

2011 Report: Use of Resources in High-Volume Hospitalizations

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Since 2008, the Puget Sound Health Alliance has been producing the Community Checkup, which measures the prevalence of effective care in the areas of prevention, chronic care, appropriate use of services, and generic prescribing. We also include data on hospital quality and use eValue8™ to measure health plan performance. What gets measured can get managed. With this report, the Alliance introduces another important area of care that we will measure and report: utilization as a driver of health care costs.



The first dimension of cost we are addressing is resource use, meaning the content of care for specific high-volume hospitalizations. Many elements go into each procedure, including tests, professional services and length of hospital stay. Together, these elements paint a picture of how intensely services are used to deliver care.

We are utilizing the Community Checkup database to analyze the variation in the amount of services delivered for these hospitalizations. Our focus is on services which are preference-sensitive (i.e., surgery is not the only treatment option and evidence is not available to support whether it is necessarily the best option) and/or supply-sensitive (i.e., the availability of services drives their use and where variation may represent overuse). Presently, there is no transactional cost data in this analysis, but the results are directionally suggestive of what the variation in costs might be.

The Alliance is looking at both the frequency with which a treatment occurs, as well as the service intensity of the treatment itself. Since frequency and intensity can each vary significantly, understanding, measuring, and revealing this variation is an important step in assessing the value within our health care system.

Resource use plays a major role in two of these components. This report explores how measures of resource use can supply directional guidance into care *appropriateness* and *intensity*. The data that the Alliance has analyzed offers practical and worthwhile ways to help the region's employers, health plans, and provider organizations ensure higher value.

Resource use is only one component of value. As the Alliance expands the Community Checkup to include patient experience, cost, and potentially outcomes, we will begin to assemble a more complete picture of health care value in our region. In the meantime, understanding the resource use dimension of care – even in the absence of perfect information – is useful.

Part I – Variation in Treatment Choice

Many health conditions have multiple treatment options. These conditions are called preference-sensitive, because surgery is an option but not the only option available to patients. In these situations, patients deserve to be given complete and unbiased information about the pros and cons of each alternative. Because risks and benefits vary among treatment options, choosing optimally requires considering the patient's own preferences via shared decision-making. If a patient receives one treatment option, but would have selected another with more complete information, the appropriateness of care suffers, and with it the value of care.

Depending on the circumstances, suboptimal treatment selection could result in increased clinical and financial risk to the patient. These potential harms are avoidable. What's more, research has shown that when fully informed about all treatment alternatives available for their condition, patients tend to select less resource-intensive options.

In many instances, there is no simple rule for which treatment is best for a given patient with a certain condition. Patients need to discuss treatment options with their doctors so that they can fully understand the risks and benefits of each option and make an informed decision. Two patients with the same diagnosis may opt for different treatments because their outcome goals and personal values differ. Ideally, a patient's role would evolve from informed consent to informed choice.

Patients need to receive easy-to-understand and objective information in order to understand their treatment options and select the treatment that makes the best sense for them. Shared Decision Making aids are structured tools customized for specific conditions, intended for doctors and patients to complete together. They are designed to increase patient awareness of treatment options and their corresponding risks and benefits, and to improve the match between treatment choice and the *patient's* treatment goals and values.

Patients who are weighing multiple treatment options should consider the following when deciding what treatment is right for them:

- Ask your doctor about using Shared Decision-Making aids
- If such aids are not available or offered, ask: What are all of my treatment options?
 - Be open to treatments not offered by your physician. Remember that “watchful waiting” is often a treatment option to consider.
 - What are the advantages and disadvantages of each option?
 - How important are each of those consequences to me?
- Finally, consider seeking second or third opinions. Some employers offer second opinion services as part of their member benefits for patients, which can help patients who feel apprehensive about seeking additional clinical guidance.

Analytic Approach

The Alliance adopted an analytic approach used by the health services researchers who publish *The Dartmouth Atlas of Healthcare*. These scientists study the frequency with which certain surgical procedures occur in the population of Medicare beneficiaries. The purpose of their work is similar to that of the Alliance: to learn whether one's place of residence seems to affect what treatment is delivered for conditions having more than one intervention.

The Alliance, working through its data aggregator Milliman, used the same procedure definitions from *The Dartmouth Atlas* and applied them to our regional database of health services for people covered by commercial insurance, a younger population than those with Medicare. Each insured person was assigned, based on where they live, to one of four residential regions: Everett, Olympia, Seattle or Tacoma. These regions are not simply city boundaries. Instead, they are larger geographies that associate patient residence with the hospitals most likely to serve them.

The Alliance examined the population rates of selected surgeries for each year from 2006 to 2009, and looked separately at men and women, as well as by different age ranges. Looking over several years allows a clearer picture of a pattern of care over time to emerge. The Alliance applied statistical methods to determine when rates were unusually high or low, using a threshold that is expected to be correct 90% of the time. Because results could be incorrect about 10% of the time, they should be used as directional, not definitive, guidance.

The Alliance looked at 21 conditions to determine whether where patients live might influence the treatment that they receive. Four of these conditions are highlighted in this report to illustrate the variation in care found in our region.

Back Surgery

Overall, people living in the Olympia area receive back surgery more often than elsewhere in the region. This pattern emerges for both men and women, and for several age groups. High rates of back surgery are most persistent among women in the 45-54 year age range. This group of patients stands out each year from 2006 through 2009.

Back pain is an extremely common condition, and patients often want to do something to alleviate the pain. The principle challenges of using surgery to treat short-term back pain are threefold.

The first is that evidence shows for most patients, back pain generally subsides within six weeks *without* surgery. Trying to maintain a normal activity level when pain is present seems to work as well as any other treatment options for many cases of low back pain, such as anti-inflammatory drugs, physical therapy and light exercise.

Second, using MRIs or CT scans to help decide who should have surgery and who shouldn't is not always helpful. With a few exceptions for serious abnormalities, imaging tests cannot always reliably predict who will benefit from surgery. Imaging is generally discouraged in the first six weeks of a back pain episode unless certain warning signs suggest a serious and treatable cause. The Community Checkup report includes a measure that examines this very recommendation.

Third, some back surgeries may change the patient's back anatomy. Areas that were not a problem before a surgery may begin having problems or scar tissue from the surgery may leave patients with pain even after surgery. Depending on the type of problem being treated, the chance of pain relief from surgery may be a 50-50 proposition, with the potential for repeat back surgeries.

As with all conditions having multiple treatment options, the physician's specialty and experience may direct the selection of a treatment path. That's why it's good for patients to have a relationship with a primary care physician, who can help them evaluate all treatment options.

Back Surgery for patients 46–64 years old

● LOWER RATE ● AVERAGE RATE ● ABOVE AVERAGE RATE



Removal of Uterus (Hysterectomy)

Overall, women living in the Everett and Tacoma areas receive hysterectomies more often than elsewhere in the region. In the Seattle area, the opposite is generally the case. This pattern emerges for several age groups. For those aged 35-44, surgery rates were persistently higher each year from 2006 through 2009 among Tacoma women, and persistently lower among Seattle women.

