The **New Framework** for Clinical Technology Investment

Key Considerations for Evaluating and Purchasing Technologies in a Value-Based Market
Technology Insights

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**Introduction to Technology Insights**

Guiding You to Right Answer Within a Rapidly Evolving Marketplace

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**Program in Brief**

Technology Insights provides *clinical investment guidance* and *strategic decision support* through *customized projects* and unlimited consultation from a team of **30 dedicated experts**. Our mission is to drive successful growth and investment strategy for our members facing new rules of competition in a value-based market.

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**Major Strategic Planning Functions**

<table>
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<th>No.</th>
<th>Function</th>
<th>New Market Complexities</th>
<th>The Value of Customized Guidance</th>
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<tr>
<td>1</td>
<td>Market Assessment</td>
<td>• Greater M&amp;A activity, new affiliations, emerging nontraditional competitors</td>
<td>• Unique insights based on your market dynamics drive fine-tuned recommendations on competitive opportunities</td>
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<tr>
<td>2</td>
<td>New Business Development</td>
<td>• Entrenched competition, new business models, escalating payment pressures</td>
<td>• Customized decisions based on your performance, risk profile, and financial assumptions</td>
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<td>3</td>
<td>Capital Planning</td>
<td>• Volume volatility, persistent cost growth, competing capital priorities</td>
<td>• Concrete plans and prioritization accounting for your institutional priorities, budget, and strategic goals</td>
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<td>4</td>
<td>Service Line Strategy</td>
<td>• Greater accountability for high-value care, pressure to expand care continuum coverage</td>
<td>• Tactical recommendations for service investment and distribution based on deep knowledge of your current care model</td>
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<tr>
<td>5</td>
<td>System Strategy</td>
<td>• Network integrity challenges, balancing access and efficiency with regional coverage</td>
<td>• Strategic recommendations on clinical asset deployment and competitive strategy based on your current system structure</td>
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Within Your Membership

How We Work With You and Your Team

Customized Support at Your Beck and Call

Access to Customized Guidance Across the Entire Year

Customized Business Plans to Address Your Challenges

- Commission projects based on top-of-mind questions and challenges
- Expert TI team deployed against customized work plan
- Queue of projects established to support key strategic initiatives spanning full planning cycle

On-Demand Content and Insights

- Tap into wealth of readily available content directly through your Dedicated Advisor
- Content spans variety of topics:
  - Clinical technology intelligence
  - Business plans
  - Clinical program models
  - Service line strategy
  - System strategy

Ongoing Implementation and Expert Support

- Access strategic plan deployment support and leverage live expert perspectives
- Dedicated Advisor connects members with our leading experts, organized across major clinical areas:
  - Cardiovascular, Diagnostic Imaging, Neurosciences, Oncology, Orthopedics, Surgical Services, Women’s Services

Commission a Project

Access Reports and Online Content

Work with Our Experts

Role of Your Dedicated Advisor:

- Facilitates periodic planning calls to understand your strategic priorities
- Maps customized resources to your priorities across the year
- Proactively identifies relevant projects, content, and events for your team
- Ensures seamless delivery on all custom support, based on your deadlines
Within Your Membership

**Broad Array of Topics Covered, Projects Available**

Deep Knowledge and Capability Spanning Top-of-Mind Decisions

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<th>Neurosciences/Orthopedics</th>
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<td>• Tomosynthesis 360° Technology Assessment</td>
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<td>• Transcatheter Valve 360° Assessment</td>
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<td>• Vascular Services Business Plan</td>
<td>• Breast Imaging Services Assessment</td>
<td>• Comprehensive Spine Center Development Plan</td>
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<td>• Heart Failure Gap Analysis</td>
<td>• Hybrid PET/CT 360° Technology Assessment</td>
<td>• Spine Implant Spend Audit</td>
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<td>• Electrophysiology Business Plan</td>
<td>• Electromagnetic Navigation Bronchoscopy (ENB) 360° Technology Assessment</td>
<td>• Intraoperative Imaging Investment Guide</td>
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<td>• Oncology Service Line Gap Analysis</td>
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<td>• Proton Beam Therapy 360° Assessment</td>
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<td>• Obstetrics Service Line Assessment</td>
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**System Priorities**

- Cross-Service Line Rationalizing Growth Plan
- Multi-hospital Service Line Gap Analysis
- Capital Budget Plan Audit
- Multi-hospital Program Capacity Audit
Beyond Technology Insights: The Marketing and Planning Leadership Council

Mapping the Marketing and Planning Leadership Council’s Resources to the Planner’s Calendar

Planning Job Functions

1. Scanning Market Forces
   • Assessing market share
   • Tracking competitor growth strategy
   • Impact of new legislation and regulations
   • Payer adoption of new reimbursement models
   • Community health needs assessments

2. Assessing New Business Opportunities
   • ROI assessment of prospective services
   • Service line program development
   • Sizing implementation and staffing costs
   • Business plan creation
   • Marketing campaigns
   • Joint venture, acquisition and affiliation strategy

3. Budgeting and Forecasting
   • Year-to-year volume projections
   • Capacity planning
   • Facility planning
   • Health system service line rationalization

4. Updating the Strategic Plan
   • Adjusting strategic objectives
   • Communicating with key stakeholders
   • Course correction action plans
   • Executive and board reporting
   • Cascading service line plan adjustments

5. Monitoring Plan Progress
   • Initiative performance reporting
   • Initiative accountability realignment
   • Project management consultations
   • Marketing prioritization and campaign ROI

