



Signature Leadership Series

Health Care Leader Action Guide: Understanding and Managing Variation

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Executive Summary

Health Care Leader Action Guide: Understanding and Managing Variation builds upon the report of the American Hospital Association's [Task Force on Variation in Health Care Spending](#) (January 2011). The purpose of this guide is to provide hospitals with a resource to help reduce inappropriate variation within their own organizations and in conjunction with care partners. The guide includes practical steps to understanding and managing variation and a list of best practices and case studies as examples and resources for hospital leaders to use for implementing key interventions.

Variation arises from many interrelated factors, some within and some beyond the control of the health care system. Not all variation is undesirable or inappropriate. Distinguishing among the types of variation to determine what is acceptable and what is not is critical to arriving at a reasonable set of recommendations for action. Hospitals and health systems can take these action steps alone or in collaboration with others to reduce inappropriate variation within their organizations.

There are six steps to understanding and managing variation:

1. Determine your strategic focus to reducing variation
2. Set measurable goals
3. Acquire and analyze data
4. Understand your data
5. Identify areas of focus
6. Implement improvements

Research has shown that some of the greatest potential areas of focus include:

- Intensity of hospital services
- End-of-life care
- Outpatient/ambulatory services
- Obstetrics
- Imaging use
- Emergency services

To address these focus areas, there are a variety of improvements to implement, including:

1. Providing feedback of performance data at the provider level
2. Standardizing processes of care by using checklists and other clinical and operational protocols
3. Implementing evidence-based guidelines and pathways
4. Utilizing evidence-based appropriateness criteria
5. Using quality improvement interventions, such as Lean, Toyota Production System, Six Sigma, Plan-Do-Study-Act
6. Initiating culture change toward safety, improvement, transparency, and excellence

By approaching the management and reduction of variation through a systematic improvement process in focused areas, inappropriate variation can be reduced to improve overall outcomes.

I Introduction

The American Hospital Association (AHA) issued a “bold call to action on the piece of variation that legitimately belongs to hospital organizations, while recognizing that other stakeholders must do the same” in the report of the [Task Force on Variation in Health Care Spending](#) (January 2011). The report further states, “Hospitals, in conjunction with physicians, other clinicians, and other care partners, must be aggressive and start to reduce the variation that is within their control; collaborate with other parts of the health care system, insurers, and employers to address inappropriate variation across the care continuum; and provide leadership in bringing together other stakeholders to deal with broader societal issues that affect health behavior and health status.”

There will always be variation. The question is, So what...what does it mean? Should the organization be concerned about the level of and trends around variation? How do you know? A hospital and health system leader’s goal need not be to *eliminate* variation, but rather to *understand and manage* it so undesirable variation can be reduced. In guiding the organization toward consistent patterns of utilization in line with clinical best practices, leaders can help ensure that care is delivered in a manner that promotes the best outcomes at the lowest cost.

The critical starting point for managing variation in utilization is a thorough understanding of internal data. (“Utilization” refers to the usage of available services within the hospital setting, e.g., treatments, procedures, or diagnostic tests.) Well-executed analysis of internal data on a historical, location/unit, or physician-by-physician basis can help identify many opportunities within the walls of one’s own organization, and it also provides a base from which to make external comparisons. Once an analysis has been completed to identify undesirable variation in utilization, managers can turn their focus to understanding what is driving it and then begin to implement solutions.

This guide is designed to inform health care leaders how to use hospital and benchmarking data to analyze care, services, safety, and appropriateness of treatment, and to identify areas where they may need to make meaningful operational decisions to provide better clinical or financial outcomes for their patients.

In addition, this guide provides senior leaders of hospitals and health systems with tools and resources to help them compare their organization’s data with other peer hospitals on different measures and explore improvement opportunities. Armed with an understanding of their data and how their hospital compares with similar health systems, health care leaders can target specific areas with the best opportunities for improvement.

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Steps to Understanding and Managing Variation

Using fundamental improvement steps, the following is a six-step approach to understanding and managing variation in your organization. Although identified linearly, these steps may be done in parallel. For example, an organization may use external data to set goals and it may also seek to acquire and analyze other data to further confirm or identify new goals.



I. Determine Your Strategic Focus to Reducing Variation

The context in which your organization embarks on understanding and managing variation is critical. Strategic considerations at your organization will direct you to the areas for greatest leverage. Potential strategic considerations include:

- Reducing operational costs
- Standardizing use of medical supplies
- Strengthening shared decision-making and patient involvement
- Improving patient safety
- Improving patient satisfaction
- Reducing spending for the population
- Preparing to accept financial risk

A recent study surveying quality improvement representatives from acute care hospitals in four states found that 90 percent of respondents were concerned about unwarranted, or inappropriate, variation,

and 75 percent of those concerned had a strategy for reduction in place¹. There are several reasons, both financial and mission-based, that hospitals and health systems should be concerned with reducing unnecessary utilization of health care services:

- **Reducing costs and improving efficiency of providing care:** Under the current fee-for-service model, financial incentives can serve to emphasize the volume of care delivered. New models such as value-based purchasing and bundled payment arrangements, however, are designed to reward providers who demonstrate improved value (defined as improvement in both quality and efficiency). In other words, they will be rewarded for demonstrating they delivered the right care at the right time and the right place. Reducing the amount of unnecessary care in turn reduces costs of providing those services for the organization (e.g., supply and labor costs).^{2,3}
- **Improving safety and quality:** Reductions in inappropriate utilization have been shown to have no adverse impacts on quality. In fact, a recently updated study on health system performance in several states indicated that quality of care in hospitals has increased while variation in care delivery across states has narrowed.⁴
- **Increasing patient satisfaction:** Patient decision aids—that is, evidence-based tools used to facilitate shared decision-making between patients and providers—lead to increased patient satisfaction and more efficient use of clinicians' time. These aids have a potential role in reducing unwarranted variations in the use of preference-sensitive health care options.^{5,6} The Comprehensive Health Enhancement Support System (CHESS), developed at the University of Wisconsin-Madison, is one such example. CHESS is a computer aid that provides patients with chronic illnesses a range of self-management resources they can access at home. In an AHRQ-funded study that evaluated the impact of using CHESS for patients with HIV infection, results showed these patients had fewer hospitalizations and a higher quality of life than patients who did not have access to the same decision aids. In addition, patients participating in the CHESS program spent less time with their physicians during office visits because they were better informed.⁷
- **Preparing for health care system transformation:** Improving integration across the care continuum is an effective way to reduce unwarranted variation and attain the desired outcomes of reducing costs—for the health care organization, the community, and the industry as a whole—and improving outcomes. Changes to payment incentives, where value over volume is rewarded, will help facilitate integration efforts.⁸ In addition, new delivery models such as accountable care organizations, bundled payment arrangements, and medical home models will require that providers accept more risk for delivering health care services. Standardizing care processes that eliminate unwarranted variation can help prepare an organization to accept this type of risk.

¹Guald R, Horwitt J, Williams S, Cohen AB. What strategies do U.S. hospitals employ to reduce unwarranted clinical practice variations? *American Journal of Medical Quality*. October 8, 2010. www.ajm.sagepub.com. Accessed November 30, 2010.

²Sutherland JM, Fisher ES, Skinner JS. Getting past denial —The high cost of health care in the United States. *New England Journal of Medicine*, 2009; 361(13):1227-1230. Accessed September 24, 2009.

³Fisher ES, Bynum JP, Skinner JS. Slowing the growth of health care costs—Lessons from regional variation. *New England Journal of Medicine*, 2009; 360(9):849-852.

⁴*Aiming Higher: Results from a State Scorecard on Health System Performance*. The Commonwealth Fund, 2009.

⁵Meyer H. Guest Commentary: Shared decision-making could cut costs and improve patient outcomes. August 23, 2010. www.fiercehealthpayer.com.

⁶O'Conner AM, Llewellyn-Thomas HA, Barry Flood A. Modifying unwarranted variations in health care: Shared decision-making using patient decision aids. *Health Affairs*, October 7, 2004; doi:10.1377/hlthaff.var.63. Accessed December 23, 2010.

⁷Gustafson DH, Hawkins R, Boberg E, et al. Impact of a patient-centered, computer-based health information/ support system. *American Journal of Preventive Medicine*, 1999; 16(1):1-9.

⁸Fisher et al., 2009.

2. Set Measurable Goals

Once you establish your organization’s strategic direction, identifying measurable goals is critical for tracking performance and evaluating if progress is being made. Below is an example of a template, populated with sample data, that can facilitate goal-setting by providing a framework for your own data, measures, and goals. When using this type of table, consider supplementing the table with additional charts and graphs to illustrate performance.

Area of Focus	Your Performance (Examples)	Performance Across Your Organization Across Time (by unit, by hospital, by service line, by physician)	Comparative Performance (compared to your average, your top performance, national average, state average, top national performance)	Your Goal (how much by when)
% of diabetics with HbA1c tests in the last 12 months	88.0%	Physician group 1 = 86.0% Physician group 2 = 89.0 % Physician group 3 = 89.0%	93% - State average 93.7%- National 90 th percentile 89.0% - National average	National 90 th percentile by year-end
Hospice days in the last 6 months of life	8.3 days	Hospital A = 8.1 days Hospital B = 10.2 days	State = 7.9 days National = 12.5 days 10 th percentile = 18.1 days	National average within 2 years
% of low back pain patients receiving an MRI without a trial of medical therapy first	35.0%	Physician 1 = 30.0% Physician 2 = 40.0% Physician 3 = 35.0 %	30.1% State average 32.7% National average	25.0% by year-end
Etc.	Etc.	Etc.	Etc.	Etc.

3. Acquire and Analyze Data

Ideally, to reduce unwarranted utilization across the care continuum, data would be collected from each relevant site of care per disease episode. In reality, most organizations do not have access to this level of detail within their own reporting systems. Being able to adequately delve into population-level data requires forming relationships with commercial payers or health plans to access claims data. It is instead best to focus on the following aspects of data collection:

- a) Collect data from internal systems that provide reliable and consistent information; in addition, be sure that physician and other clinical leaders have confidence in the data systems selected.
- b) Focus on a few critical metrics—those most relevant to the operational or clinical process that you wish to improve—to avoid “analysis paralysis” that often occurs from gathering too many irrelevant data points.
- c) Use multiple sources for data collection, including service line or unit reports, discharge records, and/or reports that track compliance to established care paths. Ideally, the organization’s electronic medical record system would provide much of this information.

Partnering with your local employers or payers may provide additional avenues for collecting and using all payer data. Having data beyond Medicare will necessitate partnerships with payers and purchasers and provide additional areas for analysis. State agencies may also have data available across payers that may be used for general analysis, though the data may not be organization-specific.

The potential advantages of partnering with others for data collection and improvement can be seen in a randomized prospective study that applied a rule-based sentinel alert system to a managed care plan's administrative claims data for a commercial population, to prevent errors in care and improve compliance with clinical guidelines. Decision rules were incorporated into a computerized system that was able to detect variation from practice guidelines and send alerts to clinicians. Members were randomly assigned to an intervention group where physicians would receive clinical recommendations via electronic alerts and to a control group where physicians did not receive alerts. Patients who triggered recommendations had 19 percent fewer hospital admissions compared to the control group. Charges and paid claims were also lower for this group. Although this study was focused on a commercial population, study authors suggest that the potential to decrease morbidity and costs would be greater if applied to a Medicare and Medicaid population since the disease entities that generated the most frequent recommendations were for conditions that typically affect the elderly, such as cardiovascular, neurological, and respiratory conditions.⁹

Many approaches can be employed to analyze data for managing variation, including the following simple but powerful analyses below:

- How has utilization varied over time?
- How does utilization vary across different locations in the system and/or units within the hospital?
- How does utilization vary by physician within the hospital or system?

For each of these analyses, the variation should be explained using summary statistics (e.g., counts and frequency distributions, averages, standard deviations) and displayed using an appropriate format (e.g., tables, charts, bullets). Summary statistics should be viewed in context of reference points, such as the range or limits that leaders agree is acceptable.

4. Understand Your Data

Looking Within

Examining your organization's own data across time and across organizational units is essential in managing variation within your organization. By looking within your organization, you can compare yourself to the best performance internally and to track trends over time. Focusing on internal data allows hospital leaders to make comparisons on an "apples-to-apples" basis and generate greater acceptance and buy-in, as stakeholders are less likely to claim that "our institution is different" from itself.

⁹ Javitt et al. Using a claims data-based, sentinel system to improve compliance with clinical guidelines: Results of a randomized prospective study. *American Journal of Managed Care*, February 2005; 11:93-10. http://www.activehealth.net/AJMC_Study.pdf

Looking Externally

While internal data is an invaluable resource for understanding and managing variation, external data is highly useful as a point of reference for performance and a basis for setting goals. Leaders in health care organizations have an opportunity to articulate their vision by setting objectives, which may include:

- *A commitment to evidence-based medicine:* Consistently achieving minimal variation from a set of metrics that reflect established guidelines.
- *Top quartile across the board:* Consistently placing in the top quartile of a given set of comparator institutions for a broad set of metrics.
- *Demonstrating excellence in a certain area:* Consistently placing in the top 10 percent of a given set of comparator institutions for a narrow set of metrics.

Many resources are available for external benchmarking, including the Dartmouth Atlas of Health Care or commercially available databases and tools maintained by health care alliances such as VHA, Premier, or University HealthSystem Consortium (UHC). Since the Dartmouth Atlas is publicly available, an overview and instructions for accessing this source are provided in Appendix B.

