This is proving to be a watershed year in the transformation of the U.S. health-care system from volume- to value-based care. The U.S. Department of Health and Human Services (HHS) has firmly planted a stake in the ground by pledging that 50 percent of Medicare payments must move to alternative payment agreements by 2018.  

Accepting the thrown gauntlet, leading health systems and payers formed the Health Care Transformation Task Force (HCTTF) and pledged that 75 percent of their businesses will move to value-based payments by 2020.  

With payment reform comes an increasing shift of care delivery from higher revenue and higher margin acute services to lower revenue and lower margin outpatient care, with a focus on a good patient experience tied to good clinical outcomes. Health systems will need to adopt a technology-enabled delivery model across the continuum of care, including pre-operative, intra-operative, and post-operative services, to manage cost and achieve the best financial and clinical outcomes across cases and episodes of care and attributed populations.

Following are seven key elements to consider when renovating your decision support system to support health-care reform and our method for an effective action plan.

Seven key elements

Today’s health-care CFO is focused on developing and managing innovative reimbursement models and identifying new business models to generate new revenue growth amidst shrinking revenues from traditional revenue and reimbursement models. Today’s CFO needs a new generation of decision support

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**HOW TO RENOVATE YOUR DECISION SUPPORT SYSTEM**

This article examines some key elements to consider when renovating your decision support system to facilitate health-care reform and presents a method for crafting an effective action plan.

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PRASHANTH KINI and WILLIAM BERCIK

**FOR THE HEALTH CARE REFORM ERA**

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tools, working in concert with the clinical and operational systems, to provide point-of-decision insights to deliver the most clinically cost-effective care paths.

The hard questions the CFO must answer require insights across the continuum of care, bringing together clinical, operational, and financial perspectives to drive care-delivery decisions.

The CFO, thinking also as the CMO, COO, and CEO, must answer “hard” questions such as:

- What are your biggest cost management strategies?
- What data insights and analytics are you using to drive down cost of care across your system?
- How are you using cost-of-care insights in your population health strategies?
- What cost and revenue management capabilities do you need for shared-risk contract negotiations?
- What methods are you employing to influence cost management beyond inpatient/acute care services (i.e., linking costs across episode of care, ambulatory care sites, and continuum of care)?
- How are you using workforce analytics to respond to flex volume demands?

Once these questions have been answered, seven key elements of a decision support system must also be considered. These elements include:

1. shared cost and quality accountability
2. closed-loop strategic decision support
3. cost accounting allocation methods
4. value-based, labor productivity capabilities
5. budgeting and flex variance analysis
6. financial modeling and what-if analysis; and
7. cost insights in population health management.

Let’s examine each of these elements in more detail.

**Shared cost and quality accountability**

An effective cost management and value-based care delivery strategy requires coordinated buy-in and engagement from stakeholders across the enterprise. This strategy should be driven by specific, actionable insights derived from a single source of truth: an enterprise-wide data repository across the various functions. Relevant performance indicators and forecasted trends must be delivered at the right time, in each manager’s specific decision-making workflow. Key performance indicators (KPIs) must be accompanied by the necessary “drill-down” transparency and
traceability to engender credibility and stakeholder buy-in.

Exhibit 1 outlines a segmentation of key stakeholders and influencers and the relevant insights necessary within each realm of the care delivery process.

**Closed-loop strategic decision support**

Health systems, transforming to meet the demands of value-based accountable care reimbursement models, must employ a portfolio of next-generation strategic decision support tools that enable their workers to continuously, accurately, and transparently engage stakeholders in the common mission to profitably evolve care delivery models. Next-generation tools will allow health systems to pragmatically and progressively adopt methodologies that effectively represent value-based constructs, like total cost of care across acute and ambulatory episodes of care, bundled service definitions, and population health performance measures, while leveraging today’s practices.

“Traditional” decision support functions of cost accounting, budgeting, planning, forecasting, and workforce analytics must now be delivered as a single, integrated suite. This is necessary in order to harmonize data from clinical and operational systems and provide multiple, seamless, real-time lenses on the health system’s short- and long-term performance against the driving performance measures of value-based care. Stakeholders should also be equipped with short- and long-term predictive modeling insights into the impact of changing patient volume on costs and profitability. Such insights will support decisions on service-line growth and potential financial risk of multiple, simultaneously modeled contractual agreements across various payers.

**Cost accounting allocation methods**

Advanced cost accounting solutions, without being prescriptive or restrictive, give institutions the capability to deploy and simultaneously compare a variety of costing methods ranging from fundamental methods such as ratio of cost to charge (RCC) through institution-specific or standard relative value units (RVUs) (see Exhibit 2). Institutions can use multiple methods to allocate departmental cost pools to the charge-master items (a chargeable procedure) as an accurate proxy of activity and service consumption.

Often, the charge master is extended to include non-chargeable activities to keep the integrity of the same costing methodology.