Selected Advisory Board Resources

• Medicare Market Share Calculator
• Physician Alignment Research and Consultation
• Competitive Intelligence Toolkit
• Community Health Needs Assessment Toolkit

• Service Line Strategy Briefings
• Original Inquiry Service and Peer-to-Peer Facilitation
• Business Plan Audits and Pro Forma Templates
• Marketing Plan Templates

• Inpatient, Outpatient, Service Line Volume Estimators
• Ambulatory Network Planning Guide
• Capital Prioritization Toolkit

• Health System Strategy Retreat Presentations
• Strategic Planning Process Audit
• On-Demand Strategic Plan Review
• Action Planning Template
• Strategic Plan Templates
• Service Line Strategy Consultations and Audits

• Strategic Scorecard Templates
• Planning for Change Toolkit
• Strategic Planner Educational Seminars
• Marketing Prioritization Toolkit and ROI Calculator
Executive Summary

Strategic Planners Face Challenges to Traditional Growth Channels

Demographic, market, and regulatory changes are shifting demand for health care services – both case mix and utilization – in fundamental ways. The aging population will require more disease management and medical, rather than procedural, services. Meanwhile, purchasers – employers, payers, and consumers – are moving aggressively to control health spending through both utilization and price controls. These pressures will require all hospitals and health systems, regardless of payment model, to manage case mix and demonstrate value by 1) controlling costs of acute episodes and 2) reducing unnecessary utilization through improved disease management and cross-continuum coordination.

Mandate for A New Clinical Technology Investment Framework

With greater accountability for value, strategic planners have devoted less mindshare to clinical technology investment decisions. Long used to drive utilization growth, particularly for procedural services, clinical technology investments have come under scrutiny from purchasers who now question their necessity. However, clinical technologies can also play important roles in delivering high-value acute care, strengthening outpatient care, and coordinating care across sites and services. To ensure these investments support providers’ new mandates, planners must redefine their approach to technology evaluation and purchasing strategy.

New Investment Imperatives and Purchasing Objectives

We propose a new investment framework that leverages technology to build purchasers’ loyalty by demonstrating value across time.

This publication offers twelve purchasing objectives and related examples, which demonstrate how planners can reestablish clinical technology as a competitive and growth lever.

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<tr>
<th>Improve Episodic Performance</th>
<th>Enhance Cross-Continuum Care</th>
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<td>5. Improve treatment efficiency</td>
<td>5. Raise patient satisfaction and loyalty</td>
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<td>6. Enhance patient safety</td>
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<tr>
<td>7. Reduce readmissions</td>
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The New Purchasing Strategy for Clinical Technology
New payment models mark a shift to greater accountability for hospitals and health systems, requiring a new strategy for growth and profitability.

Under fee-for-service incentives, clinical technology played a central role in market differentiation and growth strategy. By investing in premium technologies, strategic planners added novel services and procedures, tapping into new sources of patients and revenues.

However, in the value-based market, clinical technology will play a vastly different role, rendering the traditional investment framework—one based primarily on volume and margin considerations—less reliable over time. The aging population will require improved management of chronic conditions. Health care consumers and purchasers have become more discerning about quality and cost of care, raising the bar for episodic accountability. In particular, providers embracing population health management will face a stricter mandate to manage utilization for patients across time.

Source: Technology Insights research and analysis.
While most providers will operate primarily under fee-for-service incentives for the foreseeable future, volume-based growth strategies, including traditional clinical technology investments, face inherent risk.

The increase in chronic conditions, pricing pressures, and utilization scrutiny raise questions about long-term volume prospects for premium technologies. In addition, the widespread proliferation of many technologies across the last decade will make it increasingly difficult for providers to capture a competitive edge in the market based on the technology portfolio alone.

### Challenges to Profitable Hospital Growth

#### Deteriorating Case and Payer Mix
- High-margin inpatient volume growth depressed, limiting investment in facilities, technologies, and physicians
- Aging population fueling shift away from discrete procedural therapies toward managed medical care

#### Cost and Reimbursement Pressures
- Downward pressure on commercial payment; lower unit price for procedures and services across health system
- Meanwhile, rising population of chronically ill patients has led to increasing cost of treatment

#### Utilization Scrutiny and Pressure
- Clinical standards emphasize effective use and diminished utilization
- Commercial payer steerage is also softening the demand for inpatient services

#### Entrenched Competition
- Increasingly crowded health care landscape makes differentiation difficult
- Hospitals must also navigate competition with freestanding competitors (e.g., specialty groups) for referral sources

Source: Technology Insights research and analysis.
Clinical Technologies Must Meet New Goals

In a value-based market, clinical technology must help hospitals and health systems meet new market expectations for the cost, quality and appropriateness of health care services. While the extent of value-based payment differs by market, all providers will need to transform their core services to prove value to purchasers, intermediaries and new decision-makers such as population health managers.

Three Objectives Under Value-Based Payments

- **Lower Costs**
  - Care standardization
  - Episode efficiency
  - Readmission reduction

- **Higher Quality**
  - Service reliability
  - Clinical outcomes
  - Patient experience

- **Utilization Appropriateness**
  - Patient engagement
  - Disease management
  - Care substitution

Source: Technology Insights research and analysis.
Executives Devoting Less Mindshare to Clinical Technology Decisions

With the introduction of new payment models, many planners and hospital executives no longer view technology as a dominant lever for differentiation and growth.

Executives devote greater mindshare to competing investments such as IT infrastructure and physician practices, as they seek to coordinate care across the continuum. Hospitals must prove value to purchasers, cost-conscious consumers, and at-risk physicians that prioritize disease management over high-cost technology solutions. Lastly, many executives now view premium technology investment as a high-risk, high-reward strategy that is significantly more difficult to execute today.