Additionally, when making comparisons to external sources, it may be tempting to simplify internal data (e.g., an average for the entire institution). However, this practice may send undesirable signals to the organization or lead individuals to overlook opportunities to improve. For example, a dashboard metric that shows that, on average, an institution has performed better than an external metric does not emphasize the importance of managing variation internally to identify trouble areas and leverage best practices. This example also highlights the importance of choosing external metrics that appropriately reflect the organization's goals (e.g., seeking to be in the top quartile of a select group of peers versus being above the average of all hospitals in the United States).

Often when comparisons are made to external data, and even to data from other institutions within the same system, stakeholders may seek to dismiss observations and implications on the basis of differences in patient populations. When making comparisons, attention must be paid to ensuring data sets are comparable. Using severity-adjusted data or multiple metrics (e.g., comparing kidney surgery rates for high-risk patients and for low-risk patients separately), as appropriate, can promote buy-in. When systems and tools provide severity-adjusted data, hospital administrators must ensure they understand exactly how the adjustment is made.

5. Identify Areas of Focus

If not appropriately focused, an effort to manage variation is at risk of generating many tables and charts without driving any decisions. Therefore, it is important to carefully choose a specific area to assess. In determining which area to examine first, a hospital leader might consider:

- Highest volume services
- Areas with the greatest financial impact, in terms of revenue or cost
- Areas most likely to result in avoidable injury to a patient
- Areas identified as high priorities to the organization and its leadership

Research has demonstrated that some of the greatest areas of utilization variation are:

- Hospital readmissions
- Appropriateness of admissions and diagnostic and treatment procedures
- Emergency room utilization

- Intensive care unit utilization
- Home health utilization
- Obstetrics utilization
- Imaging tests
- Surgical procedures
- End-of-life care

Minimizing unwanted variability is critical in today’s cost- and quality-conscious environment. However, health care delivery professionals must take a balanced approach that responds to unique clinical needs and ensures that appropriate variability occurs in the context of evidence-based medicine. The challenging tasks for hospital administrators in this regard are to identify priority areas for managing variation in utilization, to determine what variation is acceptable and what is not, and to develop an action plan to make any changes needed.

The following table identifies areas of major opportunity, types of utilization data that would enable the organization to identify and define problems, and illustrative objectives for that area.

Areas of Major Opportunity	Utilization Data for Problem Diagnosis	Illustrative Objectives to Drive Improvement
<p>Intensity of Hospital Services Matching the type and amount of care provided to the severity or urgency of the patient’s condition</p>	<ul style="list-style-type: none"> • ICU usage • Length of stay data • Emergency department usage • Admissions data 	<ul style="list-style-type: none"> • Reduce usage of ICU in favor of step-down or med/surg • Manage length of stay • Improve coordination of care • Expand chronic disease management programs to reduce admissions
<p>End-of-Life Care Treatment decisions and care provided for terminal patients</p>	<ul style="list-style-type: none"> • ICU usage • ED usage by age and mortality • Med/surg usage within last six months of life • Discharges to hospice 	<ul style="list-style-type: none"> • Reduce use of ICU at end of life (EOL) in favor of other care settings (e.g., hospice) • Increase enrollment in hospice, earlier and more consistently • Ensure availability of patient instructions for EOL treatment (e.g., DNR) • Develop support network with family and community organizations
<p>Outpatient/Ambulatory Services Skilled nursing or rehab facility care, chronic disease management programs, and/or discharge process and planning</p>	<ul style="list-style-type: none"> • Use of skilled nursing programs • Discharges to rehab facilities or nursing homes • Tracking of post-discharge outcomes • Readmissions rate 	<ul style="list-style-type: none"> • Develop and deploy skilled nursing programs • Improve referral process to rehab facilities/nursing homes • Improve discharge planning, discharge process, and outcomes tracking

Areas of Major Opportunity	Utilization Data for Problem Diagnosis	Illustrative Objectives to Drive Improvement
<p>Obstetrics Pregnancy management and delivery options, critical care, complications</p>	<ul style="list-style-type: none"> • Frequency of prenatal visits, examinations, and procedures • Delivery data by patient risk factor • Frequency of inductions • Frequency of C-sections 	<ul style="list-style-type: none"> • Improve prenatal care compliance • Reduce unnecessary C-sections • Use pregnancy risk scoring consistently • Reduce frequency of premature births
<p>Imaging Optimal use of imaging options</p>	<ul style="list-style-type: none"> • Use of imaging, frequency by episode of care and by patient • Imaging orders • Use of imaging types (CT vs. MRI) 	<ul style="list-style-type: none"> • Reduce unnecessary imaging • Standardize practice patterns • Reduce duplicative imaging • Reduce biosafety risk for patients
<p>Emergency Department (ED) Optimal use of emergency services for only the most urgent cases</p>	<ul style="list-style-type: none"> • ED visits by patient acuity • Usage of ED for chronic disease flare-ups (e.g., asthma, diabetes) • ED visits for psychiatric diagnoses • Level of occupancy or other evidence of overcrowding 	<ul style="list-style-type: none"> • Reduce treatment of non-urgent cases • Reduce unnecessary hospital admissions • Expand chronic disease management programs to reduce ED visits and access to primary care • Reduce overcrowding to improve quality of care and patient safety

6. Implement Improvements

There are a number of specific interventions that can be implemented. These include:

- Engaging clinicians with feedback of data
- Standardizing operational processes using quality improvement interventions, e.g., Lean, Toyota Production System, Six Sigma, Plan-Do-Study-Act
- Implementing evidence-based clinical guidelines
- Emphasizing appropriateness criteria
- Creating a culture change

Examples of these improvement efforts include:

Engaging clinicians with feedback of data

Engage clinical stakeholders, especially physicians, early in the process. Convene physician peers to review the data and use this forum to begin asking questions to identify some of the reasons for the observed variation. Supplement the review process with literature to determine if consensus can be reached about evidence-based clinical guidelines to reduce variation. Develop and implement evidence-based guidelines (see next page) and establish a data monitoring system to review performance against appropriateness criteria. Provide feedback to physicians and incorporate the feedback into ongoing professional practice evaluations.

It will be important to consider the role of peer review in thinking about how to engage clinicians with feedback of data. Peer review programs have traditionally been focused on identifying problems in physician performance based on individual case review, with little attention paid until recently to system factors in quality of care. In a survey of peer review programs in United States hospitals, study authors found that recognition of excellence, standardization of process and governance, and integration of peer review programs with performance improvement were just a few of the factors positively perceived by physicians as impacting quality. These findings suggest that peer review programs that incorporate these components are likely to engage physicians in the process.¹⁰

In addition, the new model of ongoing and focused professional practice evaluation, introduced by the Joint Commission several years ago, has the potential to add to traditional peer review programs by providing a constructive framework for ongoing and objective feedback to physicians about their performance. Hospitals and health systems are now required to collect a broad range of data on practitioner performance for credentialing purposes—including comparative data—and to apply evidence-based practices and quality improvement techniques. When problems in performance are identified, focused professional practice evaluations are conducted. As more information becomes available about evidence-based practices for providing the right care, to the right patient, and in the right place, this information should be incorporated into evolving professional practice evaluations and peer review programs. Implementing current quality improvement approaches such as these may be another way to engage clinicians in reducing variation.

One example of how a hospital revised its morbidity and mortality rounds to focus on system improvement using quality improvement techniques is Monroe Carell Jr. Children's Hospital at Vanderbilt University. The hospital expanded participation in rounds to include all clinical staff and senior administrators and implemented a system for developing and monitoring action plans. This new system for morbidity and mortality rounds has resulted in greater participation and involvement from clinical staff and improvements in care¹¹

Standardizing operational processes using quality improvement interventions

Use quality improvement interventions to identify inefficiencies in operations and to implement standardized processes to reduce costs and inefficiencies, while improving productivity. Lean management, Six Sigma, the Institute for Healthcare Improvement's Plan-Do-Study-Act methodology, and Toyota Production System principles have been applied in various health care organizations across the country to improve productivity, efficiency, and even patient satisfaction in specific care units, such as the ICU, emergency department, and diagnostic imaging. Quality improvement tools, such as checklists, can help standardize care processes.

The MHA Keystone Center initiative in Michigan is one example that shows how using checklists and patient goal sheets to standardize infection prevention practices and improve care team communications can have a dramatic impact on reducing infections of patients in intensive care units. Implementation of these interventions resulted in Michigan ICUs reducing bloodstream infection rates by 66 percent and saving nearly 1,800 lives. Standardizing infection prevention practices in this way not only saved lives but also realized significant cost savings.¹²

¹⁰ Edwards MT, Benjamin EM. The process of peer review in U.S. hospitals. *Journal of Clinical Outcomes Management*, 2009; Vol.16, No. 10; www.turner-white.com.

¹¹ Deis JN, Smith KM, Warren MD, et al. *Transforming the morbidity and mortality conference into an instrument for system-wide improvement. Advances in patient safety: New directions and alternative approaches*. Rockville, MD: Agency for Healthcare Research and Quality, 2008. <http://www.innovations.ahrq.gov/content.aspx?id=2219>.

¹² Pronovost P, Needham D, Berenholtz S, et al. An intervention to decrease catheter-related bloodstream infections in the ICU. *New England Journal of Medicine*, 2006. 355(26):2725-2732.

Implementing evidence-based clinical guidelines

A recent report by the Congressional Budget Office indicated that less than half of all medical care in the United States is supported by good evidence. Using evidence-based guidelines could provide doctors with better information on which treatments work best for which patients, and whether the benefits are commensurate with the costs. In turn, needless treatment could be avoided, resulting in cost reductions and improved quality of care.¹³ Where publicly available information on evidence-based clinical guidelines is obtainable, organizations should implement these standardized processes to reduce unnecessary variation within their major areas of opportunity for improvement.

An example of how the use of evidence-based guidelines may improve care is the American Heart Association's Get with the Guidelines—Coronary Artery Disease program. This program provides participating hospitals with evidence-based guidelines, learning sessions, opportunities to share best practices, and online data collection and feedback. In a study published in the American Heart Association's journal *Circulation*, researchers studied acute myocardial infarction patients at 443 hospitals participating in the Get with the Guidelines program and found that evidence-based care for these patients improved over time. They also found that racial and ethnic disparities in care for the population under study were eliminated.¹⁴

Emphasizing appropriateness criteria

Appropriate criteria are an important component of evidence-based guidelines, and together the two can be used on a prospective basis to improve care. Organizations should investigate how their electronic medical record system may be used to implement or facilitate the use of clinical protocols. Standardization of care paths based on appropriateness criteria can lead to the reduction of unwarranted utilization of services. In addition, several professional associations, such as the American College of Cardiology and the American College of Radiology, have established appropriateness criteria for certain procedures that have been shown to improve quality and efficiency of care.^{15,16}

Using evidence-based guidelines to standardize processes for reducing variation in diagnostic imaging is illustrated in a study conducted at Virginia Mason Medical Center in Seattle. Virginia Mason identified utilization of certain imaging tests that were costly and had significant variation as an opportunity for improvement. The three imaging tests that were part of this study included lumbar MRI for lower back pain, brain MRI for headache, and sinus CT scan for sinusitis. Provider stakeholders reviewed the relevant literature on evidence-based guidelines, developed clinical decision rules for these specific tests, and discussed them extensively with clinicians before incorporating them into practice. The study found that using evidence-based decision supports helped reduce unnecessary physician orders for these imaging tests.¹⁷

Creating a culture change—a culture dedicated to improving performance and reducing unwarranted variation

Ultimately, organizations must make continuous performance improvement an ongoing part of everyday processes. Top-performing states, followed as part of a Commonwealth Fund study, have set benchmarks and provided examples of leadership and collaboration necessary for improvement. These

¹³ *Research on the Comparative Effectiveness of Medical Treatments: Issues and Options for an Expanded Federal Role*. Congressional Budget Office, December 2007.

¹⁴ Cohen MG, Fonarow GC, Peterson ED, Moscucci M, Dai D, Hernandez A., Bonow RO, and Smith SC. Findings from the Get with the Guidelines coronary artery disease program: Racial and ethnic differences in the treatment of acute myocardial infarction. *Circulation*, 2010; 121:2294-2301. Originally published online May 17, 2010; *Circulation*, doi:10.1161/Circulationaha.109.922286.

¹⁵ *ACR Appropriateness Criteria*. American College of Radiology. www.acr.org.

¹⁶ Kauffman G. Appropriateness criteria helpful for meeting new quality standards. *Cardiology*, November 2007. www.qualityfirst.acc.org.

¹⁷ Blackmore C, Mecklenburg RS, Kaplan GS. Effectiveness of clinical decision support in controlling inappropriate imaging. *Journal of the American College of Radiology*. 2011; 8(1): 19-25 doi:10.1016/j.jacr.2010.07.009.

and other states that have made gains have established quality improvement partnerships with other health system stakeholders to promote standard approaches to quality measurement, public reporting and transparency, consumer and provider engagement, and payment reform to encourage value-based purchasing.¹⁸

Patients can also be important partners in helping reduce unwarranted variation. For example, Horizon Blue Cross Blue Shield of New Jersey was able to reduce unnecessary emergency department visits by talking to patients and finding out why they were using the ED. They convened a multidisciplinary team to review records of Medicare Advantage members who accounted for the greatest volume of their ED visits. They then contacted members by phone to identify the reasons they were going to the ED and helped them access the care they needed. By talking with patients and working with community resources, they were able to reduce unnecessary visits by 35.9 percent for this patient population.¹⁹

End-of-life care is another opportunity for engaging patients and families in the care delivery process. Hospital palliative care consultation teams work with patients and families to identify treatment goals and help coordinate care to meet those goals. Studies show that patients receiving these services have better control of their symptoms and experience less pain, and their families report greater satisfaction. Palliative care consult teams are also associated with hospital cost savings.²⁰

An improvement initiative to manage variation is like other complex projects that organizations pursue. There are many critical factors in planning, managing, and executing complex projects.