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**EXHIBIT 2 Advanced Cost Accounting Capabilities**

<table>
<thead>
<tr>
<th></th>
<th>Fundamental Volume-Based Capabilities</th>
<th>Value-Based Capabilities</th>
</tr>
</thead>
</table>
| Data sources | • Claims  
• Charge master  
• GL main ledger | • Time keeping  
• HR payroll by job codes  
• Contract models  
• GL sub ledgers  
• EMR, ADT Clinical activity data  
• ERP, SC integrations |
| Costing Methodology | • Configurable cost pools  
• Ratio of Cost to Charges (RCC)  
• Standard Relative Value Units (RVU) | • RVU derivation  
• Multiple simultaneous methods by department (e.g. RVU for indirect, Direct for supplies, Time for labor) |
| Analytics Insights | • Acute care cost by DRG, procedure  
• Profitability rollups by service line, physician, department  
• Retrospective volume statistics: #procedures, #admissions | • Total cost of care per case / episode of care (multiple acute and post acute encounters)  
• Per member per month cost  
• Bundled service total cost  
• Variance analysis across normalized episode of care |
Advanced decision support systems will provide a rich set of pre-built and ad hoc reporting capabilities to examine costs and revenues across clinical and operational dimensions. Stakeholders would be able to examine cost and profitability by service line, diagnosis-related group code (DRG), and costs from the physician level down to the patient level. They would also be able to quickly look at variability across each dimension. Plotting profitability on a “whale” curve chart quickly enables the examination of top- and bottom-tier performers in each category.

Cost reports must provide traceability to address any skepticism about accuracy of the numbers (this is critical) and to gain stakeholder buy-in. Such traceability maps will provide drill-down visibility into the step-down allocation and cost drivers used in cost allocation at the most granular level. Advanced traceability reports will also provide automatic visibility into unallocated costs and general ledger reconciliation. Traceability maps provide transparency into revenue and cost allocations. From any point in the model you can trace backward or forward, easily visualizing the defined allocation flow for validation and knowledge transfer.

### Value-based, labor productivity capabilities

With labor costs accounting for 60 percent or more of a hospital’s budget and with hospitals already having reduced the workforce down to the point of endangering quality, hospital finance executives are now focused on managing labor costs through other initiatives. These include effective application of the right acuity-based staffing and scheduling to eliminate unnecessary payroll “leakage” from lost productivity and potentially unnecessary overtime pay from suboptimal shift transitions and handoffs. Such labor productivity diligence must be part of an integrated decision support strategy informed by established overriding performance targets, as well as cost and outcome risk management insights. Nursing managers have little or no insight into timekeeping data until it appears in payroll, and by then it is too late to affect any staff allocation or overtime decisions.

Kerri-Lynn Primmer Morris, executive director of finance operations and strategic projects at the Oakland-based Kaiser Permanente, emphasizes Kaiser’s approach to “give managers insight to make decisions in the moment by implementing a new timekeeping ecosystem that provides real time, actionable analytics and alerts with consumer grade experience with dashboards on mobile devices.”

Value-based capabilities, such as those shown in Exhibit 3, would provide some of the much-needed support for managers to make better decisions.

### Budgeting and flex variance analysis

For most health-care organizations, budgeting and strategic planning are disconnected, making it impossible to report actual results against the budget and...
EXHIBIT 4 Integrated Budgeting, Planning, and Forecasting Capabilities

<table>
<thead>
<tr>
<th>Data sources</th>
<th>Fundamental Volume-Based Capabilities</th>
<th>Value-Based Capabilities</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>• GL</td>
<td>• Integrated data feeds from key source systems</td>
</tr>
<tr>
<td></td>
<td>• Payroll</td>
<td></td>
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<tr>
<td></td>
<td>• Patient accounting</td>
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<tr>
<td></td>
<td>• Materials management</td>
<td></td>
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<tr>
<td></td>
<td>• Clinical systems</td>
<td></td>
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<tr>
<td>Budgeting and forecasting methodology</td>
<td>• Standalone monthly, annual, multi-year forecasting</td>
<td>• Linked, drill down (to department level) monthly, annual, multi-year budgeting, forecasting</td>
</tr>
<tr>
<td></td>
<td>• Spreadsheet driven</td>
<td>• Rolling forecasts</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Integrate patient data from clinical systems to improve accuracy of volume and workload projections</td>
</tr>
<tr>
<td>Analytics Insights</td>
<td>• Service line variance view against budget</td>
<td>• Continuous flex budgeting based on variance from global assumptions</td>
</tr>
<tr>
<td></td>
<td>• Budget to actual variance</td>
<td>• Multiple scenario modeling: case mix variance, payer mix, service line growth,</td>
</tr>
<tr>
<td></td>
<td>• Flex based on budgeted time and actual volumes</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Trend analysis</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Supply and labor flex variance</td>
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</tbody>
</table>

strategic plan. Connecting disparate data in unconnected systems takes time and effort, but this alone does not provide reliable information for decision-making. Instead of isolating each functional area, it is important to connect them and leverage the information from a common repository.