Hysterectomy is most often performed to treat abnormal uterine bleeding, benign tumors, or pain between and/or during periods. Non-surgical options have varying success rates. Some may be quite successful in relieving symptoms and others not so. Hysterectomy carries with it a high patient satisfaction rate when used to treat abnormal bleeding and painful periods. Its use to treat other types of pelvic area pain may not always be as successful.

Variability in regional rates of surgery appear to reflect a greater propensity towards surgical treatment, using conservative therapies less often or for shorter periods of time before proceeding to hysterectomy. Some abnormal uterine bleeding problems are related to hormonal irregularities that self-correct over time. Moving to hysterectomy as definitive treatment too soon may subject some patients to surgery for problems that may resolve on their own (much as back pain can dissipate without surgery).

Hysterectomy carries with it the risks of bladder or bowel injury, excessive post-surgical bleeding, and complications from anesthesia. It also renders patients infertile. These risks would seem to support strategies of “watchful waiting” to see if problems self-correct, and/or the use of non-surgical treatments before moving on to hysterectomy.

Alliance data show significant regional variation in the use of vaginal and laparoscopic hysterectomy. It is unknown if patients receive conservative care less frequently in certain areas. As with back surgery, this variation may be related to greater acceptance of hysterectomy by patients in these areas, lack of patient awareness of alternative therapies, or the presence of physicians whose bias leans towards surgical management, either actively by recommending such an approach more readily, or passively by underemphasizing non-surgical options.

Uterus Removal (hysterectomy) for patients 25–54 years old

● LOWER RATE ● AVERAGE RATE ● ABOVE AVERAGE RATE



Heart Artery Catheterization (Coronary Angiography) & Angioplasty (Percutaneous Coronary Intervention)

Overall, people living in the Olympia and Tacoma areas receive heart artery catheterizations more often than elsewhere in the region. This pattern emerges for both men and women, and for several age groups. Men and women aged 45–64 living in the Olympia area receive angiographies more often than elsewhere in the region during the period of 2006–2009.

Heart catheterization, also known as coronary angiography, is both a diagnostic and therapeutic procedure in which a long, thin tube (a catheter) is inserted into an artery and guided to the heart. As a diagnostic tool, angiography helps to diagnose cardiac conditions like coronary artery disease, or narrowing of the arteries. By using the catheter to transport tiny instruments to a narrowed artery, heart catheterization procedures can be used to open block arteries.

When evidence of blocked arteries is found, an angioplasty or stent procedure is often performed. It involves guiding a tiny balloon or scaffold-like stent to the affected area, using a heart catheter. Angioplasty, like heart catheterization, is one of the surgical procedures that are sensitive to patient and provider preferences.

Because heart catheterization is not risk-free to the patient, and less invasive means of detecting coronary artery disease are available to many patients, a recent study explored what it termed the “low diagnostic yield” of using heart catheterization in certain circumstances¹. In particular, the researchers focused on symptom-free patients without known disease who received catheterizations electively—a group that represented 30% of all catheterized patients studied. Because of the low rates of finding disease in this group, the authors called for improving how to decide when this procedure is appropriate for these patients.

The researchers studied a national registry of cardiovascular patients rich in clinical data; in contrast, the Alliance analysis uses administrative claims data, which do not permit such clinically exacting inquiry. The understanding of this and other instances of apparent variation in treatment selection can be improved if additional clinical data can be applied to these results in the future.

1. <http://www.nejm.org/doi/full/10.1056/NEJMoa0907272#t=abstract>

Heart Catheterization for patients 46–64 years old

● LOWER RATE ● AVERAGE RATE ● ABOVE AVERAGE RATE



Cardiac Angioplasty for patients 46–64 years old

● LOWER RATE ● AVERAGE RATE ● ABOVE AVERAGE RATE



Part II – Variation in Service Intensity

Once a decision is made for surgery, the question shifts to the content of care for similar treatments delivered by different doctors at different hospitals in the region. Although some treatments are common, the amount and composition of care can vary widely among delivery systems. Unless medically indicated, extra days spent in the hospital, radiation exposure from discretionary imaging studies, or operating room procedures that are more invasive than necessary contribute to waste, clinical risk, and undue cost to both patients and purchasers.

Researchers indicate that local availability of *unused* health care resources—for example, empty hospital beds, idle imaging equipment, and unfilled specialist capacity—can influence the overall service intensity of certain health care events. When the amount and intensity of care a patient receives during treatment is unusually high, it is possible a less resource-intensive care plan could have served the patient just as well, both in terms of outcome and cost. In these instances, decreased service intensity, by reducing waste, risk, and cost, can translate into improved health care value.

By comparing estimates of service intensity for the most common hospitalizations, the Alliance can gauge how similar resource use is among delivery systems in our region. In this instance, the term “delivery system” means the hospital-based care in addition to all professional services provided by physicians during the inpatient stay.

Assuming that outcomes for cases of comparable complexity are similar across delivery systems, higher variation would indicate an opportunity for reducing potentially unnecessary services. Moreover, delivering those services on a consistent basis may reflect standardizing practices, which is a hallmark of process quality.

This concept—lower-intensity care, consistently provided—is of interest to both buyers and sellers of health care. Moreover, in this instance their incentives are similarly aligned:

1. *Purchasers* of health care, such as employers and labor trusts, are interested in avoiding unnecessary services, so-called discretionary services. Discretionary services increase financial and clinical risk, and may contribute to delaying an employee’s return to full, productive work.
2. *Providers* of health care will be increasingly drawn to low-intensity, consistent care patterns because of the movement toward reforming the current fee-for-service payment model. For example, a fixed payment per case for a certain type of hospitalization would reward care patterns that consistently minimize unnecessary services. Or, in the case of “accountable care organizations,” providers will have a vested interest in managing the total cost of care for their patient population. Since the unnecessary services constitute operating costs borne by the provider, reducing discretionary service will boost provider profits while eliminating waste from the health care system.

Analytic Approach

Working together with the 3M Company² and Milliman, the Alliance organized and interpreted the health service information in its database with estimates of the intensity of each physician service and hospital encounter. Because the intensity assignments depend on the amount and nature of the service provided, the Alliance uses them as estimates of resource use³.

Next, the Alliance studied the claims for people with commercial insurance during 2006-2009, and analyzed their service intensity data during hospitalizations. For each inpatient stay, the Alliance identified and included all physician services the patient received from the date of admission through the date of discharge. For example, the resources used for a patient hospitalized for an appendectomy would include not only use of the operating room and the subsequent hospital stay, but also the surgeon's care, activities of the anesthesiologist, in-hospital visits by doctors, and so on.

By comparing typical cases from selected high- and low-intensity delivery systems, the Alliance can make rough estimates of the additional cost per case purchasers could potentially face. These ranges conservatively reflect current beliefs about unit price variation in the market.

Unlike the analysis of variation of treatment choice, this analysis does not consider where the patient resides. The intensity comparisons are organized by delivery system. The analysis is limited to hospitals based in the Alliance's five-county region: King, Pierce, Pierce, Snohomish, and Thurston.

No hospital or physician group is identified in this report. However, going forward, the Alliance plans to unblind many of the results in keeping with its practice of transparency.