The following questions outline some of the important aspects to consider in a change effort.

- *Communication*
 - Have improvement initiatives been given sufficient visibility within the organization?
 - Are communications frequent, relevant, and compelling?
 - Is the right amount and type of data being shared with the right parties?
- *Consensus*
 - Is there adequate buy-in among senior leaders?
 - Is there adequate buy-in among mid-level managers and clinical staff?
 - Have efforts been made to develop buy-in at the point-of-care?
 - Has utilization management and reduction of unnecessary treatment become part of everyone's job, or are those efforts isolated to a few managers?
- *Leadership*
 - Is there sufficient leadership to drive improvement?
 - Do internal decision-making processes support change and innovation?
 - Once decisions are made on behalf of the organization, will all levels of management and staff work to support improvement?
- *Accountability*
 - Have improvement initiatives been tied to performance metrics?
 - Will senior leaders of key areas be evaluated on their ability to drive improvement?

¹⁸ *Aiming Higher: Results from a State Scorecard on Health System Performance*. The Commonwealth Fund, 2009.

¹⁹ *The Medicare Advantage Emergency Room Initiative*. <http://www.ahipresearch.com/pdfs/innovations.2010.pdf>.

²⁰ Morrison RS, et al. Cost savings associated with U.S. hospital palliative care consultation programs. *Archives of Internal Medicine*, 2009; 168 (16): 1783-1790. http://www.capc.org/costsaving_aim092008.pdf.

- *Timelines*
 - Is the organization's leadership in agreement on the timeline for improvement? Have milestones been identified?
 - Does the organization recognize several levels of targets, i.e., short-term goals/targets, medium-term, and long-term? This is particularly important for areas where elimination of variation is needed.
- *Micro-centers for Change*
 - Are there relatively self-contained locations or service areas that can serve as models or demonstration sites?
 - Does a selected micro-center for improvement have enough commonality that the lessons learned can be translated to the rest of the organization?
- *Utilization Improvement Officers*
 - Are there a sufficient number of utilization experts throughout the organization who can act as resources?
 - Have training programs been developed to maintain the focus and drive for improvement?
- *Overarching Guidelines*
 - Has the organization adopted the appropriate CMS, AHRQ, or other guidelines related to utilization?
 - Is the organization looking three to five years ahead to maintain a leading position in the industry?²¹

²¹ Numerof & Associates, Inc. "Managing Complex Projects." <http://www.nai-consulting.com/MCP.aspx>. "Meaningful Process Redesign Your Customers Would Actually Care About." <http://www.nai-consulting.com/download.aspx?a=32&f=6>

3

Best Practices, Case Studies, and Resources

There are a number of resources available about managing variation that can provide examples of best practices and improvement case studies. The table below identifies general website resources that have comparative data.

General Resources	
www.statehealthfacts.org	Hosted by the Henry J. Kaiser Family Foundation, this site provides demographic, utilization, and other data organized by state with many useful map features.
www.commonwealthfund.org www.whynotthebest.org	Hosted by The Commonwealth Fund, this site provides state health care scorecards, survey data, and research studies to promote a high-performing health care system.
www.ahrq.gov	AHRQ's website includes many useful research studies and reports, such as <i>Selecting Quality and Resource Use Measures: A Decision Guide for Community Quality Collaboratives</i> , as well as health IT resources and health data standards through its United States Health Information Knowledgebase at http://ushik.ahrq.gov .
www.hcupnet.ahrq.gov	HCUPnet is a free, online query system based on data from the Healthcare Cost and Utilization Project (HCUP). It provides access to health statistics and information on hospital inpatient and emergency department utilization (28 million visits). This site includes the Nationwide Inpatient Sample (NIS) dataset with tools to extract comparison data.
www.qualityindicators.ahrq.gov	The AHRQ Quality Indicators (QIs) are measures that use readily available hospital inpatient data.
www.statesnapshots.ahrq.gov	The AHRQ State Snapshots provide annual health care performance measures and public health data by state.
www.hospitalcompare.hhs.gov	Hospital Compare provided by HHS includes information targeted toward consumers to help them find and compare hospitals based on health care needs.
www.cahps.ahrq.gov	The Consumer Assessment of Healthcare Providers and Systems (CAHPS) is a compilation of survey data from patients about their treatment experience, including communications and environmental conditions. This site also provides extensive resources on improvement.
www.dartmouthatlas.org	The Dartmouth Health Atlas provides health care utilization data for Medicare-covered decedents.
www.vha.com	The corporate site gives participating organizations access to tools and data to improve utilization and reduce cost.
www.premierinc.com	The Premier Healthcare Alliance corporate site allows members to access clinical and financial data, including claims data, on 130 million patient discharges.
www.uhc.edu	The University HealthSystem Consortium site provides access to member institutions about products and services for data analysis and performance improvement.

The following table has more detailed examples and resources categorized by major areas of opportunity. These areas are not mutually exclusive and, for simplicity, examples are only listed in one area, although they may be applicable to multiple areas. The table's areas of focus include:

- Use of Checklists, Protocols, and Pathways
- Care Coordination
- Home Health: Chronic Care Utilization
- Med/Surg Utilization: Hospital Care Intensity
- Obstetrics: C-section Utilization
- Imaging
- Surgical Procedures
- End of Life: Hospice Care Utilization
- End of Life: ICU Utilization
- End of Life: Cancer
- Emergency Room Utilization
- Emergency Room: Reducing Wait Time
- Emergency Room: Stroke
- Clinical Decision-Making

Program Name / Study	Summary of Findings	Link
Use of Checklists, Protocols, and Pathways		
Study: Heart Failure Order Sets	Impact of a standardized heart failure order set on mortality, readmission, quality, and costs of care. Study of standardized order sets.	<i>International Journal for Quality in Health Care</i> 2010; pp. 1–8, David J. Ballard et. al.
Surgical Checklist Initiative	In January 2009, a coalition of major health care stakeholders in Washington came together to create the SCOAP Surgical Checklist Initiative. The Surgical Care and Outcomes Assessment Program (SCOAP) is a unique, clinician-led, voluntary collaborative that links hospitals and surgeons with clinicians from across the state to increase the use of best practices in surgical care. SCOAP's goal is to provide the kind of surveillance of procedures and response to negative outcomes that exists in the world of aviation.	http://www.scoap.org/c hecklist/ http://www.scoap.org/d ownloads/SCOAP- Surgical- Checklist_v3_4.pdf
Surgical Check List	Implementation of a surgical checklist is associated with lower death rates and fewer complications in patients 16 years or older who are undergoing non-cardiac surgery in a diverse group of hospitals. The rate (within the hospitals included in the study) of death was 1.5% before the checklist was introduced and declined to 0.8% afterward (P=0.003). Inpatient complications occurred in 11.0% of patients at baseline and in 7.0% after introduction of the checklist (P<0.001).	http://cme.medscape.co m/viewarticle/586780 http://www.who.int/pati entsafety/safesurgery/fa q_introduction/en/inde x.html
WHO: Safe Surgery Saves Lives	The goal of the Safe Surgery Saves Lives Challenge is to improve the safety of surgical care around the world by ensuring adherence to proven standards of care in all countries. The WHO Surgical Safety Checklist has improved compliance with standards and decreased complications from surgery in eight pilot hospitals where it was evaluated.	http://www.who.int/pati entsafety/safesurgery/e n/

Program Name / Study	Summary of Findings	Link
Following Protocols Can Reduce Medication Errors for Heart, Stroke Patients	"Stroke is a huge area where there continues to be a lot of errors with blood thinners and with agents used to dissolve a blood clot causing stroke," writes Andrew D. Michaels, MD, lead author. The statement recommends that hospitals and medical personnel: (1) Obtain patients' accurate weight at admission. (2) Use the Cockcroft-Gault formula to calculate creatinine clearance (a measure of kidney function) at admission and as it changes. The formula uses a patient's blood creatinine measurement plus his/her gender, age, and weight to measure the kidneys' capacity to clear drugs. It is the only formula recommended for use in determining drug dosages, but it is not commonly calculated at admission, Michaels said. (3) Adjust medication dosages and heighten surveillance for adverse medication events in older patients. (4) Standardize order forms and protocols for anticoagulation drugs.	http://icu-management.org/node/1569
A Citywide Prehospital Protocol Increases Access to Stroke Thrombolysis in Toronto	To improve rapid access to stroke thrombolysis in Toronto, Canada, a citywide pre-hospital acute stroke activation protocol was implemented. This comprised a paramedic screening tool, ambulance destination decision rule, and formal memorandum of understanding of system stakeholders. Findings observed included a four-fold increase in patients who were eligible for and treated with tissue plasminogen activator (TPA).	http://stroke.ahajournal.org/cgi/content/short/40/12/3841
Acute Stroke Practice Standard for the Emergency Department	OHSU Hospitals and Clinics have adopted this practice standard in order to delineate a consistent, evidence-based approach to treating the patient who presents with signs and symptoms consistent with acute stroke. Although this standard assists in guiding care, responsibility to determine appropriate care for each individual remains with the providers themselves.	http://img.medscape.com/pi/emed/ckb/neurology/1134815-1159751-1162677-1604804.pdf
Sedation Order Form May Reduce ICU Stays	Sedation order forms can reduce the number of days patients spend on mechanical ventilation and shorten their stays in the intensive care unit (ICU), Nebraska researchers have found. When the order form was used, the results were impressive. Patients who were monitored according to the document were assessed for sedation more frequently than those for whom the forms were not used (every 2.1 hours vs. 3.1). The time between sedation vacations was reduced from every 41 hours to every 30.1 hours (P<0.05 for both findings). Patients who received a daily sedation vacation spent less time in the ICU than did those patients who were not given a break from the drugs (6.6 vs. 8.3 days; P<0.05). Similarly, they experienced shorter duration of mechanical ventilation (3.5 vs. 5.8 days; P<0.05).	http://www.pharmacypracticenews.com/index.asp?section_id=50&show=dept&issue_id=404&article_id=10702
A plea for intense glucose management to control hyperglycemia in the ICU. IV insulin infusion protocols reduce hyperglycemia and other hospital morbidities.	Numerous studies have shown that intense glucose control using IV insulin with blood glucose targets of 80 mg/dL to 110 mg/dL improve hospital survival compared with conventional targets with subcutaneous insulin and physician-directed dosing. Van den Berghe et al. found that intensive insulin therapy reduced mortality in the surgical ICU from 8% to 4.6% among patients on ventilation. Additionally, hospital morbidities decrease significantly (e.g., sepsis by 46%, acute renal failure requiring dialysis by 41%, transfusions by 50%, and polyneuropathy by 44%).	http://www.cardiologytoday.com/view.aspx?rID=38185

Program Name / Study	Summary of Findings	Link
Reducing MRSA Health Care-Associated Infections	In 2002, the VA Pittsburgh Healthcare System (VAPHS) began collaboration with the Pittsburgh Regional Healthcare Initiative and the CDC to adopt the principles of the Toyota Production System (TPS) to reduce transmission of MRSA and MRSA health care-associated infections (HAIs). The approach was piloted on a surgical ward at VAPHS. The key strategies implemented included: (1) surveillance cultures for MRSA on all admissions and discharges; (2) prompt isolation (in contact precautions) of patients found to be colonized or infected with MRSA; and (3) an aggressive hand hygiene training program. Using TPS, MRSA infections on the surgical ward decreased 60 percent over four years. The strategy was expanded to the Surgical Intensive Care Unit (ICU), where a 75 percent reduction in MRSA HAIs was realized over three years. In 2005, the program was expanded to include all acute care units at VAPHS and reductions of similar magnitude were noted on all acute care units.	http://www.hsrd.research.va.gov/publications/forum/may10/may10-3.cfm
Improvement Map: Mentor Hospital Registry, Institute for Healthcare Improvement	The IHI's Improvement Map Mentor Hospital Registry allows health leaders to use tables to quickly find a mentor hospital for the implementation of IHI bundles and/or checklists with demographics similar to their own. Areas include: Surgical Checklists, Ventilator Bundle, AMI Core Processes, Catheter-Associated UTI, Central Line Bundles, Falls Prevention, Hand Hygiene, Heart Failure Core Processes, High-Alert Medication Safety, Infection Prevention: MRSA, Infection Prevention: SSI, Medication Reconciliation (ADE), Pressure Ulcer Prevention, Rapid Response Systems, Surgical Complications, and Venous Thromboembolus (VTE).	http://www.ih.org/IHI/Programs/Campaign/mentor_registry_cli.htm
Regional and state initiatives	Six states' projects and initiatives with links to download best practices for CLASBI and VAP. There are links for national initiatives with interventions listed, for hospital successes, and for resources.	http://premierinc.com/quality-safety/tools-services/safety/topics/bundling/national.jsp http://premierinc.com/quality-safety/tools-services/safety/topics/bundling/success.jsp
Reducing HAIs: Effective Change Strategies	On September 27, 2010, Anthony Harris made this presentation at the 2010 Annual Conference with talking points on: important healthcare-associated infection (HAIs), science of how to decrease HAIs, epidemiological issues of HAI research, barriers to implementation and maintenance, and illustrative examples.	http://www.ahrq.gov/about/annualconf10/george_harris/harris.HTML
First State-Specific Healthcare-Associated Infections Summary Data Report, CDC's National Healthcare Safety Network (NHSN), January-June 2009	This website links to the HAIs report by state, but also has several links to HAI interventions and guidelines to help hospital leaders lower HAIs in their hospitals.	http://www.cdc.gov/hai/statesummary.html and http://www.cdc.gov/HAI/prevent/prevention.html