Technology No Longer Considered as Critical a Lever for Differentiation

Factors Shifting Mindshare Away from Clinical Technology

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<th>Competing Investments</th>
<th>New Growth Channels</th>
<th>Perception of Lost Value</th>
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<td>IT infrastructure development</td>
<td>Discerning payers and employers demanding higher value</td>
<td>Greater scrutiny of high-end procedure utilization</td>
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<td>Physician practices</td>
<td>Increasingly cost-conscious consumers demanding enhanced access at lower cost</td>
<td>Market saturation of advanced services</td>
</tr>
<tr>
<td>Hospital and ambulatory facility mergers &amp; acquisitions</td>
<td></td>
<td>Slowing pace of innovation</td>
</tr>
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</table>

Source: Technology Insights research and analysis.
Providers Ignore Benefits of Technology at Their Own Risk

Even though hospital leaders devote less mindshare to clinical technology, they continue to make plenty of technology purchases. As new market forces change the ROI calculus for clinical technologies, health systems have less room for error. Given today’s higher stakes, administrators should devote even more attention to technology strategy.

First, administrators must continue to scan the technology horizon for investments that can provide growth while yielding clinical value.

Second, “getting it wrong” could have dire implications in today’s environment. For example, hospitals facing operating losses on robotic surgery find it challenging to subsidize this loss through other means, thereby jeopardizing margin goals.

Third, there is a distinct opportunity cost associated with not investing in clinical technology that achieves key population management endpoints.

Increasing Capital Spending Obliges Increased Attention to Technology

Providers Still Spending Significant Dollars on Technology 2011-2012

- Decreased 30% or More: 5% in 2011, 9% in 2012
- Decreased 1-29%: 23% in 2011, 23% in 2012
- Unchanged: 26% in 2011, 27% in 2012
- Increased 1-29%: 37% in 2011, 36% in 2012
- Increased 30% or more: 9% in 2011, 6% in 2012

In 2012, 42% of survey respondents noted plans to increase their capital budget; only 32% noted plans to decrease.

Three Reasons Providers Must Re-evaluate Technology Strategy

1. Technology Can Still Be a Growth Lever
   Investment in PET/CT opens an untapped cancer imaging market
   PET/CT 10-year patient growth expectation: 52%
   Source: Technology Insights research and analysis.

2. “Getting It Wrong” Carries Higher Risk
   da Vinci robot investment jeopardizes margin goals
   Annual operating loss of robotic surgery at St. Paul’s: -$6M
   Source: Technology Insights research and analysis.

3. Technology Fundamental to Care Transformation
   Radial PCI improves recovery, length-of-stay for cardiac patients
   Radial PCI length-of-stay savings versus femoral PCI: 0.4 days
To create a new investment framework, it is first instructive to identify the role of technology in an environment of total cost accountability.

In this environment, hospitals would leverage clinical technology to achieve value over time according to three rules. First, technology must drive less costly care across a defined episode, as long as the clinical outcomes are equivalent. Second, technology must keep sick patients out of resource-intensive care settings through patient management. Third, technology must forestall expensive acute care demand through prevention.

**Under Risk, Technology Must Demonstrate Greater Value Over Time**

**Characteristics Defining Value**

- **Cost Reduction**
- **Quality Improvement**
- **Appropriate Utilization**

**Three Rules For Technology Investment Under Full Risk**

1. **Drive Less Costly Care Across Defined Episodes**
2. **Manage Patients in Less Costly Settings**
3. **Forestall Expensive Acute Care Demand**

**Clinical Evidence, Not Per-Click Revenues, Will Drive Future Technology Purchasing**

“Yes, the new value of health care will be defined as the intersection of high quality and low cost, but there’s also a key part missing: appropriateness. Right now, very few institutions are practicing evidence-based medicine when it comes to technology purchasing. Under full population management, you should only invest in technology with proven outcomes, and sometimes the best treatment is no treatment at all.”

*Director of Population Health, Pioneer ACO*
Rule #1: Drive Less Costly Care Across Defined Episodes

Under population management incentives, technologies must create care efficiencies versus previous standards, while also delivering equivalent or better quality outcomes across defined episodes.

For example, contrast-enhanced ultrasound (CEUS) is less expensive to administer than nuclear SPECT imaging on a per-procedure basis while offering the same or better outcomes. Though not highly profitable under fee-for-service, ultrasound may deliver greater value under risk for certain patients because it is less costly but equally as effective.

In another example, endobronchial ultrasound (EBUS) indirectly lowers the total episodic cost by eliminating complications, which simultaneously improves patient care. Specifically, EBUS offers a less invasive, outpatient-based staging method in comparison to traditional inpatient mediastinoscopy. EBUS also demonstrates similar negative predictive value and better sensitivity.

In both examples, technology reduces cost while also achieving equivalent or better outcomes compared the standard of care.
Rule #2: Manage Patients in Less Costly Settings

In addition to improving episodic value, providers must leverage technology to manage patients in less costly settings.

For example, technologies like telemedicine and remote monitoring have demonstrated success in managing several conditions, including chronic heart failure. By monitoring vital signs and facilitating communication between the patient and clinical staff, these technologies engage patients in follow-up care and monitor progress. Clinicians may then proactively determine appropriate post-acute needs. Hospital leaders benefit from lower readmissions and better patient satisfaction, which can result in cost savings of approximately $1,500 per patient.