2. The Puget Sound Health Alliance is grateful to the 3M Company for granting a free license to use their inpatient grouping software, APR-DRGs (All Patient Refined Diagnosis Related Groups).

3. Assignment of resource use estimates was accomplished using RBRVS for Hospitals, a product developed by and licensed from Milliman. Product white paper is available at <http://www.milliman.com/expertise/healthcare/products-tools/rbrvs/>

Selected Hospitalization and Results

The Alliance has examined over 300 hospitalization types. Ten are selected below as representative of the results of the data analysis.

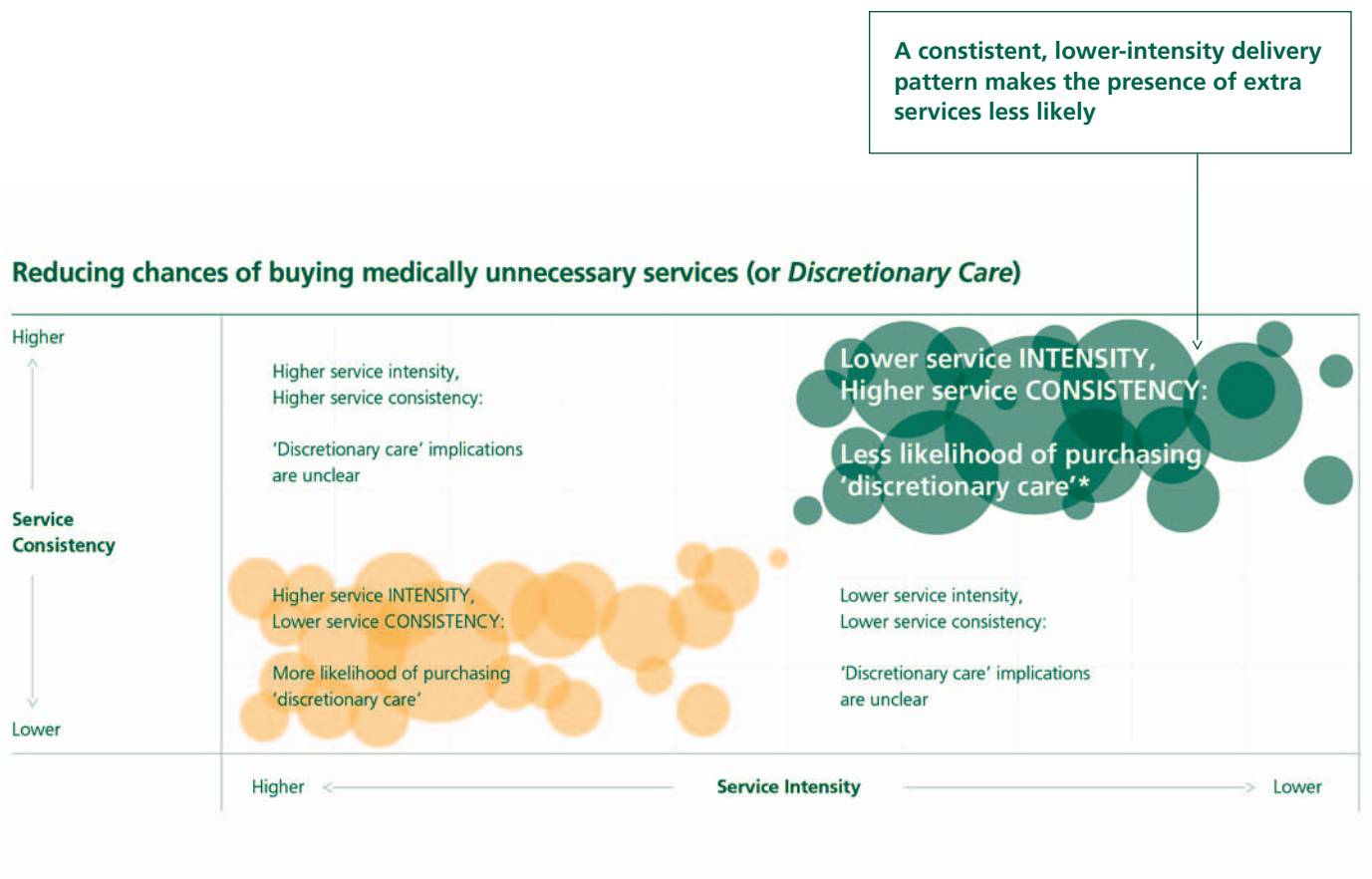
The Alliance is interested in resource use both in terms of average service intensity per case, and consistency of service intensity across cases. Each of these attributes can be measured and plotted on a graph. The following diagram represents a graph where the upper right quadrant is a zone of consistent, low-intensity service delivery, the high-value corner.

As the notations in the diagram indicate, the green quadrant is where service intensity patterns tell us that patients and employers are less likely to receive, or purchase, medically unnecessary services. It also means less exposure to the risks of treatment, such as complications, health care associated infections, or contra-indicated interventions from multiple providers. This pattern is also a distinguishing characteristic of delivery systems that are relatively well positioned for certain payment reforms, such as bundled payments for specific conditions.

Using charts oriented in this manner, the Alliance plotted distinct delivery systems according to the intensity and consistency of their performance. Instead of plotting points, we use circles, or bubbles, of different sizes, where a bubble's area indicates the delivery system's case volume, i.e., the larger the bubble, the higher the number of cases.

We feature one type of hospitalization in each graph. Results have been adjusted for each patient's illness severity level, meaning factors such as age, and the existence of other conditions or diseases that can complicate treatment have been taken into account.

The Alliance applied statistical methods to determine when a delivery system's average service intensity level was unusually high or low, using a threshold that is expected to be correct 90% of the time. Because results could be incorrect about 10% of the time, they should be used as directional, not definitive, guidance. Each bubble is color-coded to signal its relationship to the regional average.



Dorsal and Lumbar Fusion Procedures (Back Severity)

Dorsal and Lumbar Fusion procedures are spinal surgeries for the lower back and are used to treat back pain and spinal instability. Specific diagnoses that may require surgical procedures are:

- Herniated discs;
- Spinal stenosis, which is the narrowing of the spinal canal through which the spinal cord and spinal nerves run;
- Spondylolisthesis, which occurs when a vertebra of the lumbar spine slips out of place; or
- Vertebral fractures.

One type of procedure permanently connects two or more bones (vertebrae) in the spine. An extra bone (bone graft) is placed between the vertebrae, and may be held in place with screws or rods. Over time the vertebrae grow together (fuse). The procedure is an attempt to get two vertebral segments to grow together and turn them into one segment, eliminating motion between them. While the surgery can frequently relieve symptoms, it has complication risks and is not always effective.

Herniated disc and/or spinal stenosis is/are identified in the Dartmouth Atlas as Preference-Sensitive Care conditions. The pain associated with herniated disc usually goes away on its own. Some people with mild to moderately symptomatic stenosis get better with no treatment, some get worse, and most stay about the same. Strengthening and aerobic activities may help reduce pain and improve the ability to do physical activities for some people with spinal stenosis. Medications may also help with short-term flare-ups, but the drugs can be habit forming and cause side effects. Steroid injections may relieve pain temporarily, although it is not known how often they can be taken safely.