Program Name / Study	Summary of Findings	Link
CMS Discharge Planning Checklist, Home Health Quality Improvement National Campaign, Hospital to Home (H2H) National Quality Initiative	Website contains links to resources useful for home health transitions, discharge planning, and other links/resources/tools for providers on formal multidimensional programs to improve care transitions.	http://www.cfmc.org/ca_retransitions/provider_resources.htm and http://www.medicare.gov/publications/pubs/pdf/11376.pdf
Care Coordination		
Project BOOST	The year-long mentoring program providing expert coaching is in place at 60 sites. Project BOOST mentor sites are in various stages of planning implementation and data reporting. Aggregate findings for sites with an intervention in place for one year will be available in early 2011. Early data from six sites, which implemented Project BOOST, reveals a reduction in their 30-day readmission rates from 14.2% before BOOST to 11.2% after implementation; also, a 21% reduction in 30-day all-cause readmission rates.	http://www.hospitalmedicine.org/ResourceRoomRedesign/RR_CareTransitions/Boost_vanity_landing.cfm
Care Transitions Program, Louisiana	The project aims to provide Medicare beneficiaries with a health coach upon hospital admission to connect with patients and let them know what to expect during their hospital visit and after. The project has succeeded in reducing the rate of unnecessary hospitalizations from almost 19 percent to approximately 4 percent in the pilot group of patients receiving transitions coaching.	http://louisianaqio.eqhs.org/PDF/Media/Care%20Transitions%20Showing%20Success.pdf
PATH (Post Acute Transitions in Healthcare) Alabama; Tuscaloosa, Bibb, Greene, Hale, Fayette, Lamar and Pickens counties	Specific aims of PATH Alabama are: (1) to establish a multidisciplinary, multi-provider work group that will lead to effective partnerships between the community at large, providers, academic institutions, and patients; (2) to promote capacity building in the targeted communities through increased knowledge and empowerment of community constituents; and (3) to engage community providers in the development, application, and dissemination of data-driven strategies for reducing hospital readmissions.	http://www.aqaf.com/index.php?option=com_content&task=view&id=448&Itemid=824
Alliance of Community Health Plans Care Coordination Program	Two examples from the source: (1) At Security Health Plan in Marshfield, Wisconsin, nurse managers work with patients prescribed the anti-clotting drug Warfarin and their families to prevent falls, ensure proper nutrition, and answer questions about the proper use, safe dosage, and dangerous interactions with other medications. Security reduced the normal 7%-10% risk of hospitalizations or death in patients taking Warfarin to less than 2%. (2) Priority Health Plan of Grand Rapids, Michigan, tracks patients with cardiovascular conditions as they are discharged from a hospital to make sure that their medications are correct, that they have a follow-up appointment with a physician, and that they receive the other services needed to help them adhere to a treatment plan. Just 2 out of 105 Medicare patients included in Priority's pilot project had an unplanned readmission within 30 days of being discharged.	http://www.achp.org/files.php?force&file=front/JohnsHopkinsStudy-FinalReport.pdf

Program Name / Study	Summary of Findings	Link
Lean Healthcare / The Pittsburgh Way, UPMC St. Margaret Hospital in Pittsburgh	This hospital's goal in using Lean principles was to reduce readmissions for chronic obstructive pulmonary disease (COPD) by an aggressive 40% in one year. An intervention based on Lean principles helped find areas contributing to these readmissions, organized and established new protocols to prevent problem areas and strengthen efficiency, and established systems to sustain and maintain these changes. For example, the intervention team found that different doses of the same drug (.63 mg and 1.25 mg of Xopenex, a drug commonly used with COPD patients) were in identical containers side by side in the same drawer. To address this problem, the team moved the different doses to different drawers with highly distinctive labels to call special attention to the dosages. After finding other such areas for change and implementing new systems of efficiency and safety, within one year, UPMC St. Margaret reduced readmission rates for COPD patients by 48% and produced an estimated savings to the hospital of over \$85,000.	http://www.naidagrunden.com/ http://www.cahealthadvocates.org/news/basics/2010/creative.html
Georgia Care Transitions Program, Piedmont Hospital, Atlanta	The Care Transitions Initiative aims to educate the patient and caregiver on how to take medications correctly, identify potential problems after discharge, and find community-based services. Pilots are under way in Gwinnett, Rockdale, and Newton counties. Atlanta's Piedmont Hospital cut readmissions to 10.6% among Medicare patients.	http://www.gmcf.org/transitions/index.shtml
Project RED, Boston Medical Center	Project Re-Engineered Discharge uses an 11-point checklist for hospital staff to follow during discharge, and is coordinated by a nurse trained as a discharge advocate and a pharmacist, both employed by the hospital. The list includes educating patients about their diagnoses, confirming medications, creating a personal health record, making follow-up appointments with primary care providers, and giving patients a written discharge plan. A recent randomized study showed a 30% decrease in readmission when all steps were followed.	https://www.bu.edu/fam/med/projectred/
Home Health – Chronic Care Utilization		
Aetna Transitional Care Model Program	Aetna's Medicare Advantage members participating in the Transitional Care Model program receive home visits from advanced-practice nurses within seven days of hospital discharge. Nurses ensure that patients have all of the items and services needed to follow their physicians' care plans and that their home environments are safe. Among patients receiving services through the Transitional Care Model pilot from 2006-2007, significant improvements were achieved in functional status, depression symptom status, self-reported health, and quality of life. The pilot program achieved a cost savings of \$175,000, or \$439 per member per month. Aetna is now implementing the program for larger populations of Medicare Advantage members across the country.	http://www.commonwealthfund.org/Content/Newsletters/Quality-Matters/2010/August-September-2010/Case-Study.aspx

Program Name / Study	Summary of Findings	Link
The Alliance for Home Health Quality and Innovation (AHHQI)	According to the 2008 Data Book issued by the Medicare Payment Advisory Commission (MedPAC), an analysis of Medicare home health utilization between 2002 and 2006 revealed the following: (1) The number of Medicare recipients using home health services increased from 2.5 million to 2.9 million, or 4% a year. (2) The percent of all Medicare beneficiaries using home health rose from 7.1% to 8.1%, a 3.5% annual increase. (3) Total episodes of care went from approximately 4 million to more than 5 million, a 6.3% annual change. (4) Episodes per user rose from 1.62 to 1.76, while visits per user increased from 31 to 34. (5) Average payment per episode went from \$2,317 to \$2,569, an average 2.6% annual increase. This document explains the roles and responsibilities of the home health team.	www.ahhqi.org/download/File/AHHQI_HomeCareDataBookv4.pdf
Physician Awareness and Understanding of Home Health Services in Massachusetts	Contains information on physician awareness and understanding of home health services in Massachusetts. For example, 97% of physicians said home health care helps manage their patients care from home and 41% report cost savings.	www.massmed.org/HomeSurvey09
Guided Care	A Guided Care nurse, based in a primary care office, works with patients and their families to improve their quality of life and make more efficient use of health services. The nurse assesses patient needs, monitors conditions, educates and empowers the patient, and works with community agencies to ensure that the patient's health care goals are met.	www.guidedcare.org
King County Care Partners Chronic Care Management Project	Of those in the chronic care management group (839 clients), 18% (153 clients) received at least one month of chronic care management in the nine-month post period. The impact of offering chronic care management services in the program's initial nine months of operation is estimated to have resulted in an average \$36 per member per month increase in Health and Recovery Services Administration medical expenditures, less than a 3% change from baseline. The change is not statistically significant given the variability of costs within both groups.	http://www.aasa.dshs.wa.gov/professional/hcs/CCL/
Home-Based Chronic Care: An Expanded Integrative Model for Home Health Professionals	This article posits that the role of chronic care coordination assistance and disease management fits within the purview of home health care and should be central to home health chronic care delivery.	http://www.nursingcenter.com/library/JournalArticle.asp?Article_ID=786675
The Sutter Care Coordination Program	The Sutter Care Coordination Program combines chronic care and disease management to address the medical and psychosocial needs of individuals with multiple chronic conditions. The program reduced patient visits to specialists by 12.7%, emergency department visits by 25.9%, and hospitalizations by 18.3%. Because the program's sponsor, Sutter Health Sacramento-Sierra, serves many patients on a capitation basis, much of the savings achieved through avoided medical costs are shared by its physician organizations and hospitals. The program was the first of its kind to receive Disease-Specific Certification from The Joint Commission.	http://www.innovations.ahrq.gov/content.aspx?id=1696

Program Name / Study	Summary of Findings	Link
The Long Term Home Health Care Program (LTHHCP) in Niagara County	The LTHHCP is available in every county in New York, and its patients are extraordinarily diverse. Though most LTHHCP patients are elderly, people of all ages, infants through senior adults may participate. LTHHCP patients include people with severe physical disabilities, such as advanced multiple sclerosis and severe cerebral palsy, people with multiple chronic diseases, such as diabetes, people with progressive conditions such as heart, kidney, and respiratory failure, and physically frail elders.	http://www.niagaracounty.com/health/Nu_LTHHCP.asp
Med/Surg Utilization – Hospital Care Intensity		
Rethinking the Use of Intensive Care Beds in California Hospitals	Hospital reliance on the ICU is growing: the supply of noncritical care beds shrunk 31% whereas the supply of critical care beds increased 26%. Research shows hospitals lose money on Medicare ICU cases. Reducing variation in utilization would produce significant ICU savings (i.e., substituting medical/surgical floor days for 130,000 ICU patients would yield \$159 million in operating costs savings for hospitals in California annually) Quality-driven initiatives produce ICU utilization savings.	http://www.chcf.org/publications/2007/03/rethinking-the-use-of-intensive-care-beds-in-california-hospitals
Evaluation of Appropriateness of Intensive Care Unit Admissions: The GIVITI's StART Approach	StART is an approach to identify possible mismatches between the level of care actually delivered, assumed to correspond to what is clinically required, and the level of care deliverable by the unit.	http://ccforum.com/content/14/S1/P449
Patient Tracker	The Patient Tracker software is an interdisciplinary communication tool that has been widely used and has proved effective in coordinating inpatient flow. The use of the software facilitated a decrease in cancellations of surgical procedures and in delays of admissions through the ED. This is an example of the use of HIT to solve an important bed management efficiency challenge faced by academic hospitals.	http://www.ncbi.nlm.nih.gov/pmc/articles/PMC2655791/
Patient Placement Coordinators, Jackson Memorial Hospital (JM)	In an attempt to improve patient care and to maximize bed utilization, the hospital's ED developed two new initiatives. The first of these to evolve was a new position called Patient Placement Coordinator (PPC). The PPC evolved from a group of select senior nurses with strong administrative and clinical backgrounds. Their sole job was to improve ED throughput, improve bed utilization throughout the entire hospital, and to ensure that patients were assigned to in-house settings that would provide the appropriate level of care.	http://www.psqh.com/novdec05/bed-utilization.html
ED Problems Are Result of Bed Shortages, Doctors Contend	Overview of some programs that have been implemented in Canadian hospitals. An example is Montreal's Regional Health Board, which has had some success in dealing with overcrowding. Over the last two years, the board has increased home care services and improved access to medical clinics and outpatient services to free beds within hospitals. The board has also developed a management guide to improve coordination between emergency physicians and those coordinating admissions. Some hospitals have hired medical coordinators who are on-site or on-call 24/7.	http://www.cmaj.ca/cgi/content/full/170/11/1653

Program Name / Study	Summary of Findings	Link
Critical Access Hospital: An Overview of the Bed Management Program	Provides an approach to bed management within a critical access hospital. Real time information on bed use, streamlined placement, and earlier discharges are just a few examples of its approach.	http://www.healthynh.com/nhha/nh_hospitals/ruralhealth/cah%20downloads/Monadnock%20Bed%20Management.ppt
Reducing Inpatient Length of Stay	These findings show that hospitals that successfully lower their lengths of stay adopt a process with many of the following features: (1) Identifying clinical and financial opportunities associated with current experience based on a comparison to best-practice benchmarks. (2) Obtaining the commitment of senior management to support, encourage and reward change. (3) Engaging physicians and hospital staff and identifying champions for change. (4) Establishing baseline performance. (5) Setting objective and measurable performance targets. (6) Creating quality processes built on evidence-based, best-practice clinical processes adapted to local conditions. (7) Measuring and reporting results on a timely basis. (8) Linking target achievement to financial rewards in a legally sound manner.	http://publications.milliman.com/research/health-rr/pdfs/Reducing-InPatient-Length-Stay-CC.pdf
Learn ICU	Site with multiple guidelines on admissions and discharges for the ICU.	http://www.learnicu.org/Quick_Links/Pages/default.aspx
Obstetrics – C-Section utilization		
The Mount Sinai Cesarean Section Reduction Program	A six-year follow-up evaluation of their original cesarean section reduction program is presented. While establishing obstetric practice guidelines was accomplished, two prerequisites remain critical: lowering cesarean utilization was to be accomplished without harm to mother or fetus, and a target rate was prospectively determined. The results after six years indicate that total cesarean rates of 10%-12% can consistently be achieved without adverse outcome. Additionally, operative vaginal procedures were employed less than 3% of cases. Separate analysis of 580 breech deliveries failed to show an effect of route of delivery on mortality. This effort indicates that long-term reductions and cesarean utilization are possible with a comprehensive departmental program designed to accomplish achieving a target rate of 11%.	http://www.ncbi.nlm.nih.gov/pubmed/8272900
Northern New England Perinatal Quality Improvement Network - VBAC	Since 2000, the VBAC rate in New Hampshire fell from 36.74% to 20.12%, 8.00% due to lack of availability. In 2002, 372 extra cesarean deliveries, 179 due to lack of option, at a total cost of \$1.4 million were performed in New Hampshire. Although 14 of 33 hospitals no longer offer VBAC, 31 of 33 participated in the conference, and 97.2% of individuals polled wished to offer VBAC.	http://www.nnepqin.org/site/page/vbac
Assessing Regional Variation in Cesarean Section (C-Section) and Vaginal Delivery After C-Section (VBAC) in a Major Metropolitan Area Utilizing a Statewide Database and Risk Stratification Tool	The significant variation among physicians for C-section and VBAC rates suggests that decision-making by physicians providing obstetrical care is a major contributor to overall rates. Low VBAC rates combined with high numbers of low risk repeat C-sections provide the best opportunity to modify practice patterns.	http://gateway.nlm.nih.gov/MeetingAbstracts/ma?f=102272673.html