Patient Monitoring Can Keep Sick Patients Out of Costly Acute Care Settings

Patient Monitoring Proven To Reduce Readmissions For CHF, COPD, Diabetes

- Centura Health at Home pilot program launched in 2010 to manage congestive heart failure, chronic obstructive pulmonary disease, and diabetes
- For all three conditions, 30-day readmission rates dropped 62%, on average
- Hospital achieved estimated cost savings of $1,000 to $1,500 per patient

Rule #3: Forestall Expensive Acute Care Demand

Beyond chronic patient management, providers under full risk must identify additional ways to reduce acute care demand to generate significant cost savings. Technologies that support prevention and risk assessment thus become powerful tools to manage longitudinal costs and outcomes.

For example, early data shows that genetic tests for BRCA and Lynch Syndrome biomarkers can lead to proactive screening and preventative treatment options—such as prophylactic bilateral mastectomy. If used appropriately for high-risk patients—who are likely to need expensive treatment down the road—genetic tests can improve patient outcomes while lowering the total cost of care.

While these examples illustrate the potential power of preventive measures, providers must use genetic tests judiciously to avoid overuse of unnecessary tests.

Market Pushing All Toward Value-Based Care

Regardless of Payment Model, All Providers Beholden to Value

While many hospitals have taken on risk-based contracts, most hospitals are still far from assuming full risk. Regardless of an institution’s position along the path to value-based care, the mounting pressures in today’s environment—ranging from the growing burden of an aging population to the increasing focus on quality performance—are forcing all providers to compete on value. Accordingly, hospital leaders must rethink strategic decisions to thrive under these new incentives.

Market Pushing All Toward Value-Based Care

Regardless of Payment Model, All Providers Beholden to Value

Value-Based Care Evolution

Yesterday’s Fee-for-Service

Enhanced Fee-for-Service

Hybrid Incentives

Total Population Management

Provider Accountability for Value

Common Forces Raise Accountability For All Providers

Demographic Forces

• Aging patient population generates significant chronic disease case mix
• Increasing patient acuity erodes procedural mix

Cultural Forces

• Nationwide backlash against excessive spending
• Budget and sequester cuts

Performance Forces

• Formal quality-oriented performance targets for fee-for-service and risk-based payments
• RAC audit penalties

Source: Technology Insights research and analysis.

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The same forces that raise accountability for value-based care also create new mandates for competition.

Under fee-for-service incentives, providers competed fiercely for share of individual treatments, with a distinct focus on high-margin inpatient procedures. By gaining more market share and scale, providers sought to negotiate better pricing with payers.

Now, however, providers must shift their competitive focus to emphasize individuals rather than procedures. Value-based purchasing and population management incentives require hospitals to prove value to purchasers by attracting and managing individuals over time to achieve better outcomes at lower cost.

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<tr>
<th>Traditional Competitive Mandates</th>
<th>Emerging Competitive Mandates</th>
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<tr>
<td><strong>1</strong> Invest in high margin inpatient services</td>
<td>Invest to enhance patient access across continuum</td>
</tr>
<tr>
<td><strong>2</strong> Control referrals for specialty care</td>
<td>Rebalance toward primary care, control full care pathway</td>
</tr>
<tr>
<td><strong>3</strong> Increase scale and volumes share</td>
<td>Secure greater population share</td>
</tr>
<tr>
<td><strong>4</strong> Leverage scale for better pricing</td>
<td>Improve outcomes and prove value to purchasers</td>
</tr>
<tr>
<td><strong>5</strong> Ensure per-procedure profitability</td>
<td>Aggressively manage costs across time</td>
</tr>
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Source: Technology Insights research and analysis.
Depending on the extent to which providers assume risk, they will face evolving goals related to individual patient management.

While hospitals must still grow treatment share regardless of payment model, they must also increasingly improve the value of episodic care to appeal to purchasers. Additionally, providers competing under risk-based contracts must build patient loyalty to ensure greater control over costs of care, thereby executing on acuity arbitrage over time. Therefore, providers must evaluate clinical technology investments on their ability to contribute to patient engagement and management goals.

**Technologies Must Help Providers Compete for Patient Loyalty**

**New Competitive Incentives Prioritize Individuals Over Treatments**

**Evolving Goals of Value-Based Competition**

- **Grow Treatment Share**
  - Compete for treatment volumes

- **Improve Episodic Performance**
  - Raise accountability and improve value of episodic care

- **Enhance Cross-Continuum Care**
  - Build patient loyalty to execute on acuity arbitrage over time

- **Manage Full Population**
  - Incorporate long-term preventative care, disease management

Source: Technology Insights research and analysis.
The vast majority of hospitals and health systems now operate under enhanced fee-for-service payment models—where payment is contingent on performance—or hybrid payment environments that include both contingency payment models and some population health management contracts.

As a result, providers must adopt a new investment framework that not only evaluates new technologies on their profitability and competitive advantages, but also weighs the ability of technologies to improve care value and patient management.