About 850 patients of the lowest degree of illness severity are represented in the following graph.

Findings:

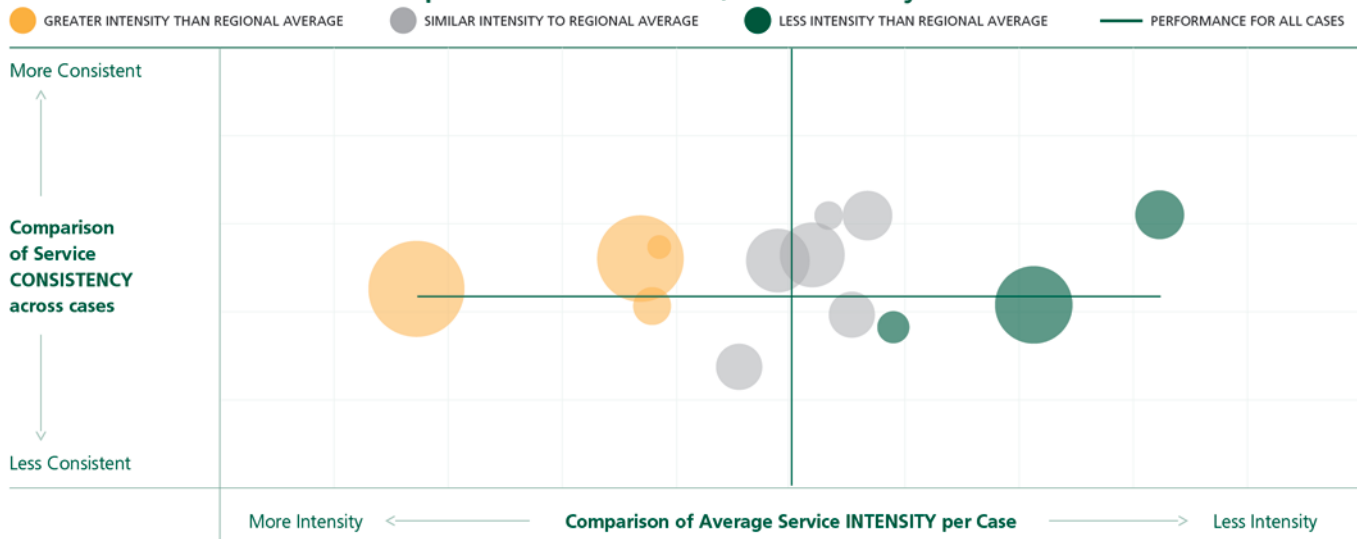
In this chart, one delivery system stands out as being the least service-intensive with the most consistency across cases. Four delivery systems have higher service intensity, three are lower, and several are not statistically different from the prevailing regional average.

Other findings based on data review by the Alliance:

1. On average, *both* shorter hospital stays and less intensive professional surgical service levels account for the lower service intensity.
2. The difference in resource use between the most and least service intensive delivery systems is 28%. The Alliance estimates that on average the difference in cost per patient between the most and least service intensity delivery systems could range from \$8,900 and \$17,800.
3. If all delivery systems performed like the delivery system with the lowest average service intensity, our region could free about 14% of these resources for other services or savings in cost.

Resource Use by Delivery System during:

Dorsal & Lumbar Fusion Proc Except for Curvature of Back, Minor Severity — APR DRG 304.1*



* Each bubble represents a single Delivery System (admitting hospital and professional care during the stay).
Bubble area represents case volume; commercially insured people, 2006–2009

Percutaneous Cardiovascular Procedures without AMI (Coronary Angioplasty)

Percutaneous coronary intervention (PCI) is commonly known as a coronary angioplasty. It is a procedure to treat the narrowed coronary arteries of the heart found in coronary heart disease. These narrowed segments are due to the build-up of cholesterol-laden plaques. In this type of hospitalization, a patient who has not suffered a heart attack (acute myocardial infarction, or AMI) receives an angioplasty.

With PCI, a doctor guides a thin flexible tube (catheter) into the narrowed coronary arteries to open them. The two common types of PCI are:

- Angioplasty with stenting: the angioplasty is done by attaching a small balloon to the catheter. Once the catheter is in the proper location in a coronary artery, the balloon is inflated. After the plaque is compressed, a small expandable wire tube called a stent is inserted into the artery to hold it open.
- Atherectomy: this procedure may be done during cardiac catheterization to open a partially blocked coronary artery. Once the catheter reaches the narrowed portion of the artery, a cutting device, a whirling blade or a laser beam is used to remove the plaque. This procedure is done in combination with balloon angioplasty or stenting.

The value of angioplasty in rescuing someone having a heart attack (by immediately alleviating an obstruction) is clearly defined in multiple studies. But studies have failed to find reduction in hard endpoints for angioplasty vs. medical therapy in stable angina patients. The artery-opening procedure can temporarily alleviate chest pain, but does not contribute to longevity.

This surgical procedure was also included in the section on treatment choice. About 1,500 patients of the lowest degree of illness severity are represented in the following graph.

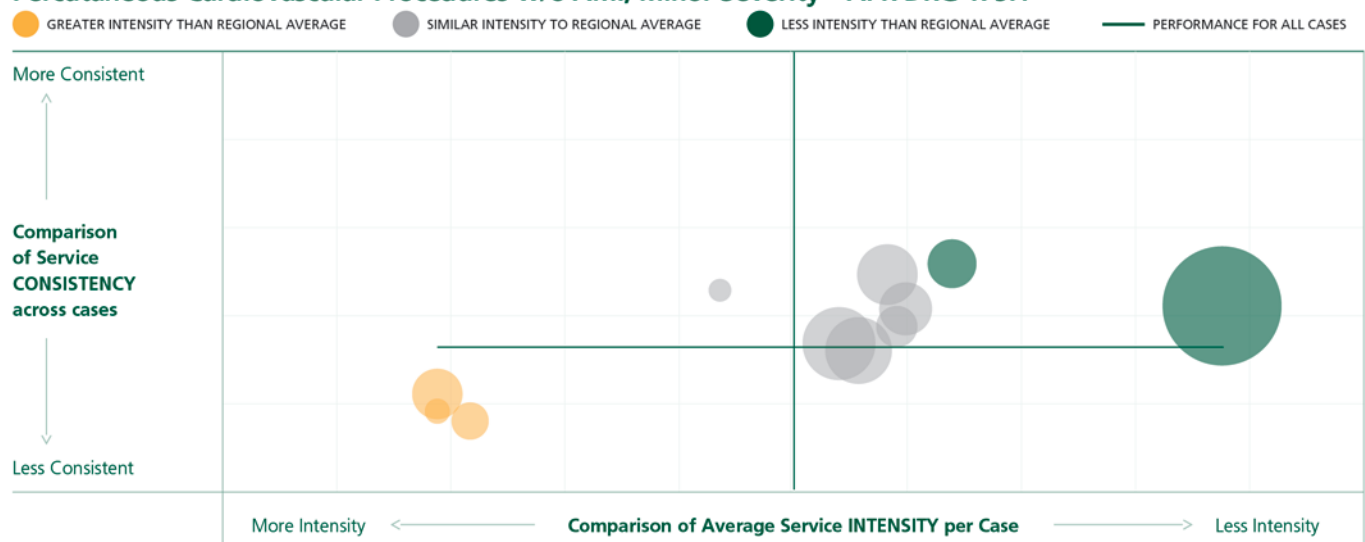
Findings:

In this example, the delivery system with the most cases also has the lowest service intensity per case. Three delivery systems have higher service intensity, two are lower, and several are not statistically different from the prevailing regional average. The delivery systems with higher service intensity levels also tend to show lower consistency across cases.