Program Name / Study	Summary of Findings	Link
Bariatric Operations Reduce Odds of Gestational Diabetes, Cesarean Section	Obese women who have bariatric surgical procedures before pregnancy were three times less likely to develop gestational diabetes (GDM) than women who have bariatric operations after delivery, according to new research findings published in the August 2010 issue of the <i>Journal of the American College of Surgeons</i> . The retrospective study also found that delivery after bariatric procedures was associated with reduced odds of cesarean section—an outcome associated with GDM.	http://www.eurekalert.org/pub_releases/2010-09/wsw-bor090710.php
Ob-Gyns Issue Less Restrictive VBAC Guidelines	The cesarean delivery rate in the U.S. increased dramatically over the past four decades, from 5% in 1970 to over 31% in 2007. "The current cesarean rate is undeniably high and absolutely concerns us as ob-gyns," said Richard N. Waldman, MD, president of ACOG. "These VBAC guidelines emphasize the need for thorough counseling of benefits and risks, shared patient-doctor decision-making, and the importance of patient autonomy. Moving forward, we need to work collaboratively with our patients and our colleagues, hospitals, and insurers to swing the pendulum back to fewer cesareans and a more reasonable VBAC rate." Approximately 60-80% of appropriate candidates who attempt VBAC will be successful.	http://www.acog.org/fr_om_home/publications/press_releases/nr07-21-10-1.cfm
AHRQ Analysis of Delivery Trends	"Vaginal Birth After Cesarean: New Insights." This structured abstract, published in March 2010, provides an analysis of research studies on vaginal birth after cesarean (VBAC), trial of labor (TOL) and elective repeat cesarean delivery (ERCD).	http://www.ahrq.gov/research/maternalhth/
Imaging		
American College of Radiology	This website provides Industry research and resources.	www.acr.org
Interventions for Improving the Appropriate Use of Imaging in People with Musculoskeletal Conditions	For improving the use of imaging in osteoporosis, most interventions aimed at health professionals demonstrated benefit, and patient-mediated, reminder, and organizational interventions appeared to have most potential for benefit. For low back pain studies, the most common intervention evaluated was distribution of educational materials and this showed varying effects. Other interventions in low back pain studies showed variable effects. For other musculoskeletal conditions, educational materials, educational meetings, and audit and feedback were not shown to be effective for changing imaging ordering behavior. Across all conditions, increasing the number of intervention components did not result in producing a larger effect of interventions.	http://www2.cochrane.org/reviews/en/ab006094.html
ACR Appropriateness Criteria for Low Back Pain.	Evaluation criteria for the appropriateness of initial radiologic examinations for patients with low back pain with or without radiculopathy.	http://www.guideline.gov/content.aspx?id=13671
No Benefit to Routine Imaging for Low Back Pain Without "Red Flags"	Researchers conclude that clinicians should refrain from routine use of imaging in these patients, although they acknowledge that patient expectations will also have to be managed to accomplish this.	http://www.medscape.com/viewarticle/587940

Program Name / Study	Summary of Findings	Link
Radiologists See Opportunity in Overuse of Back Imaging	Radiologists need to help clinicians better understand which back pain symptoms require diagnostic imaging and which symptoms are likely to improve with or without imaging.	http://www.rsna.org/Publications/rsnanews/May-2009/Radiologists_feature.cfm
Minnesota Community Measurement, Low Back Pain Measure Impact and Recommendation Document	Low back pain was ranked as one of the top six clinical conditions with potential performance variation selected by clinicians in the technical advisory group for high-tech diagnostic imaging. Lumbar imaging for low back pain without indications of serious underlying conditions does not improve clinical outcomes. Therefore, clinicians should refrain from routine, immediate lumbar imaging in patients with acute or subacute low back pain and without features suggesting a serious underlying condition.	http://www.health.state.mn.us/healthreform/measurement/2010_LowBackPain.pdf
National Priorities Partnership	The National Priorities Partnership selected nine areas of overuse and misuse, one of which is unwarranted diagnostic procedures, specifically targeting lumbar spine MRI prior to conservative therapy without red flags. Imaging of the back and the use of back surgery was also identified as early targets for waste reduction by New England Healthcare Institute.	http://www.nationalprioritiespartnership.org/PriorityDetails.aspx?id=598
Community Checkup, Puget Sound Health Alliance	Researchers found “a clear relationship between MRI availability and MRI use for low back pain patients.” The areas with the largest growth in MRI availability also had the fastest-growing Medicare bills for imaging. The Community Checkup, the name of the Alliance’s public report, scores practices on how often imaging is deployed for new low back pain patients—the fewer the scans, the higher the score.	http://rwjfblogs.typepad.com/healthreform/2010/01/htk-1.html#more
		http://www.wacomunitycheckup.org/
Institute for Clinical Systems Improvement (ICSI)	ICSI developed protocols based on national guidelines for use.	http://www.icsi.org/health_care_redesign/diagnostic_imaging_35952/
Surgical Procedures		
NEJM: Variation in Hospital Mortality Associated with Inpatient Surgery	In addition to efforts aimed at avoiding complications in the first place, reducing mortality associated with inpatient surgery will require greater attention to timely recognition and management of complications once they occur.	http://www.nejm.org/doi/full/10.1056/NEJMsa0903048#t=articleTop
Intensive Care Unit Nurse Staffing and the Risk for Complications after Abdominal Aortic Surgery	The authors report findings based on categorizing intensive care units (ICUs) into those with less versus greater nurse-to-patient ratios. Results demonstrated an increased risk for complications, including specific respiratory-related ones, in ICUs with smaller care ratios. The authors suggest that nurse staffing affects the quality of postoperative care and that continued efforts should explore optimal care ratios as one method of reducing ICU complication rates.	http://www.acponline.org/clinical_information/journals_publications/sep/oct01/pronovost.htm
Understanding and Reducing Variation in Surgical Mortality	Strategies focusing on selective referral, process compliance, or outcomes measurement reflect different philosophies on how best to improve surgical quality and have distinct advantages and disadvantages. As described elsewhere, the optimal strategy may depend on both the clinical context (e.g., which procedure) and political realities. It may also depend on which outcomes measure is to be improved.	http://www.annualreviews.org/doi/abs/10.1146/annurev.med.60.062107.101214

Program Name / Study	Summary of Findings	Link
5 Million Lives Campaign	The 5 Million Lives campaign sponsored by Institute for Healthcare Improvement sought to reduce 5 million instances of medical harm from December 2006 through December 2008. One of their goals was reducing surgical complications. The site provides toolkits for interventions and progress made by the campaign.	http://www.ihi.org/IHI/Programs/Campaign/
Department of Veterans' Affairs Inpatient Evaluation Center (IPEC)	Following four intense years of building a system that measures and reports risk adjusted mortality in 138 hospitals nationally, these researchers have identified lessons regarding structure of a national measurement system outside of the VA that might be valid. First, a risk adjustment model that predicts death at 30 days in addition to a model predicting death at hospital discharge will be important to avoid gaming. Next, having resources and expertise to support recalibration of the weights of the model at appropriate time frame is needed. Also, using a large dataset will be needed as part of the infrastructure of the program.	www.ahrq.gov/qual/mortality/VAMort.pdf
Surgical Continuum of Care (SCoC) model	SCoC model is patient-centered, outcomes-driven, value-based approach for hospital-wide surgical patient safety. The principles of this value paradigm are adaptable to other hospitals as demonstrated in our longitudinal study in 3 hospital systems, and the initial experience of CoC suggests that this model will have benefit beyond surgical hospital cohort.	http://www.ncbi.nlm.nih.gov/pubmed/20739849
End of Life: Hospice Care Utilization		
AHA's Circle of Life Award	Useful case studies of institutions that were recognized for their performance.	www.aha.org/aha/news-center/awards/circle-of-life/awardees.html
Report of the Center for Improving the Value of Health Care (CIVHC) Palliative Care Task Force	The CIVHC Palliative Care Task Force represents a spectrum of palliative care providers and experts in Colorado. The preponderance of palliative care in Colorado is delivered by 53 hospice programs (total of 72 sites) to over 15,000 patients and their families annually. A number of hospitals and one health care system offer palliative care programs, and other hospitals and nursing homes partner with hospices to provide palliative care services in their institutions.	http://www.colorado.gov/cs/Satellite?blobcol=urldata&blobheader=application%2Fpdf&blobkey=id&blobtable=MungoBlobs&blobwhere=1251615969179&ssbinary=true
Palliative Care and Home Hospice Program: Northwestern Memorial Hospital	Northwestern Memorial Hospital (NMH) established its hospice and palliative care program step by step over 17 years. The program has three components: a consultation service, an acute inpatient unit, and a home hospice program. During 1997, the consultation service had an average of 57 new patients per month ranging in age from 45 to 80 years. During 1996, the 12-bed acute care inpatient unit had an average midnight census of 9.8 patients. That average dropped to 6.9 in 1997, due to new treatments for AIDS, and rose to 9.0 in the third quarter of 1998. The inpatient unit cares for more than one third of all dying patients in NMH, a 779-bed private nonprofit hospital. Patients need not have hospice insurance benefits to be admitted to the acute care unit. The home hospice program serves patients living within the city of Chicago.	http://www.milbank.org/pppc/0011pppc.html#northwestern

Program Name / Study	Summary of Findings	Link
Dr. Alexander Nesbitt: Pulled to Palliative Care	The inpatient palliative care service at the Gatehouse Hospice Unit launched in January 2005 and grew rapidly, while the hospice census was also rising to its current level of about 100 patients. Dr. Nesbitt went to the system's administrators and persuaded them to open seven-bed Gatehouse Inpatient Hospice in July 2006 in a medical office building two miles from the acute hospital, with him as its medical director.	http://archive.constantcontact.com/fs087/1102316637620/archive/1102920975121.html
Agency for Healthcare Research and Quality (AHRQ) End of Life Care and Outcomes Report	To evaluate progress in the field of end-of-life care and clarify research priorities, the National Institute of Nursing Research (NINR) with the Agency for Healthcare Research and Quality (AHRQ), commissioned this evidence report as the basis for a State-of-the-Science Conference in December 2004. The need for such an assessment is clear. More than 75 percent of Americans now live past age 65, and 83 percent of Americans now die while covered by Medicare.	http://www.ahrq.gov/downloads/pub/evidence/pdf/eolcare/eolcare.pdf
Use of hospitals, physician visits, and hospice care during last six months of life among cohorts loyal to highly respected hospitals in the United States	This study evaluated the use of health care resources during the last six months of life among patients of U.S. hospitals with strong reputations for high-quality care in managing chronic illness.	http://www.bmj.com/content/328/7440/607.full.pdf
Researchers Define Best Practices for End-of-Life Care in Nursing Homes with Hospice Services	Researchers at Brown Medical School identified, recorded, and disseminated collaborative solutions (best practices) for end-of-life care in nursing homes with hospice services. They created a project website with information about the project, resources and guidelines, and bibliographies. Researchers identified these key collaborative solutions: Systematic processes facilitate communication among all levels of nursing home and hospice staff. Hospice chief executive officers are well versed in nursing home regulatory and care environments, are skilled leaders, and convey a consistent vision for hospice nursing home care. Nursing homes share their care expectations with their hospice partners and provide feedback to hospices.	http://www.rwjf.org/reports/grr/049891.htm
Workgroup Report on Hospice Care, Palliative Care and End-of-Life Counseling	The workgroup was asked to examine the following questions: (1) What are the types of care available in the state for individuals at the end of life for palliative and hospice care? (2) What is the degree to which these options are utilized within a home setting, long-term care setting, hospital setting, and hospice setting? (3) What is the average length of time spent in various types of palliative and hospice care settings? (4) What are the types and degrees of barriers that exist regarding awareness of and access to hospice and palliative programs? (5) What are recommendations to improve awareness and access to hospice and palliative care programs?	http://www.oag.state.md.us/Healthpol/Hospice_and_Palliative_Care_Workgroup_Report.pdf