There are three key components of an effective financial performance solution:

1. strategic planning;
2. service-line budgeting; and
3. operational/capital budgeting.

The goal is to develop a long-range strategic plan; to create a service-line budget that provides business detail and depicts volumes and revenues accurately while automatically generating operational budget targets. How do rolling forecasts fit in? It is increasingly important to align rolling forecasts with multiyear plans and detailed budgets. After creating the operating budget, analysis and reporting (e.g., actual versus budget) continue on a go-forward basis. The net result is a real-time view of your strategic plan, market investments, variances, and actual performance down to the service-line level to promote mul-
tidirectional reporting and to refine your projections. Exhibit 4 lists some of the value-based capabilities that would make this long-range strategic plan a reality.

Financial modeling and what-if analysis

Equipped with high-quality, granular, historical data across the enterprise functions, health-care organizations can progress to the most advanced level of analytics maturity with predictive modeling. Organizations need to assess financial models that reflect the impact of value-based payment arrangements, side by side with current financial projections based on volume. With advanced planning and forecasting tools, finance departments can examine multiple financial scenarios simultaneously. Parameters such as various reimbursement rates by payer, average length of stay (ALOS), and volume of admissions can be adjusted to examine net revenue impact.

Advanced modeling tools enable providers to organize services used across multiple patient encounters into episodes of care or bundled service definitions,
and they also enable those providers to examine care path and corresponding cost variations. Such modeled service bundles can be informative for contract negotiations and can be exported into contract management systems as a grouping of negotiated contractual service definitions.

**Use cost insights in population health management**

The abilities for health systems to create hierarchies of patient populations based on clinical and financial risk will be pivotal to their abilities to manage these patients under value-based payments. Managing them is, of course, hinging on the savings and outcomes achieved across cohort (like cases) populations. The Certification Commission for Health Information Technology’s (CCHIT) 2013 framework for accountable care IT (see Exhibit 5) outlines and describes the key functions an IT infrastructure must deliver to support the triple aim of accountable care: improving population health and delivering the best patient experience, all at an affordable level. A review of the detailed processes outlined in the framework reveals ample and ubiquitous opportunities to propagate cost insights throughout various points of decision across the care delivery path.

**Action plan**

Health-care organizations can pursue a pragmatic and progressive approach to
building out their portfolios of decision support solutions, but they first need to start with some fundamental building blocks to ensure visibility across the enterprise. It is important to be able to embark on phased, cross-organizational initiatives with stakeholder engagement on each initiative, namely:

1. Establish an enterprise data warehouse (EDW) as a single source of truth across clinical, financial, and operational systems.
   - Adopt a unifying data model and data governance infrastructure reflecting a health-care enterprise with inpatient, outpatient, physician practice, allied health facilities, and even home-based care sites. Such a data model will incorporate health-care-specific clinical, operational, and financial subject areas across the care continuum.

2. Progressively integrate sources into the EDW in the following order:
   - general ledger, patient accounting, and charge master: RCC- and RVU-based costing;
   - electronic medical records (EMR)/admission discharge and transfer (ADT) for encounter- and patient-level activity details (time-based drivers): labor costing via activity-based costing (ABC);
   - supply chain: Rx direct costs; and
   - enterprise resource planning (ERP).

3. Establish a portfolio of costing methods and standardize within activity types (cost pools) across service lines and continuum of care.

4. Standardize stakeholder-specific dashboards and reports in enterprise BI solution: Engage stakeholders in definition, traceability, and validation.

5. Provide ad hoc reporting and root-cause analysis drill-down capabilities.

**Case study: Providence Health & Services**

The Seattle-based Providence Health & Services is committed to a system-wide consolidated decision support system while adopting such a phased approach.
A key first step is driving standardized approaches across the continuum of care for defining and providing comparable and reliable financial, operational, and clinical data as it relates to the reporting and analytics of cost, profitability, and performance of business operations and health-care services. Christine Santos, chief of strategic business analytics at Providence, remarked that “as health systems embrace value-based purchasing, a key first step is to extend their cost-accounting capabilities beyond the acute-care setting to include ambulatory/clinics and post-acute settings (home health, long-term care, and hospice) building the critical foundation for understanding the cost of delivering care across the continuum.” Exhibit 6 illustrates Providence’s phased implementation approach toward unified cost accounting across the continuum, beginning with standardizing data inputs across the organization.

**Conclusion**
An effective population health strategy in the era of health-care reform demands a comprehensive, pervasive, and data-driven financial decision support portfolio operating from a single unified source of high quality: reliable data across clinical, financial, and operational functions. Considering the seven key elements presented here and implementing the action plan are excellent steps toward renovating your decision support system to support today’s health-care reform.

Health-care organizations like Providence that deploy advanced, business-user-configurable and non-prescriptive decision support solutions can avoid big-bang investments and progressively harness targeted data sources to gain insight across the care continuum while leveraging current “best practices.”

Health care is changing whether we like it or not. Take up the challenge and renovate your decision support system to support it. ■

**NOTES**