### New Investment Framework for the Value-Based Market

#### Episodic Performance, Cross-Continuum Care Key Imperatives During Transition

**Transition to Risk and Associated Technology Purchasing Objectives**

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<th>Yesterday’s Fee-for-Service</th>
<th>Enhanced Fee-for-Service</th>
<th>Hybrid Incentives</th>
<th>Total Population Management</th>
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#### Improve Episodic Performance

**Purchasing Objectives:**

1. Effectively triage acute patients
2. Eliminate unnecessary episode sequences
3. Reduce per-procedure costs
4. Drive care to lower-cost setting
5. Improve treatment efficiency
6. Enhance patient safety
7. Reduce readmissions

#### Enhance Cross-Continuum Care

**Purchasing Objectives:**

1. Optimize screening to recruit patients pre-diagnosis
2. Attract patients early for ongoing management
3. Find patients more quickly
4. Close gaps within care continuum
5. Raise patient satisfaction and loyalty

Source: Technology Insights research and analysis.
The New Purchasing Strategy for Clinical Technology
Improving Episodic Performance—Overview

Ample Opportunity to Improve Episodic Performance

As providers conceptualize a new investment framework, they must first evaluate how clinical technology can improve the value of episodic care. Episodic performance is imperative in an environment where purchasers hold providers accountable for care before, during and after an acute care treatments.

Across the duration of an episode, seven purchasing objectives support selection of the right clinical technology.

Technology Can Reduce Preventable Cost, Raise Episode Quality

Role of Technology in Addressing Episodic Care Challenges

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<th>Challenges of Episodic Care</th>
<th>Technology Purchasing Objectives</th>
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<tr>
<td>Incomplete diagnoses lead to superfluous tests</td>
<td>1. Effectively triage acute patients</td>
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<tr>
<td>Costly inputs or care setting raise expense</td>
<td>3. Reduce per-procedure costs</td>
</tr>
<tr>
<td>Ineffective treatment means more intervention</td>
<td>4. Drive care to lower-cost setting</td>
</tr>
<tr>
<td>Inadequate follow-up results in additional care</td>
<td>5. Improve treatment efficiency</td>
</tr>
</tbody>
</table>

1. Effectively triage acute patients
2. Eliminate unnecessary episode sequences
3. Reduce per-procedure costs
4. Drive care to lower-cost setting
5. Improve treatment efficiency
6. Enhance patient safety
7. Reduce readmissions

Source: Technology Insights research and analysis.
CCTA Effectively Triages Acute Patients but with Unproven Ability to Reduce Costs

Problem: High Rate of Expensive, Invasive, and Avoidable Catheterizations

40%-60%
Percentage of ICA’s done unnecessarily

Solution: CCTA, Used in Conjunction with Risk Stratification, Has High Negative Predictive Value

High-Risk
• Increases ED efficiency
• Lowers LOS
• Fewer unneeded ICAs

Low-Medium Risk

Lowest Risk

Reduction in Cost and Unnecessary Utilization Not Always Realized with CCTA

CCTA Total Cost of Care Versus Standard Pathway

Promised Benefit
CCTA used selectively

Lower LOS and ICA utilization

$1,321 Less¹

Potential Risk
CCTA used unselectively

More incidental findings and tests

$4,200 More²

¹ Patients randomly allocated to CCTA or SPECT MPI, includes 6-month follow-up period. Goldstein et al. CT-STAT. J Am Coll Cardiol. 2011;58(14):1414-1422. Note that other randomized controlled trials (e.g., ROMICAT II) have shown that even with selective application, cost reduction is not realized.

In addition to effective triage, technology purchases should be evaluated for their ability to streamline care pathways. Digital breast tomosynthesis (DBT), used to perform 3D mammography, offers the potential to lower costs, enhance efficiency, and improve patient satisfaction. By reducing the recall rate, or the percentage of patients who require additional imaging, DBT eliminates an unnecessary sequence in a breast patient’s episode of care.

The main adoption hurdle under fee-for-service is the lack of guaranteed incremental payment DBT, despite the fact that it may increase radiologist read time by 50%. DBT also reduces the need for follow-up diagnostic mammograms and biopsies, which may shrink revenue. However, under risk-based contracts and capitation, DBT provides more information at the same billable cost, streamlining patient care. By reducing false positives and false negatives, providers may require 10%-15% fewer diagnostic mammograms and biopsies, which may shrink revenue.

Digital Breast Tomosynthesis Potentially Obviates Need for Second Line Imaging

Breast Imaging Pathway from Screening to Accurate Diagnosis

- Screening Mammogram
- Diagnostic Mammogram
- Breast Ultrasound
- Breast Biopsy

Implementation of Digital Breast Tomosynthesis In Screening Pathway

- Screening Mammogram

  54% Increase in Cancer Detection

- Diagnostic Mammogram

  37% Reduction in Recall Rate

- Breast Ultrasound

- Breast Biopsy

  11% Drop in Biopsy Rate

Fee-for-Service

- Reduces downstream volume (and revenue)
- No guarantee for incremental reimbursement
- Increases radiologist read time

Hybrid Risk-Based Incentives

+ Greater clinical benefit
+ Reduces unnecessary episode sequences and costs
+ Increases patient satisfaction

Beyond diagnostic efficiency, planners must assess the potential of new technologies to reduce treatment costs.

Minimizing costs has always been a desirable endpoint, but under fee-for-service, hospitals prioritized volume growth. Under value-based care, hospitals have a greater mandate to reduce procedural spending, resulting in new purchasing priorities for procedural inputs like orthopedic implants.

Generic orthopedic implants simply provide a cheaper alternative to custom implants without sacrificing quality. In comparison to other means of care transformation like treatment substitutions or utilization management, generic substitutes are easier to implement. Still, hospitals must secure physician buy-in for purchasing these lower-cost technologies in order to successfully orient clinical culture towards value-based care.