Other findings based on data review by the Alliance:

1. On average, shorter hospital stays and less intensive professional service levels account for a portion of the lower service intensity.
2. The difference in resource use between the most and least service intensive delivery systems is 15%. The Alliance estimates that on average the difference in cost per patient between the most and least service intensity delivery systems could range from \$2,900 and \$5,800.
3. If all delivery systems performed like the delivery system with the lowest average service intensity, our region could free about 3% of these resources for other services or cost savings.

Resource Use by Delivery System during: Percutaneous Cardiovascular Procedures w/o AMI, Minor Severity—APR DRG 175.1*



* Each bubble represents a single Delivery System (admitting hospital and professional care during the stay).
Bubble area represents case volume; commercially insured people, 2006–2009

Obesity Procedures

Obesity increases an individual's risk of disease and health problems such as diabetes and high blood pressure. Individuals with extreme obesity, also called severe obesity or morbid obesity, are especially likely to have serious health problems and may seek surgery.

Bariatric surgery alters the digestive system to help people with severe weight-related health problems lose weight. Roux-en-Y gastric bypass surgery restricts food intake by creating a small pouch at the top of the stomach. The pouch is then connected to a section of the small intestine, allowing food to bypass the lower stomach and the first parts of the small intestine. Laparoscopic gastric banding involves placing an inflatable band around the upper portion of the stomach to restrict the amount of food an individual may consume.

Bariatric surgery should be seen as a last resort for weight loss, as it is a very serious surgery that drastically alters the anatomy of the digestive tract and requires a complete life change afterwards. Those who suffer from obesity should explore all weight loss alternatives, including working with a nutritionist or dietitian, maintaining an exercise routine, or joining a weight loss support group, before seeking out bariatric surgery.

About 325 patients whose condition was rated as moderate are represented in the following graph.

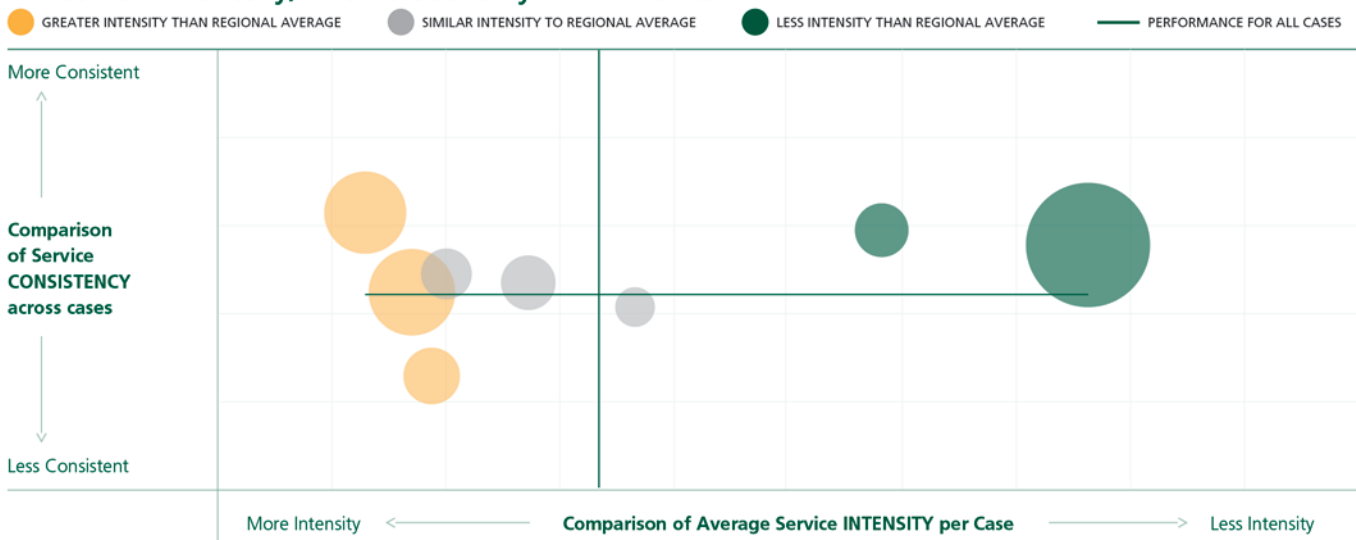
Findings:

In this example, the delivery system with the most cases in the Alliance database also has the lowest service intensity per case. Three delivery systems have higher service intensity, two are lower, and three are not statistically different from the prevailing regional average.

Other findings based on data review by the Alliance:

1. On average, shorter hospital stays account for the lower service intensity.
2. The difference in resource use between the most and least service intensive delivery systems is 24%. The Alliance estimates that on average the difference in cost per patient between the most and least service intensity delivery systems could range between \$4,100 and \$8,200.
3. If all delivery systems performed like the delivery system with the lowest average service intensity, our region could free about 14% of these resources for other services or cost savings.

Resource Use by Delivery System during: Procedures for Obesity, Moderate Severity—APR DRG 403.2*



* Each bubble represents a single Delivery System (admitting hospital and professional care during the stay).
Bubble area represents case volume; commercially insured people, 2006–2009

Cervical Spine Fusion

Cervical spine fusion is a neurosurgical procedure that joins selected bones in the neck to treat neck pain. It is performed to relieve the pressure on one or more nerve roots, or on the spinal cord. It involves the stabilization of two or more vertebrae by locking them together (fusing). The surgeon may use metal plates or pins that can be necessary to provide extra pressure and support to the neck and to make sure that the bones fuse adequately. After an injury, this procedure may be performed to stabilize the neck and prevent a bone fracture from causing instability or damage to the spinal cord. It is also used to treat misalignment of the vertebra and as a follow-up procedure to treat spinal stenosis, a herniated disc, the effects of rheumatoid arthritis, an infection, tumors or spinal deformities.

Fusion usually provides pain relief, and almost always results in increased range of motion and neck stability shortly after the surgery, but the main disadvantage to a neck fusion is that the fixation of one level usually results in increased wear on the adjacent levels. The increase in stress in these adjacent cervical joints puts them at risk of faster degeneration and also needing a fusion later on. Sometimes a fusion creates a cascade of problems with the end result of many cervical fusions throughout the cervical spine, leaving the patient with very little motion.