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Caring at All Stages of Life and Health	The National Hospice and Palliative Care Organization (NHPCO), which represents hospices, palliative care providers, and end-of-life care professionals, has articulated a vision for improved end-of-life care: "A world where individuals and families facing serious illness, death, and grief will experience the best that humankind can offer." NIH experts recognized that new models of care may include aggressive technology but will also take into account the patient and the family's priorities regarding quality of life as well as the patient's spiritual needs. In these care models, honest conversations and planning with a patient and the family begin soon after a serious illness is diagnosed.	http://www.ahip.org/content/default.aspx?bc=311301361874418748
American Hospice Foundation	Nonprofit organization that supports programs to serve the needs of terminally ill and grieving individuals of all ages	www.americanhospice.org
Hospice Foundation of America	Nonprofit organization that "provides leadership in the development and application of hospice and its philosophy of care."	www.hospicefoundation.org
National Hospice and Palliative Care Organization	Largest nonprofit membership organization representing hospice and palliative care programs and professionals in the U.S.	www.nhpco.org
Informed Medical Decisions	Nonprofit organization with a goal to lead changes to ensure that health care decisions are made with the active participation of fully informed patients. Numerous cases and research studies provided.	www.informedmedicaldecisions.org
The Palliative Care Program	The KP TriCentral Palliative Care (TCPC) program started as a pilot study in 1997 and began receiving annual funding in 1998. The TCPC program is an interdisciplinary, home-based program for patients at the end of life.	http://www.thepermanentejournal.org/files/PDF/Spring2003.pdf
End of Life: ICU Utilization		
Changes in Critical Care and the Variable-Acuity Unit	The "acuity adaptable" room is a concept that has been gaining ground as a strategy to relieve pressure on critical care areas.	http://medicalconnectivity.com/2005/08/25/changes-in-critical-care-and-the-variable-acuity-unit/
Impact of a Proactive Approach to Improve End-of-Life Care in a Medical ICU	This study assessed the impact of a proactive case-finding approach to end-of-life care for critically ill patients experiencing global cerebral ischemia (GCI) after cardiopulmonary resuscitation and multiple organ system failure (MOSF), in comparison to historical control subjects.	http://www.medscape.com/viewarticle/447781
A National Survey of End-of-Life Care for Critically Ill Patients	To determine the frequency of withdrawal of life support, these researchers contacted every American postgraduate training program with significant clinical exposure to critical care medicine, asking them prospectively to classify patients who died into one of five mutually exclusive categories. Data was received from 131 ICUs at 110 institutions in 38 states.	http://ajrcm.atsjournals.org/cgi/reprint/158/4/1163

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Can Health Care Costs Be Reduced by Limiting Intensive Care at the End of Life?	As concern has risen over the high cost of health care, especially in the last year of life, J. F. Fries and coworkers, among others, have suggested that such costs might be reduced by decreasing the need and demand for medical services, particularly among terminally ill patients, elderly and otherwise, whose deaths are seemingly imminent. Furthermore, because the terminally ill often are hospitalized and may be candidates for the intensive care unit (ICU), and because the ICU is particularly resource-intensive, reducing use of the ICU among such patients appears to present unique opportunities for cost reduction . A further rationale for limiting ICU care was provided by the Study to Understand Prognoses and Preferences for Outcomes and Risks of Treatment (SUPPORT). This landmark study followed a large cohort of critically ill patients with a predicted six-month survival probability of only 52%. The SUPPORT investigators found that despite an intervention designed to improve end-of-life care, many patients who died did so not only at great expense but also after spending at least 10 days in the ICU comatose, receiving mechanical ventilation, with do-not-resuscitate (DNR) orders written 2 days before death, and in pain.	http://ajrccm.atsjournals.org/cgi/reprint/165/6/750
Withdrawing Life Support and Resolution of Conflict with Families	Summary points: Many deaths in intensive care occur after withdrawing or withholding life support. Clinicians and families generally make the decision as most patients are too ill to participate, but who takes the lead role varies greatly. Conflict about withholding or withdrawing life support is common between clinicians and families, and negotiation of these conflicts requires good communication skills. Good communication by intensive care physicians may shorten the dying process. Withdrawal of life support is a clinical procedure that requires good medical skills, cultural sensitivity, attention to ethical principles, and close collaboration with patients' families.	http://www.bmj.com/content/325/7376/1342.full.pdf
Rethinking the Use of Intensive Care Beds In California Hospitals	Now is the appropriate time to review the utilization of intensive care units in California as many of the state's hospitals have yet to begin construction to meet new seismic standards.	http://www.chcf.org/~media/Files/PDF/R/PDF%20RethinkingUseOfICUCareBedsInCA.pdf
Reducing Costs and Improving Outcomes in Adult Intensive Care	The organizations in the Breakthrough Series have proven that it is possible to close the gap between what we know and what we practice, thus achieving substantial reductions in cost and improvements in quality within a matter of months. This guide is intended to help others work on closing that gap in their own institutions.	http://www.ihl.org/nr/rdonlyres/3594c6cc-3d3f-4d6d-aca8-fab39cad9a16/0/ihl_btsguide_aic.pdf
The Case of Hospital Palliative Care	Palliative care is not dependent on prognosis and can be delivered at the same time as curative treatment. The ultimate goal: to improve quality of life for patients and families facing serious illness.	http://www.capc.org/support-from-capc/capc_publications/making-the-case.pdf
Improving Outcomes While Reducing Utilization: An ICU Case Study	This case study describes St. Vincent's Charity Hospital's ambitious goal to reduce the utilization and cost of critical care, while improving quality.	http://www.himss.org/content/files/jhim/10-1/10-1-8.pdf

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Improving Resource Utilization in the Intensive Care Units: A Challenge for Saudi Hospitals	In the face of increasing demand of intensive care services in the kingdom of Saudi Arabia, as well as the high cost of delivering such services, systematic steps must be undertaken to ensure optimal utilization and fair allocation of resources. Strategies start prior to intensive care units (ICU) admission by the proper selection of patients who are likely to benefit from ICU. Less resource-demanding alternatives, such as intermediate care units, should be used for low-risk patients. Do-not-resuscitate status in patients with no meaningful chance of recovery will prevent futile admissions to ICUs. Measures known to improve the efficiency of care in the ICU must be implemented, including hiring full-time qualified intensivists, switching open units to closed ones, and introducing certain evidence-base driven management protocols. On discharge, the intermediate care units again play a role as less expensive alternative transitional areas for patients who are not stable enough to go to the general ward. Measures to reduce readmissions to the ICU must also be implemented. Improving ICU resource utilization requires teamwork by not only the intensivists but also the administrators and other health care providers.	http://www.smj.org.sa/PDFFiles/Feb03/!IMPROVI.PDF
Cost Savings Associated with U.S. Hospital Palliative Care Consultation Programs	This study examined the impact of palliative care consultation teams on hospital costs and found that palliative care consultation teams were associated with a reduction of direct hospital costs of nearly \$1,700 per admission for live discharges and nearly \$5,000 per admission for patients who died.	http://www.capc.org/costsaving_aim092008.pdf
End of Life: Cancer		
Quality of End-of-Life Cancer Care for Medicare Beneficiaries, Regional and Hospital-Specific Analyses	This Dartmouth Atlas report examines how elderly patients with poor prognosis cancer are cared for across regions and hospitals and finds remarkable variation depending on where the patients live and receive care.	http://www.dartmouthatlas.org/downloads/reports/Cancer_report_11_16_10.pdf
Report: End-of-Life Cancer Care Varies Widely for Medicare Patients	Whether Medicare patients with advanced cancer will die while receiving hospice care or in the hospital varies markedly depending on where they live and receive care, according to the Dartmouth Atlas Project's first-ever report on cancer care at the end of life. The researchers found no consistent pattern of care or evidence that treatment patterns follow patient preferences, even among the nation's leading academic medical centers.	http://www.dhmc.org/webpage.cfm?site_id=2&org_id=796&morg_id=0&gsec_id=58181&sec_id=0&item_id=58181
Achieving Best Practice Cancer Care	The government of Victoria, Australia, is committed to developing and implementing multidisciplinary care for all cancer patients from diagnosis through palliative care. The aim is to ensure a multidisciplinary team approach to prospective treatment and care planning that is aligned with best-practice and evidenced-based care.	http://www.health.vic.gov.au/cancer/docs/mdcare/multidisciplinarypolicy0702.pdf

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Home Care for Cancer Patients	A doctor, nurse, or social worker can provide information about a patient's specific needs, the availability of home care services, and a list of local home care agencies. Services provided by home care agencies may include access to medical equipment; visits from registered nurses, physical therapists, and social workers; help with running errands, meal preparation, and personal hygiene; and delivery of medication. Medicare may offer reimbursement for some home care services. Medicaid covers part-time nursing care, home care aide services, and medical supplies and equipment. Veterans who are disabled as a result of military service can receive home care services from the U.S. Department of Veterans Affairs (VA).	http://www.cancer.gov/cancertopics/factsheet/Support/home-care
Palliative Care for Lung Cancer Patients	The majority of patients who acquire lung cancer will have troublesome symptoms at some time during the course of their disease. Some of the symptoms are common to many types of cancers, while others are more often encountered with lung cancer than other primary sites. The most common symptoms are pain, dyspnea, and cough. This document addresses the management of these symptoms, and it also addresses the palliation of specific problems that are commonly seen in lung cancer: metastases to the brain, spinal cord, and bones; hemoptysis; tracheoesophageal fistula; and obstruction of the superior vena cava.	http://chestjournal.chestpubs.org/content/123/1_suppl/284S.full.pdf+html
Palliative Care, End of Life, and Pain Relief	Two key national studies have evaluated these issues. The first, a National Cancer Policy Board (NCPB) study, responded to the 1997 Institute of Medicine (IOM) report, <i>Approaching Death: Improving Care at the End of Life</i> , which discussed a range of end-of-life issues. This report received national attention and is now regarded as a milestone in palliative care. Opportunely, the NCPB report <i>Improving Palliative Care for Cancer: Summary and Recommendations</i> was issued by the IOM the week after the NIA/NCI cancer centers workshop. Two cancer center workshop participants, Dr. Kathleen M. Foley, the speaker for Working Group 6, and Dr. Charles S. Cleveland, a participant in Working Group 6, contributed to the NCPB report, which is an excellent resource for all initiatives generated from the priorities of Working Group 6.	http://www.nia.nih.gov/ResearchInformation/ConferencesAndMeetings/WorkshopReports/WorkingGroup6.htm
Early Palliative Care for Patients with Metastatic Non-Small-Cell Lung Cancer	Patients with metastatic non-small-cell lung cancer have a substantial symptom burden and may receive aggressive care at the end of life. We examined the effect of introducing palliative care early after diagnosis on patient-reported outcomes and end-of-life care among ambulatory patients with newly diagnosed disease.	http://www.nejm.org/doi/full/10.1056/NEJMoa1000678
Dana-Farber Cancer Institute Department of Psychosocial Oncology and Palliative Care	In 2008, Dana-Farber created the new Department of Psychosocial Oncology and Palliative Care. This was done in recognition of the growth and evolution of these fields and their centrality to cancer care.	http://www.dana-farber.org/res/departments/center-for-psychosocial-oncology-and-palliative-care-research/
Integrating Palliative Care in Oncology	A comprehensive approach to treating patients with cancer includes cancer treatment, supportive interventions, and palliative care.	http://www.moffitt.org/CCJRoot/v8n1/pdf/32.pdf

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Emergency Room Utilization		
<p>Frequent Users of the Emergency Department: A Program to Improve Care and Reduce Visits</p>	<p>The authors describe a case management program for frequent users of the emergency department. The study had a single-subject design, with evaluation for each patient of the number of visits to the emergency department for a 12-month period before referral to the program and a similar period after implementation of an individualized care plan. Referrals were made on the basis of two or more of the following criteria: chronic medical condition, complex medical condition, drug-seeking behavior, violent behavior, and abusive behavior. A multidisciplinary team developed the individualized care plans. Twenty-four patients agreed to participate. For the 12-month period before their referral, these patients accounted for a total of 616 (median 26.5) visits to the emergency department; for a similar period after implementation of the care plans, they accounted for 175 (median 6.5) visits. The difficult-case management program appeared to be effective in reducing the total number of visits to the emergency department during the study period and in improving the care for these patients.</p>	<p>http://www.cmaj.ca/cgi/reprint/162/7/1017</p>
<p>Reducing Emergency Room Use by Low-Income Patients May Improve Their Health</p>	<p>Researchers at the Robert F. Wagner Graduate School of Public Service of New York University explored the differences in health outcomes experienced by low-income patients who received primary care services in various health care settings in New York City. Patients who do not receive appropriate primary care frequently use emergency rooms for nonemergencies or they are hospitalized for existing conditions that can be managed with routine care. As part of their study, the investigators: (1) Examined about 200 million Medicaid claims records filed over a six-year period; (2) Examined records from the New York City public hospital and health care system; (3) Surveyed 300 primary care providers affiliated with hospitals and other institutions; (4) Explored why some patients choose to use emergency rooms for their primary care needs while others seek care in outpatient settings.</p>	<p>http://www.rwjf.org/reports/grr/026673.htm</p>
<p>Increasing Paramedics' Skills Can Reduce Emergency Room Visits of Children with Special Needs</p>	<p>From 1997 to 2000, the University of Arizona College of Medicine developed and tested a model program to train paramedics to treat children with special health care needs at the scene instead of transporting them to an emergency facility. At the time the grant was made, such a training program did not exist. The model program focused on needs including severe asthma, seizure disorders, and cerebral palsy; children with those conditions may be dependent on oxygen supplementation, infusion pumps, or other technology. Investigators at the university's Arizona Emergency Medicine Research Center (AEMRC) developed the program, which paramedics could complete in a self-instruction course while on duty. It included: (1) A self-study manual and companion video. (2) Eleven integrated practice case scenarios. (3) A skills evaluation workshop. (4) A handbook of clinical activities with a supplemental CD.</p>	<p>http://www.rwjf.org/reports/grr/030671s.htm</p>