Hospitals Seek Easy Wins by Minimizing Input Costs

Purchasing Objective #3: Reduce Per-procedure Cost

Standardized Generic Implants Lower Treatment Costs, Raise Episodic Accountability

Impact Versus Complexity of Cost Reduction Tactics

- **Utilize less expensive inputs**
- **Substitute lower-cost treatment**
- **Lower utilization over care pathway**
- **Drive to a lower-cost setting**

**Potential Barriers**
- Less expensive inputs require buy-in from physicians
- Some procedures may have limited potential within lower-cost settings
- Implementing alternative treatments and reducing utilization requires altering care pathways

**Case in Brief: Ridge Care¹ Standardizes System-Wide Procurement of Generic Implants**

- Large health system located in the Midwest faced hefty implant costs on high-volume orthopedic procedures
- Leadership team engaged all stakeholders from orthopedic service line to standardize joint purchasing by vendor and implant type; generic implants seen as crucial part of solution
- By providing cost transparency and reinvesting 10% of shared savings back into program, health system gained buy-in from physicians, negotiated favorable pricing from vendor

¹: Pseudonym
Outpatient Alternatives Avoid High Costs of Inpatient Care

A more complex, yet valuable method of episodic cost reduction lies in driving care to lower-cost settings.

Technologies that facilitate this shift include minimally invasive surgical tools which allow for procedures to be performed effectively in the outpatient setting.

For example, gastroesophageal reflux disease (GERD), affects one in 14 adults, and many patients opt for expensive interventional treatment. The Stretta procedure is an outpatient endoscopic intervention for GERD that could lower costs. In contrast to the inpatient Nissen Fundoplication, the Stretta procedure takes between 40 minutes and one hour, with no hospital stay required. Therefore, it eliminates many costly steps within the treatment pathway for qualified patient candidates.

### Stretta Procedure a Cheaper Option for an Otherwise Costly Care Episode

<table>
<thead>
<tr>
<th>Challenge: Inpatient Nissen Fundoplication Carries High Costs</th>
<th>Solution: Stretta Outpatient Procedure Less Costly</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hospital Admission</td>
<td>Admitted inpatient</td>
</tr>
<tr>
<td>Interventional Procedure</td>
<td>Performed in operating room</td>
</tr>
<tr>
<td>Cost of Performing</td>
<td>&gt;$7,500 costs</td>
</tr>
<tr>
<td>Intervention Duration</td>
<td>Procedure time &gt;1 hour</td>
</tr>
<tr>
<td>Recovery Duration</td>
<td>Extended length-of-stay</td>
</tr>
<tr>
<td>Extended Impact</td>
<td>4 to 6 week patient recovery, rehabilitation²</td>
</tr>
</tbody>
</table>

1) Ambulatory surgery center
2) Standard of care for severe GERD is the Nissen Fundoplication, which can be performed laparoscopically or open. The laparoscopic procedure’s rehabilitation is shorter.

In addition to shifts in care setting, providers can transform clinical practice with alternative, more efficient treatments.

One technology shown to provide efficient, high-quality treatment for heart disease patients is radial percutaneous coronary intervention (PCI).

Patients undergoing radial access for PCI—as opposed to femoral access—experience reduced bleeding, lower mortality, and improved quality of life compared to the standard method. However, a higher incidence of access failure is associated with the radial approach, as opposed to the femoral. Therefore, a significant learning curve exists for the procedure which has tempered adoption by physicians.

While more risky and complex, radial PCI’s shorter length of stay and recovery time may offer hospitals a competitive advantage by boosting patient satisfaction and appealing to purchasers.

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**Efficient Treatments Raise Quality, Lower Costs**

**Radial PCI Affords for Faster, Equally Effective Option For Treatment of Stenosis**

### RADIAL STEMI Study: Clinical Benefits of Radial PCI

<table>
<thead>
<tr>
<th></th>
<th>Femoral Access</th>
<th>Radial Access</th>
</tr>
</thead>
<tbody>
<tr>
<td>30-day Bleeding Rate</td>
<td>7.2%</td>
<td>1.4%</td>
</tr>
<tr>
<td>MACE + Bleeding Rate</td>
<td>11.0%</td>
<td>4.6%</td>
</tr>
<tr>
<td>Mortality Rate</td>
<td>3.1%</td>
<td>2.3%</td>
</tr>
</tbody>
</table>

*2012 n = 707*

**Radial PCI Cost-Savings Benefits**

- **17%** ICU length-of-stay with radial approach 17% lower
- **0.4** Radial access total LOS 0.4 days shorter than the femoral approach
- **3.5** Time to ambulation 3.5 hours shorter with radial approach

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**Hospital Invests in Radial PCI Training to Help Climb Learning Curve**

- Administrators at 217-bed hospital in Midwest hoped to implement radial PCI given substantial clinical benefits, cost-savings potential
- Physicians were hesitant to adopt technology due to learning curve and their comfort with femoral access approach
- To facilitate radial PCI adoption, hospital leaders appointed a physician champion to spearhead program growth
- Then, executives sponsored a radial PCI training program for physicians, including travel to vendor site
- By emphasizing this high-quality, more efficient treatment option, clinicians were more effectively able manage the PCI acute care episode

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1) Major adverse cardiac events
2) Mortality rate trends were non-significant

Purchasing Objective #6: Enhance Patient Safety

Patient Safety Directly Related To Overall Cost of Care

For patients requiring an extended inpatient stay, providers can improve episodic performance by purchasing technology that improves patient safety. Regardless of their risk-adoption status, all providers have a financial stake in achieving patient safety metrics. For example, providers in the highest quartile of incidence of hospital acquired conditions (HACs) face a 1% reduction across all Medicare payments in 2015.

Hospitals, therefore, have a strong incentive to promote patient safety to avoid financial penalties and reduce overall cost of care.