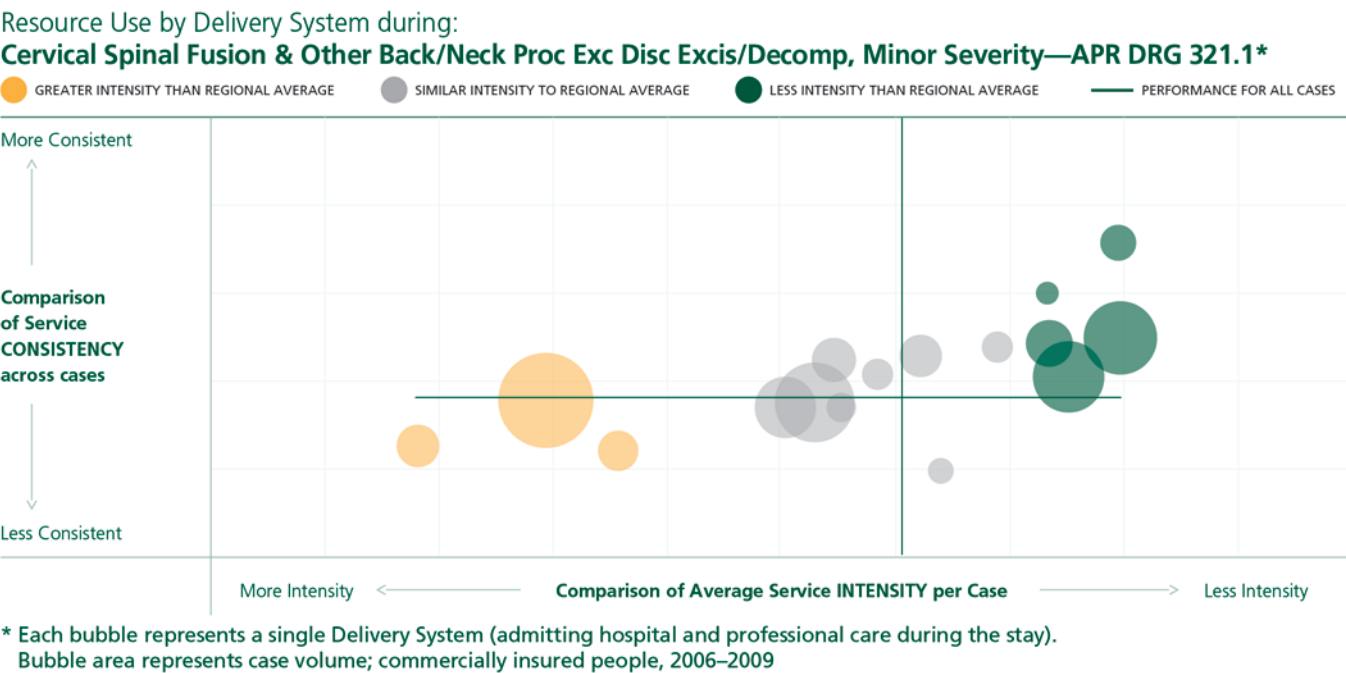
This surgical procedure was also included in the section on treatment choice. About 1,350 patients of the lowest degree of illness severity are represented in the following graph.

Findings:

In this example, one delivery system stands out as being the least service-intensive with the most consistency across cases. Three delivery systems have higher service intensity, four are lower, and several are not statistically different from the prevailing regional average.

Other findings based on data review by the Alliance:

- 1. Professional surgical service intensity is the major driver in differences.
- 2. The difference in resource use between the most and least service intensive delivery systems is 25%. The Alliance estimates that on average the difference in cost per patient between the most and least service intensity delivery systems could range from \$3,100 to \$6,200.
- 3. If all delivery systems performed like the delivery system with the lowest average service intensity, our region could free about 9% of these resources for other services or cost savings.



Cardiac Catheterization for Ischemic Heart Disease

Cardiac catheterization is a procedure to test the heart and coronary arteries. It is used to check blood flow in the coronary arteries, blood flow and blood pressure in the chambers of the heart, find out how well the heart valves work, and check for defects in the way the wall of the heart moves. It involves passing a thin flexible tube (catheter) into the right or left side of the heart, usually from the groin or the arm. Ischemic heart disease refers to reduced blood supply to the heart.

In general, this procedure is done to get information about the heart or its blood vessels or to provide treatment in certain types of heart conditions. It may also be used to determine the need for heart surgery.

This surgical procedure is also included in the section about treatment choice. About 600 patients of the lowest degree of illness severity are represented in the following graph.

Findings:

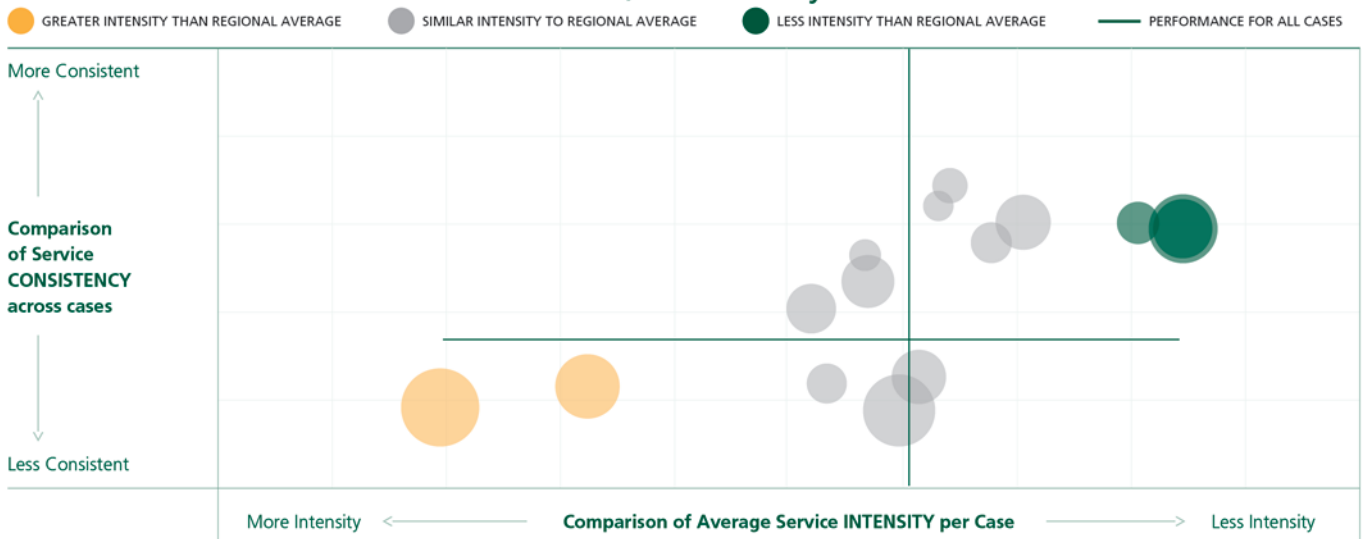
In this example, three delivery systems stand out as being the least service-intensive with relatively good consistency across cases. Two delivery systems have higher service intensity, three are lower, and several are not statistically different from the prevailing regional average. The delivery systems with higher service intensity levels tend to show lower consistency across cases.