Program Name / Study	Summary of Findings	Link
Providence St. Peter Brings Frequent Flyers Down to Earth	The Emergency Department Consistent Care Program in Olympia, Washington, began in 2003 with Providence St. Peter Hospital and a local organization called the CHOICE Regional Health Network. CHOICE, a nonprofit regional coalition of health care providers, manages it along with the hospital, with help from participating local medical groups and clinics. Over the past seven years, four other area hospitals have joined.	http://www.chausa.org/Providence_St._Peter_brings_frequent_flyers_down_to_earth.aspx
The Medicare Advantage Emergency Room Initiative	This initiative, by Horizon Blue Cross Blue Shield of New Jersey, convened monthly meetings of a multidisciplinary team to review records of Medicare Advantage members who account for the greatest portion of ER visits. Members were contacted by phone to identify issues leading to frequent emergency room use in nonemergency situations and help them access the care they need. In 2009, ER use declined by 35.9% among Medicare Advantage members who had eight or more emergency room visits during the previous year.	http://www.ahipresearch.com/pdfs/innovations2010.pdf
The Emergency Room Outreach Initiative	Objectives of this program by EmblemHealth, New York, were: (1) Create a multidisciplinary care team to analyze reasons behind frequent emergency room use among some members. (2) Contact members who use emergency rooms frequently for nonemergency diagnoses to address factors preventing them from obtaining ongoing care. (3) Help members access medical care, case management, disease management, and other services as needed. Within six months of the program's launch, emergency room use among participating members was 8% lower than among a control group.	http://www.ahipresearch.com/pdfs/innovations2010.pdf
Three Strategies to Reduce Avoidable ER Use	Patient education, promotion of urgent care or walk-in centers, and medical home assignments are the top three programs companies use to prevent inappropriate use of the ER, according to a new survey conducted by the Healthcare Intelligence Network. Avoidable and preventable use of the hospital ERs is not only an inefficient use of health care resources, but also a waste of payors' and consumers' health care dollars. The majority of preventable ER visits were for conditions that could have been treated more efficiently in another health care setting, according to 34.1% of respondents. About 29.3% said high utilizers were the top contributors to avoidable ER use.	http://www.hin.com/sw/Hindustry_MC91310_reduce_avoidable_ER_use_medical_home_education_urgent_care_coordination_consumer.html
Frequent Users of Emergency Departments: The Myths, the Data, and the Policy Implications	In this study, researchers reviewed the literature on frequent ED users to gain a better understanding of their characteristics. They found that frequent users made up 4.5% to 8% of patients coming to the ED, but account for 21% to 28% of all ED visits. Study authors conclude "frequent ED users are a heterogeneous group along many dimensions and defy popular assumptions. The subgroups have not yet been sufficiently defined to allow clearly directed policy design, and many frequent users present with true medical needs, which may explain why existing attempts to address the phenomena have had mixed success at best."	http://www.annemergmed.com/article/S0196-0644(10)00105-8/abstract

Program Name / Study	Summary of Findings	Link
Emergency Room: Reducing Wait Time		
Improvement Report: Eliminate Overcrowding in the Emergency Department	This report describes improvement of the percent of patients placed from the emergency department (ED) to an inpatient bed within one hour of decision to admit by 44%.	http://www.ihl.org/IHL/Topics/Flow/PatientFlow/ImprovementStories/ImprovementReportEliminateOvercrowdingintheEmergencyDepartment.htm
Reducing Emergency Department Overcrowding: Five Patient Buffer Concepts in Comparison	Emergency Department (ED) overcrowding is a common medical care issue in the United States and other developed nations. One major cause of ED crowding are holding patients waiting in the Emergency Room (ER) for inpatient unit admission where they block critical ED resources. With input data from a hospital in Massachusetts, researchers tested five patient buffer concepts aimed at relieving pressure of the ER. The buffers are also assumed to improve patient and staff satisfaction through their design tailored to needs in patient flow. To ensure patient safety, researchers performed tests with discrete event simulation in which triage-to-bed time was reduced up to 22% and diversion hour was decreased up to 24%. All buffers managed to run with significantly fewer resources than the ER. These findings have a potential impact on hospital process flow due to clear results which offer substantial improvement of hospital organization.	http://www.informs-sim.org/wsc08papers/185.pdf
Team Triage Improves Emergency Department Efficiency	This study was designed to evaluate whether three hours of combined doctor and nurse triage would lead to earlier medical assessment and treatment and whether this benefit would carry on for the rest of the day when normal triage had resumed.	http://www.ncbi.nlm.nih.gov/pmc/articles/PMC1726448/pdf/v021p00542.pdf
Emergency Department Triage Revisited	Triage is a process that is critical to the effective management of modern emergency departments. Triage systems aim not only to ensure clinical justice for the patient, but also to provide an effective tool for departmental organization, monitoring, and evaluation. In addition, international variance in triage systems limits the capacity for benchmarking. While education, guidelines, and algorithms have been shown to reduce triage variation, there remains significant inconsistency in triage assessment arising from the diversity of factors determining the urgency of any individual patient. These authors call for developing and testing an International Triage Scale (ITS), which is supported by an international collaborative approach toward a triage research agenda. This agenda would seek to further develop application and moderating tools and to utilize the scales for international benchmarking and research programs.	http://emj.bmj.com/content/27/2/86.full.pdf
Reducing Emergency Department Crowding Through the Full Capacity Protocol	Staff implemented the Full Capacity Protocol, which redistributes admitted patients boarding in the ED to acute-care hallway beds on inpatient units when the ED is unable to evaluate and treat new emergency patients in a timely manner because of a lack of space and resources.	http://www.rwjf.org/product.jsp?id=28816

Program Name / Study	Summary of Findings	Link
Addressing Emergency Department Wait Times and Enhancing Access to Community Mental Health and Addictions Services and Supports	This report includes suggestions that are believed to improve emergency department care for people with mental health and addiction problems, reduce demand on emergency departments, and strengthen the capacity of the community sector to address mental health and addiction problems before they become acute. Most of the suggestions are supported by a body of empirical evidence, in Canada and abroad; all are supported by the experience of consumers and service providers working to improve care for people with mental health and addiction problems.	http://www.camh.net/Public_policy/Public_policy_papers/Addressing%20ER%20and%20System%20Navigation%20for%20MHA%20july%202008.pdf
How Charleston Area Medical Center Reduced Wait Time in the Emergency Room	Charleston Area Medical Center (CAMC) is West Virginia's largest medical center and a level I trauma facility. For the past five years, visits to CAMC's General Hospital ER have grown by 5% to 6% annually. This increasing volume, along with a desire to improve patient care and satisfaction, prompted CAMC to hold a rapid-improvement event designed to streamline the ER.	http://www.bmgi.com/sites/bmgi.com/files/Charleston%20Medical%20Center.pdf
Emergency Room: Stroke		
Deaths Higher for Strokes Treated at Night, on Weekends	Two new studies suggest that stroke mortality is higher in patients who are admitted to the hospital during nights and on weekends.	http://www.medscape.com/viewarticle/570477
Recommendations for Improving the Quality of Care Through Stroke Centers and Systems: An Examination of Stroke Center Identification Options	A series of options with respect to stroke center identification were presented at the October 2001 meeting of ASA's <i>Advisory Working Group on Stroke Center Identification</i> . These options are not mutually exclusive. Some options could be pursued on parallel tracks while others might provide one or more incremental steps in the evolution to a more mature identification program.	http://stroke.ahajournals.org/cgi/content/full/33/1/e1
Stroke Team Telemedicine	Through the use of telemedicine, stroke teams can extend expert stroke care into rural remote communities lacking sufficient neurological expertise. The Stroke Team Remote Evaluation Using a Digital Observation Camera (STRokE DOC) trial and its follow-up, the STRokE DOC Arizona TIME (The Initial Mayo Clinic Experience) trial, showed the effectiveness of a single-hub, multispoke rural hospital telestroke research network.	http://emedicine.medscape.com/article/1162677-overview

Program Name / Study	Summary of Findings	Link
Critical Pathways Can Improve Results with Carotid Endarterectomy	Approximately 10 years ago, the Section of Vascular Surgery at Pennsylvania Hospital reported results of critical pathways developed for all major vascular operations, including carotid endarterectomy (CEA). After implementing these pathways, a specific five-step protocol was developed to further improve results and decrease costs for elective CEA. With the advent of carotid artery balloon angioplasty and stenting (CABAS), CEA has come under increasing attack by endovascular interventionalists. We believe our regimen remains the gold-standard against which CABAS should be compared. Our five-step CEA protocol includes: (1) duplex ultrasonography performed in an accredited vascular laboratory as the sole diagnostic carotid preoperative study, (2) admission the day of surgery, (3) cervical block anesthesia to eliminate intraoperative electroencephalographic monitoring and other costly intraoperative monitoring tests, (4) transfer from the recovery room after a short observation period to the vascular ward, and (5) discharge the first postoperative morning. Since this five-step protocol was implemented several years ago, we have found it to be safe and cost-effective, and it now represents the standard against which CABAS should be compared.	http://www.ncbi.nlm.nih.gov/pubmed/15449249
A Regional Intervention to Improve the Hospital Mortality Associated With Coronary Artery Bypass Graft Surgery	A multi-institutional, regional model for the continuous improvement of surgical care is feasible and effective. This model may have applications in other settings.	http://jama.ama-assn.org/content/275/11/841.abstract?ijkey=3608a142382ef153e2c638a08f8f641cecaef877&keytype=tf_ipsecsha
Get With The Guidelines: Stroke	U.S. hospitals participating in <i>Get With The Guidelines: Stroke</i> had a 10% relative drop in ischemic stroke deaths and a 29% relative drop in length of stay beyond 4 days in 2009, compared with 2003.	http://americanheart.org/presenter.jhtml?identifier=3002728
Use of Intravenous tPA for the Management of Acute Stroke in the Emergency Department: Policy Resource and Education Paper (PREP)	The purpose of this PREP is to assist the emergency physician in distilling the literature that has been published regarding intravenous tPA in acute stroke management in order to facilitate establishing the setting in which fibrinolytics can be safely used in patient care.	http://www.acep.org/content.aspx?id=29936
Statin Pretreatment Reduces Mortality in Cardiac-Surgery Patients without CAD	The use of preoperative statin therapy among patients undergoing CABG surgery has been shown to improve operative outcomes in other studies, including a large 30 000-patient meta-analysis published in the June 2008 issue of the <i>European Heart Journal</i> . In that study, previously reported by <i>heartwire</i> , preoperative statins reduced the risk of 30-day mortality from any cause by 40%, as well as significantly reduced the risk of stroke and atrial fibrillation.	http://www.theheart.org/article/932955.do
In-Hospital Medical Complications and Long-Term Mortality After Ischemic Stroke	The study shows that stroke patient mortality is influenced by in-hospital medical complications significantly up to the chronic stage. This finding suggests that the appropriate prevention and management of in-hospital complications could improve short-term and long-term prognoses after stroke.	http://stroke.ahajournals.org/cgi/content/full/36/11/2441

Program Name / Study	Summary of Findings	Link
Georgia Coverdell Stroke Registry	This program addresses quality improvement in multiple areas of stroke care, from rapid screening, diagnosis, and intervention for patients experiencing an acute stroke, to secondary prevention measures such as blood pressure control, smoking cessation, and treatment of elevated cholesterol to reduce the incidence of recurrent stroke after hospital discharge. For participating hospitals, training in Advanced Stroke Life Support through the University of Miami's ASLS Emergency Medical Skills Training Course is provided to hospital staff. This training teaches emergency assessment and management of acute stroke to all levels of health care providers, from EMS personnel to hospital and emergency department nurses and physicians.	http://health.state.ga.us/epi/cdiee/strokeregistry.asp
A Blueprint for Successful Stroke Intervention	Sacred Heart Hospital was the first hospital in the Pensacola (Florida) area to earn Primary Stroke Center Certification from the Joint Commission on Accreditation of Healthcare Organizations. The Joint Commission's certification and its award of the Gold Seal of Approval to Sacred Heart's Regional Stroke Center means the center complies with the highest national standards for safety and quality of stroke care.	http://www.sacred-heart.org/strokecenter/
Clinical Decision-Making		
CHES (Comprehensive Health Enhancement Support System)	CHES is a computer aid to help patients with self-management of chronic diseases such as HIV infection, breast cancer, and heart disease. The system was developed at the University of Wisconsin-Madison. In an AHRQ-funded study that evaluated the effect of using CHES on patients with HIV infection, results showed that they had fewer hospitalizations and a higher quality of life than patients who did not have access to the CHES computer decision-aids. Hospitalization costs for patients using the CHES program was \$728 per month lower. The CHES tools include answers to frequently asked questions, a reference library, descriptions of health services and consumer tips, and tools to assess and reduce risk, decision supports to help patients make informed decisions, an action guide to help patients carry out decisions, online discussion groups, ability to ask questions of experts and receive confidential replies, and stories from other patients	http://www.ahrq.gov/data/informatics/informatr ia.htm - chronicdisease
The Missing Piece: Embracing Shared Decision-Making to Reform Health Care	In this editorial published in the journal <i>Spine</i> , Dr. James N. Weinstein discusses the role of patient preferences as the missing piece in health care delivery. He summarizes the experience with shared decision-making tools when patients are deciding on surgical or nonsurgical treatment options. The specific studies cited involved decisions about prostate surgery and decisions about cardiac surgery. In the studies he cites, use of decision-making tools were positively received by patients, appeared to help them make decisions that were consistent with their values and preferences, and resulted in patient decisions that leaned toward nonsurgical options. He concludes that "the patient's desire and ability to make decisions when well informed" is the missing link in health care.	http://tdi.dartmouth.edu/documents/publications/Missing Piece.pdf

