatment feedback to providers and staff.

This intervention has had a tremendous impact. Racial disparities in treatment rates for patients in the ACCURE group almost completely disappeared both for lung cancer patients who only underwent surgical resection and patients who underwent resection and stereotactic body radiation therapy (SBRT). In fact, due to heightened focus on access, the ACCURE program increased overall treatment rates for both racial groups.

### Program Closes Racial Gap in Lung Cancer Treatment

#### Components of ACCURE Program

1. **Missed Appointment Alert**
   - Leverage EHR to alert providers when patient misses an appointment or treatment milestone

2. **Trained Navigators**
   - Use nurse navigators trained to deal with race-related barriers to care

3. **Provider Feedback**
   - Present race-specific feedback on treatment to care teams

4. **Staff Education**
   - Conduct health equity training sessions every three months for healthcare staff

#### Treatment Rates by Race for Lung Cancer Patients at Baseline and in ACCURE Group

![Graph showing treatment rates by race for lung cancer patients at baseline and in ACCURE group.](chart)

**Baseline, 2007-2012**

- Black, Resection Only: 55%
- White, Resection Only: 61%
- Black, Resection Plus SBRT: 64%
- White, Resection Plus SBRT: 76%

**ACCURE, 2013-2015**

- Black, Resection Plus SBRT: 79%
- White, Resection Plus SBRT: 80%
- Black, Resection Only: 76%
- White, Resection Only: 96%

### Case in Brief: Cone Health

- Six-hospital health network based in Greensboro, North Carolina
- Developed coordinated patient outreach program, Accountability for Cancer Care Through Undoing Racism and Equity (ACCURE), to combat racial disparities in curative treatment of early-stage lung cancer
- Found ACCURE program increased rates of resection plus SBRT and resection alone for both black and white patients and eliminated racial disparities between the two groups; observed moderate improvement in treatment rates and decline in disparities in control group also, likely due to spillover effect

Consider All the Options

To tackle geographic barriers to accessing breast reconstruction surgery, University of North Carolina (UNC) Lineberger Comprehensive Cancer Center employs myriad strategies. Sample approaches include leveraging telemedicine and encouraging patients to connect over social media to share rides to the cancer center. UNC also partners with community providers for follow-up care and trains caregivers to do home expansion for patients with tissue expanders.

### A Multipronged Approach to Reduce Disparities

**UNC’s Strategies to Increase Patient Access to Breast Reconstruction**

<table>
<thead>
<tr>
<th>Leverage Telemedicine</th>
<th>Partner with Community Providers</th>
<th>Stage Procedures</th>
<th>Maximize Social Media</th>
<th>Train Caregivers</th>
</tr>
</thead>
<tbody>
<tr>
<td>Use telemedicine equipment installed at hospital in patient’s community (or Skype, FaceTime) for initial consult</td>
<td>Engage physicians in patient’s community to help with follow-up care (e.g., drain removal)</td>
<td>Have surgeon in patient’s community perform mastectomy and UNC surgeon perform staged immediate reconstruction within two weeks</td>
<td>Leverage social media to encourage breast reconstruction patients to connect with each other and organize carpools to appointments</td>
<td>Train caregivers to do home expansion of balloons for patients with tissue expanders in lieu of returning to UNC</td>
</tr>
</tbody>
</table>

### Case in Brief: UNC Lineberger Comprehensive Cancer Center

- NCI-designated Comprehensive Cancer Center based in Chapel Hill, North Carolina
- Found patient distance from plastic surgeon is a major barrier to breast reconstruction for women in North Carolina diagnosed with breast cancer
- Identified five strategies to mitigate geographic barriers:
  - Use telemedicine equipment installed at a hospital in the patient’s community for initial consults with breast reconstruction surgeon
  - Partner with physicians in the community to help with follow-up care
  - Conduct staged breast reconstructions where a local surgeon performs the mastectomy and the patient comes to UNC for a separate staged immediate reconstruction operation; within two weeks of the mastectomy the result mirrors immediate/same-day reconstruction
  - Leverage social media to facilitate networking across breast reconstruction patients to organize carpools to appointments
  - Train caregivers to perform home expansion for breast reconstruction patients with tissue expanders, which reduces travel to cancer program
- Providers select best strategy or combination of strategies for each patient’s situation

Source: UNC Lineberger Comprehensive Cancer Center, Chapel Hill, NC; Oncology Roundtable interviews and analysis.
DIY Breast Tissue Expansion

New Device Reduces Patient Travel Burden and Speeds Reconstruction

In fact, at-home tissue expansion may become more feasible for patients due to AeroForm, which was approved by the Food and Drug Administration (FDA) at the end of 2016. AeroForm is an at-home wireless tissue expander system for patients who choose to have reconstruction surgery following a mastectomy. Patients can use a dose controller to inflate the expander with prescribed amounts of carbon dioxide in their own home. The goal is to minimize the number of times a patient needs to see their doctor for saline injections following their surgery. A large clinical trial showed that AeroForm significantly reduced the number of days to complete expansion and to exchange the expander for a permanent implant.