Pressure ulcers are one condition which often results in significantly longer lengths of stay and greater total treatment costs.

Purchasing technology such as pressure-redistributing mattresses allows hospitals to prevent ulcers and avoid hefty treatment bills. While these beds may be nearly double the cost of standard beds (approximately $500 versus $300), they have the potential for huge cost savings by reducing the prevalence of pressure ulcers.

<table>
<thead>
<tr>
<th>Pressure-Redistributing Mattresses Lower Hospital-Acquired Infections and Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Hospital-Acquired Conditions Subject to Payment Denials</strong></td>
</tr>
<tr>
<td>1. Foreign object retained after surgery</td>
</tr>
<tr>
<td>2. Air embolism</td>
</tr>
<tr>
<td>3. Blood incompatibility</td>
</tr>
<tr>
<td>4. Pressure ulcer stages III and IV</td>
</tr>
<tr>
<td>5. Falls and trauma</td>
</tr>
<tr>
<td>6. Vascular catheter-associated infection</td>
</tr>
<tr>
<td>7. Catheter-associated urinary tract infection</td>
</tr>
<tr>
<td>8. Manifestations of poor glycemic control</td>
</tr>
</tbody>
</table>

Technology-Based Prevention Exhibits Significant Benefit For Otherwise Costly Pressure Ulcers

Pressure Ulcers Nearly Triple Cost of Treatment

Pressure-Redistributing Mattresses (PRMs) Reduced Incidence, Cost of Pressure Ulcers in Canadian Hospitals

$17M
Annual aggregate direct cost savings for population of 258K targeted cases

-2.2%
Reduction in pressure ulcer prevalence in population using PRMs in Toronto

Readmissions Pose High Risk To Episodic Performance

Strategies for improving episodic performance should extend beyond inpatient encounters to post-acute patient management to reduce avoidable care.

Even for those remaining in fee-for-service, the Department of Justice has altered incentives by according greater scrutiny to preventable readmissions. Hospitals striving to perform under Medicare quality metrics have a direct incentive to lower readmissions for certain patient populations.

Hospitals should therefore purchase technology that helps reduce readmissions, especially within high-risk patient populations, like heart failure (HF) patients. Lacking adequate follow-up, these underserved patients often return to the ED in an acute state, requiring readmission.

Hospitals may use remote monitoring platforms to target the heart failure population, engage patients in treatment, and monitor follow-up to prevent readmissions.

Remote Monitoring Reduces Readmissions Through Efficient Data Gathering

National 30-Day Readmission Rate for HF Hospitalizations, 2012
\[ n = 1,020,276 \]

Outcomes with Remote Monitoring Versus Standard Care, 2012

Length of Stay

<table>
<thead>
<tr>
<th>With Telemangement</th>
<th>Without Telemangement</th>
</tr>
</thead>
<tbody>
<tr>
<td>4 Days</td>
<td>11 Days</td>
</tr>
</tbody>
</table>

12-month Readmission

<table>
<thead>
<tr>
<th>With Telemangement</th>
<th>Without Telemangement</th>
</tr>
</thead>
<tbody>
<tr>
<td>57%</td>
<td>86%</td>
</tr>
</tbody>
</table>

Impact of Remote Monitoring Platforms and Functions

Issues Health Alerts
- Telehealth Advisor asks diagnosis-specific questions; Health Buddy device alerts physicians to changes

Gives Patient Prompts
- Genesis Telemonitor asks diagnosis-related questions through voice or text message

Monitors Vital Signs
- ZOE™ Monitor measures fluid congestion
- Many modalities measure BP, heart-rate, respiration

Generates Usable Data
- AVIVO Mobile System includes cell phone data transmission to physician portal

Physicians aware of patient needs, reduces unexpected adverse events
Patients more likely to follow discharge instructions
Easier monitoring and integration of patient history at clinic visit
Tracked data informs physician of disease progression

Source: Inaki, et. al. "Impact of Telemonitoring Home Care Patients with Heart Failure or Chronic Lung Disease from Primary Care on Healthcare Resource Use (the TELBIL study randomised controlled trial)." BMC Health Services Research 2013, 13:118; The Advisory Board Company Cardiovascular Roundtable.
Providers Face Competitive Pressure to Enhance Care Across Care Continuum

In addition to improving performance on care episode delivery, providers must also evaluate clinical technologies for their ability to enhance cross-continuum care.

Cross-continuum care coordination is an essential competency for providers aiming to prove value to purchasers.

Prospective technology purchases should be evaluated on five objectives ranging from improving patient selection to engendering ongoing patient loyalty.

Challenges of Cross-Continuum Care

- Strong competition for newly diagnosed patients
- Early intervention critical for cost, outcomes improvement
- Health care system slow to match patient candidates to the right provider
- Providers lose control of cost and quality of care when patients seek services elsewhere
- Over time, patients susceptible to leave system depending on previous experiences

Technology Purchasing Objectives

1. Optimize screening to recruit patients pre-diagnosis
2. Attract patients early for ongoing management
3. Find patients more quickly
4. Close gaps within care continuum
5. Raise patient satisfaction and loyalty

Technology Can Provide Competitive Edge While Streamlining Care

Role of Technology In Managing Cross-Continuum Care

Source: Technology Insights research and analysis.
Lung CT Leads to Early Diagnosis, Retention, but Cost-Effectiveness Questioned

Enhancing cross-continuum care begins with patient selection. Lung CT screening permits earlier patient selection than is otherwise currently available, supporting both value-oriented and competitive imperatives.