Program Name / Study	Summary of Findings	Link
Effectiveness of Clinical Decision Support in Controlling Inappropriate Imaging	In a study conducted at Virginia Mason Medical Center in Seattle and published in the <i>Journal of the American College of Radiology</i> , clinicians reviewed the relevant literature on evidence-based guidelines and developed clinical decision rules for areas where they had identified opportunities for improvement. The targeted use of clinical decision support was found to reduce imaging test orders for three imaging tests: orders for lumber MRI for back pain, orders for brain MRI for headaches, and orders for sinus CT for Sinusitis.	http://www.jacr.org/article/S1546-1440(10)00389-3/fulltext
A Randomized Trial of a Telephone Care - Management Strategy	This randomized study evaluated the effect of a telephone-based care-management strategy on medical costs and resource utilization. Health coaches contacted patients with certain medical conditions known to have high medical costs and, using shared decision-making tools, educated them about self-care and behavioral change. After one year of the program, the average monthly medical and pharmacy costs per person in the enhanced-support group were 3.6% (\$7.96) lower than those in the usual-support group (\$213.82 vs. \$221.78, P=0.05). The majority of the savings were due to a 10.1% reduction in annual hospital admissions (P<0.001). The cost of this intervention was less than \$2.00 per person per month.	http://www.nejm.org/doi/pdf/10.1056/NEJMsa0902321
Using a Claims Data-based, Sentinel System to Improve Compliance with Clinical Guidelines: Results of a Randomized Prospective Study	This randomized prospective study evaluated the impact of applying a rule-based sentinel alert system to a managed care plan's administrative claims data for a commercial population to prevent errors in care and improve compliance with clinical guidelines. More than 1,000 decision rules were incorporated into a computerized system that was able to detect variation from practice guidelines and send alerts to clinicians. Members were randomly assigned to an intervention group where physicians would receive clinical recommendations via electronic alert and to a control group where physicians did not receive alerts. Patients who triggered recommendations had 19% fewer hospital admissions compared to the control group. Charges and paid claims were also lower for this group. While this study focused on a commercial population, study authors suggest that the potential to decrease morbidity and costs would be greater if applied to a Medicare and Medicaid population since the disease entities that generated the most frequent recommendations were for conditions that typically effect the elderly, such as cardiovascular, neurological, and respiratory conditions.	http://www.activehealth.net/AJMC_Study.pdf

Appendix A: Dartmouth Atlas of Health Care Utilization Indicators

The Dartmouth Atlas of Health Care (www.dartmouthatlas.org) is an interactive website that provides data on care utilization for hospitals. Utilization data includes Medicare claims; demographic data includes gender, race, and select socio-economic indicators. All data has been organized into geographic hospital services areas (HSAs) and hospital referral regions (HRRs) according to a specific methodology.

Claims data is grouped into sections related to care of chronic illness in the last two years of life: Medicare reimbursements, hospital and physician capacity, quality care, hospital use, end-of-life care, and physician care service areas. Data is presented in tables, graphs, and customizable maps. National averages and percentile breakdowns (10th, 50th, and 90th percentiles) are also available. A list of the utilization measures that can be found using this resource appears on the following page.

While this source is extensive and widely used, it has some limitations: (a) data is available for the period 1996–2005 only; (b) some metrics are provided in aggregate (e.g., 2001–2005) rather than by year (e.g., 2001, 2002...); (c) the dataset includes Medicare-enrolled decedents only, so comparisons to other populations may not be appropriate; and (d) data have been allocated according to a specific methodology and are not likely to match internal utilization figures for a given facility. Researchers have identified other strengths and weaknesses of the data.²²

Nearly all utilization indicators in the Dartmouth Atlas are available by gender and race, and for the years 1996–2005. Certain indicators are available for the summary period 2001–2005 only. Details can also be obtained by state, hospital service area, or hospital referral region.

Please note that the following list only includes a sample of *utilization* indicators. A complete list of all indicators, including those not shown here (e.g., demographics or Medicare reimbursements) is available at <http://www.dartmouthatlas.org/data/topic/all.aspx>.

²² Bach PB, Skinner J, Staiger D, Fisher ES. The debate over regional variation in health care spending. *New England Journal of Medicine*, 2010; 362:7. Accessed November 23, 2010 from www.nejm.org.

Cancer Care

- Percent of deaths in hospital
- Percent hospitalized, last month of life
- Hospital days, last month of life
- Percent admitted to ICU, last month of life
- ICU days, last month of life
- Chemotherapy, last 2 weeks of life
- Life-sustaining procedures, last month of life
- Percent enrolled in hospice
- Hospice days, last month of life
- Percent seeing 10 or more MDs, last 6 months

Home Health Agency Utilization

- HHA visits

Hospice Utilization

- Hospice days, last 6 months
- Percent enrolled in hospice, last 6 months

Hospital Care Intensity

- HCI index, last 2 years

Hospital Utilization

- Inpatient days

Physician Utilization

- Number of MDs seen, last 6 months
- Percent seeing 10 or more MDs, last 6 months
- Physician visits

SNF Utilization

- SNF days per decedent

Terminal Care

- Inpatient days, terminal admission
- Percent of deaths with ICU admission
- Percent of deaths in hospital

Hospital Use, by type of admission

- Hospital Discharges
- Inpatient Days

Medical Discharges

- Discharges for ACS Conditions
- Non-ACS Medical Discharges
- Medical Discharges

Surgical Procedures

- All Surgical Discharges
- Hospitalization for Hip Fracture
- Inpatient AAA Repair
- Inpatient Valve Replacement
- Inpatient Back Surgery
- Inpatient Carotid Endarterectomy
- Inpatient Cholecystectomy
- Inpatient Coronary Angiography
- Inpatient CABG
- Inpatient Hip Replacement
- Inpatient Knee Replacement
- Inpatient Lower Extremity Bypass
- Inpatient Mastectomy, by race only
- Inpatient PCI
- Inpatient Colectomy
- Inpatient TURP for BPH, by race only

End-of-Life Care, by level of care intensity

- Hospital Admissions, last 6 months
- Inpatient Days, Terminal Hospitalization
- Inpatient Days, last 6 months
- Inpatient Spending, Terminal Hospitalization
- ICU Admissions During Terminal Hospitalization
- Percent of Deaths Occurring in Hospital
- Percent Hospitalized, last 6 months

Appendix B: Step-by-Step Process for Using Dartmouth Atlas Data

The Dartmouth Atlas of Health Care website has data to compare your organization to other hospitals and health systems and provides one way to compare utilization.

First go to the Dartmouth Atlas website: <http://www.dartmouthatlas.org/>

You will notice under the heading a tab called “*Data by Hospital.*”



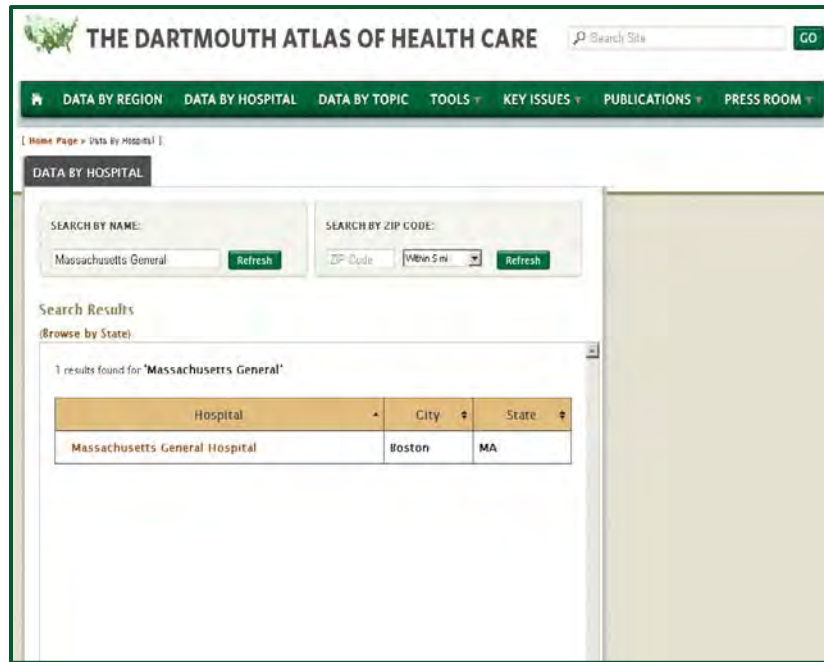
Clicking on this tab will go to the section of the Atlas that will allow leadership to choose by state, hospitals, topics, and indicators. This pulls the most information about demographics and national comparisons into one place. There are two types of searches under this tab: one is to search for a specific hospital under the grey tab labeled “*Data by Hospital*” under the main tab bar and the other is to search for a specific topic on the gray tab on the right labeled “*Start a New Report.*” Below we explain both approaches.

DATA BY HOSPITAL

Click on “*Data by Hospital*” tab on the top of the page. If you know the name of the hospital you wish to search, type it into the “*Search by Name*” textbox and click “*Refresh.*”



The hospital name should appear in the “[Search Results](#)” box. Click on the name of the hospital you wish to explore.



This will provide a comprehensive profile of the hospital’s performance. To access the data for the hospital you searched for, navigate through the red tabs labeled: Basic Information, Medicare Spending, Resource Inputs, and Patient Experience.



START A NEW REPORT

Another way to gather data on hospitals is by topic. To search specific topics, such as Hospital Utilization, click the drop-down menu on the right side of the webpage under “*Start a New Report*” and select an option under “*Topic*.” After this selection, pick an indicator you would like to see under “*Indicator*” drop-down box such as “*Inpatient Days*.” Click “*Submit*.”

The screenshot shows the 'START A NEW REPORT' section of the Dartmouth Atlas of Health Care website. It features a 'TOPIC' dropdown menu with 'Hospital Utilization' selected, and an 'INDICATOR' dropdown menu with 'Inpatient days, by Interval Before Death and Level of Care Intensity' selected. A 'Submit' button is visible below these menus. To the left, there are search boxes for 'Hospital Name' and 'ZIP Code' with 'Refresh' buttons. Below the search boxes is a 'Browse Hospitals' section with a list of states including Alabama, Alaska, Arizona, Arkansas, California, Colorado, Connecticut, Delaware, and District of Columbia.

At the “*Customize Report*” page, you can narrow your search with the given categories provided. For example, to look at “*Inpatient Days per Decedent*” during the last two years of a patient’s life in an ICU, you would specify that data in the appropriate drop-down boxes. If you would like to view the report as a PDF file, there is an option to do so next to the “*Print*” icon.

The screenshot shows the 'CUSTOMIZE REPORT' page for 'INPATIENT DAYS PER DECEDENT, BY INTERVAL BEFORE DEATH AND LEVEL OF CARE INTENSITY'. The page includes a 'Customize Report' section with dropdown menus for 'YEAR' (2001-2005), 'INTERVAL BEFORE DEATH' (Last Two Years of Life), and 'LEVEL OF CARE INTENSITY' (High-Intensity ICU). There is also a 'LOCATIONS' section with a 'State' dropdown menu set to 'Massachusetts'. Below this, there is an 'ADDITIONAL INDICATORS' section with a 'None selected' option. A 'Refresh' button is located at the bottom right of the 'Customize Report' section. To the right, there is a 'START A NEW REPORT' section with 'TOPIC' and 'INDICATOR' dropdown menus, and a 'Submit' button. Below that is a 'RELATED CONTENT' section with a link to 'Supply-Sensitive Care' and a 'STAY INFORMED' section with an email sign-up form.

After clicking “Refresh,” scroll down the screen to view the data.

[TRANSPOSE TABLE]

Inpatient Days per Decedent, by Interval Before Death and Level of Care Intensity (Interval Before Death: Last Two Years of Life, Level of Care Intensity: High-Intensity ICU – 2001–2005)	
Massachusetts	2.7
National Average	3.0
90th Percentile	3.6
50th Percentile	2.7
10th Percentile	2.1

DENOMINATOR DEFINITION:
The study population includes beneficiaries with one of nine chronic conditions who were enrolled in traditional (fee-for-service) Medicare and died during the measurement period. To allow for two years of follow-back for all patients, the population is restricted to those whose age on the date of death was 67 to 99 years, and to those having full Part A and Part B entitlement throughout the last two years of life. Persons enrolled in managed care organizations were excluded from the analysis. For the hospital-specific analyses, patients had to be hospitalized for chronic illness at least once during their last two years of life to be included. For regional analyses, all patients diagnosed with a chronic illness were included.

NUMERATOR DEFINITION:
Any inpatient days within the interval before the death date in the MedPAR file. For stays that began prior to the designated period before the death date, only the portion of the event that occurred within the window is used. ICU days are determined by the following indicators in the MedPAR claim: ICARECNT (intensive care day

Once you have the report, you can compare your data to other hospitals or health care systems, with the 90th percentile, 50th percentile, and 10th percentile as well as with the national average.