AeroForm Technology

Proposed Benefits Over Saline Expansion

- Needle-free
- Shorter recovery
- Patient-controlled daily expansion
- Programmed dosing limits
- Reduced pain
- True anatomical shape

Preliminary Results from XPAND Clinical Trial

51%
Reduction in median days to complete expansion using AeroForm compared to saline injection

8%
Reduction in median days to expander exchange for permanent implant using AeroForm compared to saline injection

84%
Of patients who used AeroForm for tissue expansion reported being satisfied with their experience with the device

Technology in Brief: AeroForm

• Needle-free, wireless tissue expander system for patients who choose to have reconstruction surgery following a mastectomy that allows patients to use a wireless dose controller to inflate the expander with prescribed amounts of carbon dioxide at home; intended to reduce patient burden of traveling to doctor weekly for saline injection into tissue expanders after reconstruction

• Underwent three successful clinical trials in Australia; currently in final phase of US multi-site randomized controlled clinical trial

• Preliminary results from US XPAND clinical trial show a similar rate of successful exchange for permanent implant in the AeroForm and saline injection groups, but 51% reduction in median days to complete expansion and 8% reduction in median days to expander exchange for permanent implant using AeroForm compared to saline injection; also found 84% and 89% patient and physician satisfaction with AeroForm, respectively

• Received FDA approval December 2016

Surgical Oncology Innovation Overview

Potential Impact in the Next Three to Five Years

To evaluate and prioritize future investments in surgical oncology, program leaders need to carefully weigh each investment's impact on patient volumes, outcomes, cost, and research. For example, investing in hiring a surgical oncologist can have a significant impact on patient volumes, outcomes, and market share. In contrast, tumor localization, which is limited to lumpectomy patients, will have a minimal impact on those factors.

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</thead>
<tbody>
<tr>
<td>Surgical Oncologist</td>
<td>How many patients could potentially be affected?</td>
<td>What is the impact on costs (e.g., increased efficiency, decreased service utilization)?</td>
<td>What is the potential to attract new patients?</td>
<td>How much will this differentiate us as a research program?</td>
</tr>
<tr>
<td>Surgical Robot</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Optical Imaging</td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Tumor Localization</td>
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</tr>
</tbody>
</table>

- **No Impact**: 0
- **Minimal Impact**: 1
- **Moderate Impact**: 2
- **Significant Impact**: 3
- **Maximum Impact**: 4

Key Takeaways

1. **Make sure surgery is integrated into the cancer program.**
   Surgery is a core component of cancer treatment, and volumes are expected to grow significantly across the next 5 to 10 years. As such, cancer program leaders should advocate for direct or indirect oversight of surgical oncology to improve integration and coordination. Programs should also include surgeons in initiatives and events.

2. **Make informed decisions about your surgical oncology investments.**
   Conduct a comprehensive assessment of internal resources and market dynamics to decide which areas your surgical oncology program will focus on and what strategies it will use to gain the necessary expertise. Programs must also ensure they have the right infrastructure to support their surgical oncology program. While having a da Vinci robot is no longer a differentiator, cancer programs must make the most of their investment by evaluating how and where they use it.

3. **Focus on opportunities to deliver high-value surgical care.**
   As we transition to value-based care, programs have to improve quality and decrease costs. Due to the growing evidence linking volumes to quality, set minimum procedure volumes for surgeons and hospitals. Organizations should also implement initiatives to standardize care across surgeons and hospitals.

4. **Deliver on your mission of ensuring access to high-quality surgical oncology care.**
   To reduce health disparities, programs should identify the populations in their community that disproportionately struggle to access surgical oncology services. Programs then need to develop targeted interventions to reduce these disparities, such as providing targeted education, outreach, and telehealth options.

Source: Oncology Roundtable interviews and analysis.

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