From a clinical standpoint, recent studies have demonstrated lung CT’s ability to save one life for every 320 patients scanned due to early detection and treatment.

From a competitive standpoint, hospitals may reap significant retention benefits from lung screening programs: one survey indicated that 87% of patients were retained for further tests or treatment after positive screening results.

However, the high false positive rate associated with lung CT challenges its overall utility by contributing to significant unnecessary downstream testing. Providers must therefore limit use only to the riskiest patients and provide comprehensive, low cost options for patient work-up, such as EBUS\(^1\) and ENB\(^2\) for the most suspicious nodules.

Overall, lung CT compares favorably to the cost effectiveness profiles of other screening modalities.

Proper Patient Selection and Low-Cost Management Can Help Solve Lung CT Puzzle

- **Proper Patient Selection**
  - Age 55 to 74 years
  - Smoking history of at least 30 pack-years\(^4\)
  - Preclusion of patients with multiple comorbidities

- **Low Cost Management**
  - Minimally invasive diagnostic procedures such as EBUS\(^1\) and ENB\(^2\)
  - Determine right nodule size threshold for positive finding (5mm, 6mm, 8mm, etc.)

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\(^1\) Endobronchial Ultrasound
\(^2\) Electromagnetic Navigation Bronchoscopy
\(^3\) National Lung Screening Trial
\(^4\) Pack Years defined as cigarette packs smoked per day multiplied by the number of years a person has smoked
Early patient selection is especially important for patients that may develop chronic diseases, and providers should invest in clinical technologies and services that attract these patients for ongoing management.

Comprehensive bariatric programs offer an opportunity for hospitals to re-brand their services to better attract patients—who are often fearful of surgery—while bolstering their reputation among value-oriented purchasers.

Under fee-for-service, hospitals market bariatric surgery to generate more procedural volumes. Within this model, other programmatic elements merely serve to “check off the box” on bariatric surgery requirements.

Under risk-based payments, however, hospitals have a greater incentive to brand their bariatric services as a more comprehensive program.

Combining bariatric surgery with a weight loss clinic allows hospitals to build a relationship over time and manage all healthcare needs for the patient while minimizing costs.
Providers may take patient attraction to a new level by establishing channels to proactively find and “match” patient candidates to their services.

While the health care system is often slow to match patients with the right specialists needed to treat their condition, telemedicine provides a “market matching” channel. Using telemedicine at affiliate physician offices, large institutions can capture good candidates within their population by triaging patients to the right specialists more quickly.

Effective triaging via telemedicine mitigates leakage potential, facilitating individual capture, especially in health care markets that are crowded, poorly organized, or encompass a large (and/or rural) geography.

As a result, physicians may see higher volumes of patients and obtain a greater geographic reach, extending clinical impact to patients who would otherwise travel to multiple disparate specialists before receiving the advanced care they need.

Telemedicine Facilitates Earlier Patient-Provider “Matching,” Minimizing Leakage

Role of Telemedicine in “Matching” Patients and Providers

- **Traditional Pathway**
- **Telemedicine Pathway**
- **Leakage Points”**

![Diagram showing the comparison between traditional and telemedicine pathways in patient matching.](image)
Palliative care improves quality of life, mitigates expenses of end-of-life care

Once providers have captured patients, they must effectively manage chronic disease across the entire care continuum through multiple care options. Given the historical focus on procedure-based cancer services, providers have underutilized palliative care to manage symptoms and disease progression.

This gap in the care continuum can leave patients searching for other options at competitor institutions. It may also lead to more expensive end-of-life care, impacting a hospital’s ability to meet its cost benchmark under shared savings.

Used early in the disease lifecycle, palliative care can also lengthen survival and support shared patient decision-making to make desired end-of-life plans.

Consequently, palliative care can play a vital role within a risk-based payment environment to lower cost and improve quality of care.

Palliative Care Patients Less Likely to Receive Aggressive End-of-Life Care, More Likely To Prolong Survival

Percentage of patients receiving aggressive end-of-life care

Patient’s median survival, months

1) Patients were classified as receiving “aggressive care” if they met one of the following criteria: chemotherapy within 14 days of death, no hospice care, or admission to hospice just before death.

For chronic patients, the care continuum can extend over a long period of time and feature repeated visits to care providers. During each interaction, providers face strong pressure to improve patient experiences and generate loyalty for repeat business. While return on investment may be difficult to quantify, loyalty leads to increased procedural volumes and enhances a provider’s control over costs, the key to financial success under risk-based payments. Toward this end, investing in technologies that improve comfort and convenience is key for hospitals’ strategy within value-based care.

Improving the Patient Experience Generates Loyalty Over Time

Patient-Friendly Technologies Improve Overall Experience

- **Wide-Bore MRI** minimizes discomfort during exams
- **RT Dose Escalation** offers more convenient treatment via fewer fractions
- **Low-Dose CT** alleviates safety concerns
- **Minimally Invasive Surgery** provides cosmetic benefit, shorter recovery time
- **Dedicated Breast Center** offers comfortable, patient-friendly atmosphere

**Patient Loyalty**

- Patient returns to hospital for future care
- FFS: Hospital captures revenue from future services
- Risk: Hospital able to manage full cost of care

**Previous Experience a Strong Predictor of Likelihood to Return to Hospital for Care**

- **Doctor Recommendation**: 87.7%
- **Previous Experience with Hospital**: 82.8%
- **High Scores on Patient Satisfaction Report Cards**: 68.5%

Patient experience more important than satisfaction, nearly as important as physician recommendation