Other findings based on data review by the Alliance:

1. On average, shorter hospital stays and less intensive professional service levels account for a portion of the lower service intensity.
2. The difference in resource use between the most and least service intensive delivery systems is 27%. The Alliance estimates that on average the difference in cost per patient between the most and least service intensity delivery systems could range from \$2,000 to \$4,000.
3. If all delivery systems performed like the delivery system with the lowest average service intensity, our region could free about 11% of these resources for other services or cost savings.

Resource Use by Delivery System during:

Cardiac Catheterization for Ischemic Heart Disease, Minor Severity—APR DRG 192.1*



* Each bubble represents a single Delivery System (admitting hospital and professional care during the stay).
Bubble area represents case volume; commercially insured people, 2006–2009

Chest Pain

Chest pain is discomfort or pain that you feel anywhere along the front of your body between your neck and upper abdomen. Many problems can cause chest pain. These include:

- Angina
- Aortic dissection (tearing of the aorta wall)
- Heart attack
- Inflammation or infection in the tissue around the heart
- A blood clot in the lung, collapse of a small area of the lung, or inflammation of the lining around the lung
- Asthma
- Pneumonia
- Anxiety and rapid breathing

Statistical information has shown that more than 3 million patients may be hospitalized annually in the United States to “rule out” heart attack. The associated societal costs are in the range of \$3 billion annually.

More than 750 patients of the lowest degree of illness severity are represented in the following graph.

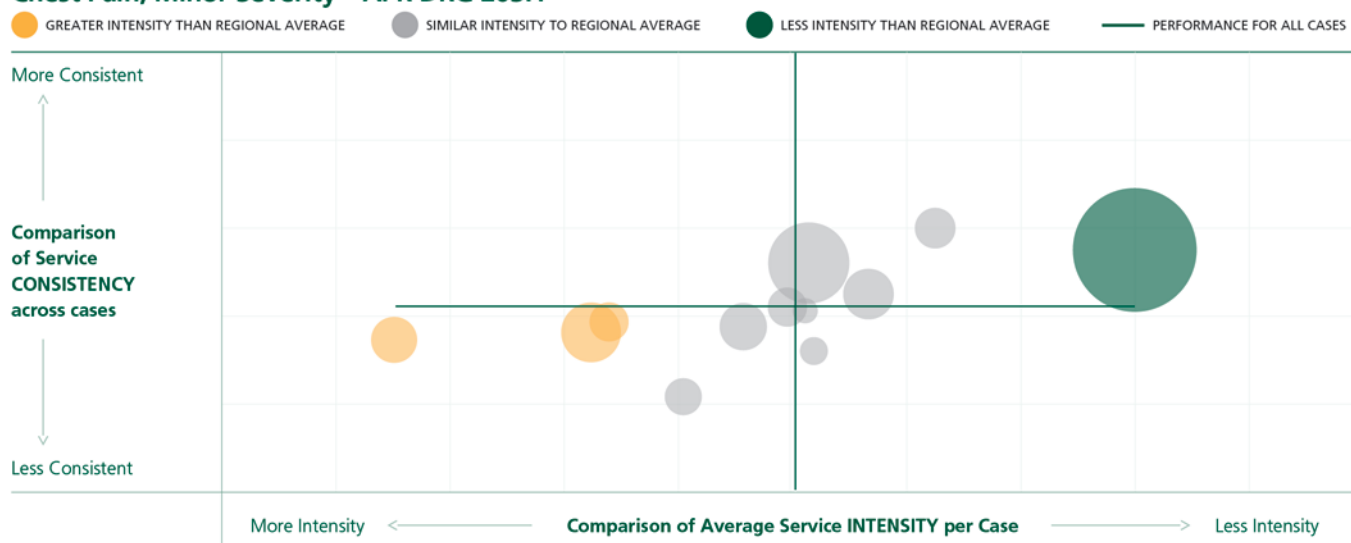
Findings:

In this example, the delivery system with the most cases in the Alliance database also has the lowest service intensity per case. Three delivery systems have higher service intensity, one is lower, and several are not statistically different from the prevailing regional average.

Other findings based on data review by the Alliance:

1. On average, shorter hospital stays and less intensive professional service levels account for a portion of the lower service intensity.
2. The difference in resource use between the most and least service intensive delivery systems is 26%. The Alliance estimates that on average the difference in cost per patient between the most and least service intensity delivery systems could range from \$1,100 to \$2,200.
3. If all delivery systems performed like the delivery system with the lowest average service intensity, our region could free about 7% of these resources for other services or cost savings.

Resource Use by Delivery System during: Chest Pain, Minor Severity—APR DRG 203.1*



* Each bubble represents a single Delivery System (admitting hospital and professional care during the stay).
Bubble area represents case volume; commercially insured people, 2006–2009

Laparoscopic Cholecystectomy, (Gallbladder Removal)

Cholecystectomy is a surgical procedure to remove the gallbladder. It may be necessary to ease pain from gallstones that block the flow of bile. A doctor may recommend a cholecystectomy to treat gallstones in the gallbladder, gallstones in the bile duct, gallbladder inflammation, and pancreas inflammation. Laparoscopic cholecystectomy is done by inserting a tiny video camera and tiny surgical tools through four small incisions to see inside a patient's abdomen and remove the gallbladder. (When a large incision is made, it is called an open cholecystectomy.) Laparoscopic cholecystectomy is very effective, but carries a small risk of serious complications.

Chronic cholecystitis is a *Dartmouth Atlas* Preference-Sensitive Care condition. An alternative treatment option is watchful waiting. Watchful waiting may avoid the need for surgery, but carries a risk of a later serious attack and the need for urgent, open surgery.

About 675 patients with moderate illness severity are represented in the following graph.

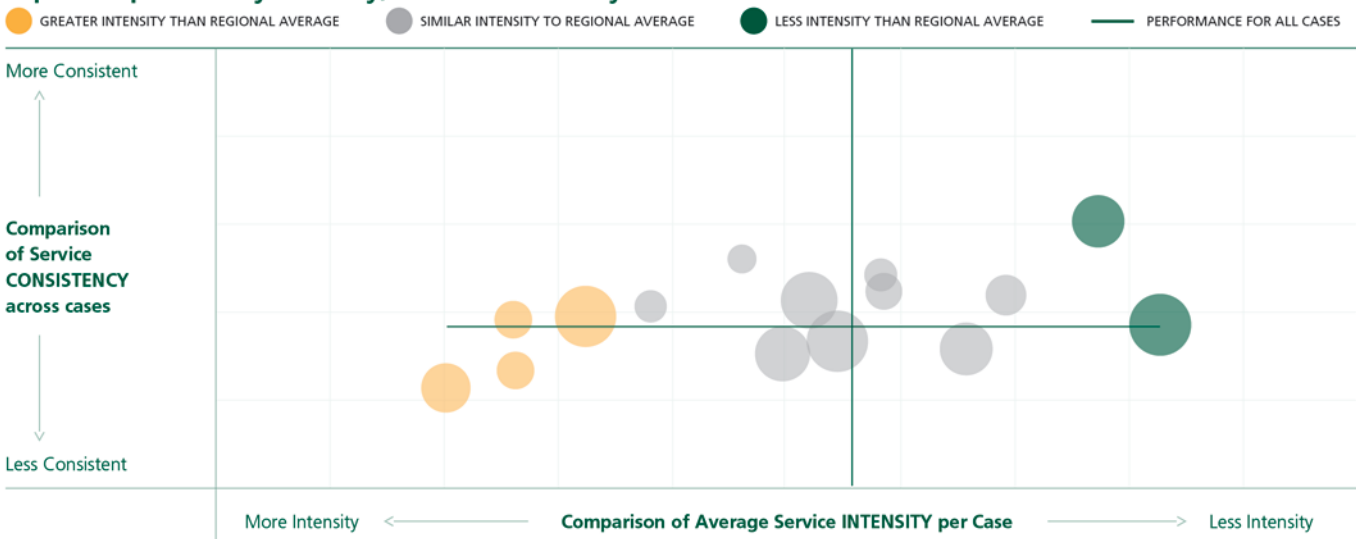
Findings:

In this example, one delivery system stands out as being the least service-intensive with the most consistency across cases. Four delivery systems have higher service intensity, two are lower, and several are not statistically different from the prevailing regional average.

Other findings based on data review by the Alliance:

1. On average, shorter hospital stays and less intensive professional service levels account for a portion of the lower service intensity variation shown.
2. The difference in resource use between the most and least service intensive delivery systems is 30%. The Alliance estimates that on average the difference in cost per patient between the most and least service intensity delivery systems could range from \$3,300 to \$6,600
3. If all delivery systems performed like the delivery system with the lowest average service intensity, our region could free about 10% of these resources for other services or cost savings.

Resource Use by Delivery System during: Laparoscopic Cholecystectomy, Moderate Severity—APR DRG 263.2*



* Each bubble represents a single Delivery System (admitting hospital and professional care during the stay).
Bubble area represents case volume; commercially insured people, 2006–2009

Knee Joint Replacement

Knee joint replacement is surgery to replace a knee joint with an artificial joint. It can help relieve pain and restore function in severely diseased knee joints. During knee replacement, a surgeon cuts away damaged bone and cartilage from the thighbone, shinbone and kneecap and replaces it with an artificial joint made of metal alloys, high-grade plastics and polymers. Common reasons for knee joint replacement are osteoarthritis and rheumatoid arthritis, disabling pain, knee deformity, or injury.

Knee replacement is one of the procedures that the *Dartmouth Atlas* classifies as preference-sensitive. Rates of knee replacement surgery vary considerably throughout the nation, reflecting the fact that there is less consensus among physicians about when to do these procedures, who needs them and how effective they are in addressing the problems they are intended to solve.

Alternative treatment options for knee replacement surgery include weight loss, activity modifications, and anti-inflammatory medications.

More than 2,300 patients of the lowest degree of illness severity are represented in the following graph.

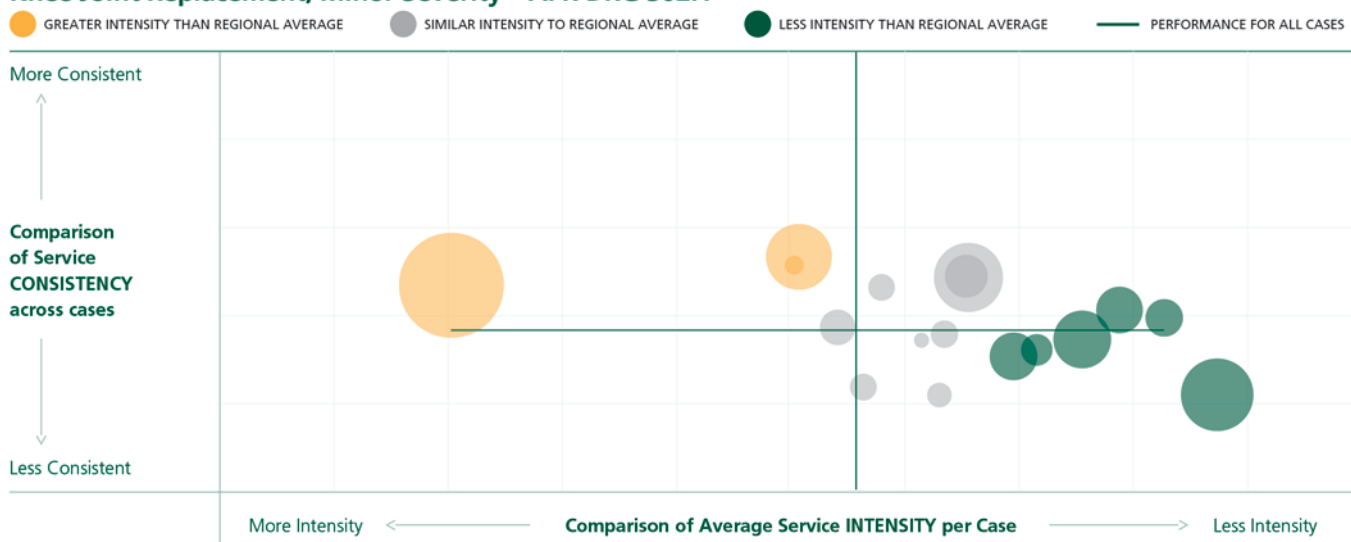
Findings:

In this example, the delivery system with the most cases in the Alliance database also has the highest service intensity per case. Two delivery systems have higher service intensity, six are lower, and several are not statistically different from the prevailing regional average.

Other findings based on data review by the Alliance:

1. On average, shorter hospital stays and less intensive professional surgical service levels account for a portion of the lower service intensity.
2. The difference in resource use between the most and least service intensive delivery systems is 13%. The Alliance estimates that on average the difference in cost per patient between the most and least service intensity delivery systems could range from \$1,700 to \$3,400.
3. If all delivery systems performed like the delivery system with the lowest average service intensity, our region could free about 6% of these resources for other service or cost savings.

Resource Use by Delivery System during: Knee Joint Replacement, Minor Severity—APR DRG 302.1*



* Each bubble represents a single Delivery System (admitting hospital and professional care during the stay).
Bubble area represents case volume; commercially insured people, 2006–2009

Major Male Pelvic Procedures

Major male pelvic procedures include removal of the prostate (prostatectomy). Surgical removal of the prostate gland is one of several treatment options for men with prostate cancer. Increasingly, providers conduct these operations at hospitals that have acquired robotic surgery machines. These are believed to shorten hospital stays, but also are known to have substantial learning curves for adopting surgeons.

The Dartmouth Atlas considers radical prostatectomy a preference-sensitive procedure for men with early-stage prostate cancer. The procedure removes the prostate cancer entirely, but there are substantial risks for incontinence and impotence.

Other treatment options for early-stage prostate cancer include watchful waiting, which generally involves regular biopsies, and radiation treatment, which shrinks or eliminates the cancer but has significant side effects.

This analysis includes patients receiving both traditional and robotically-assisted surgeries. About 785 patients of the lowest degree of illness severity are represented in the following graph.

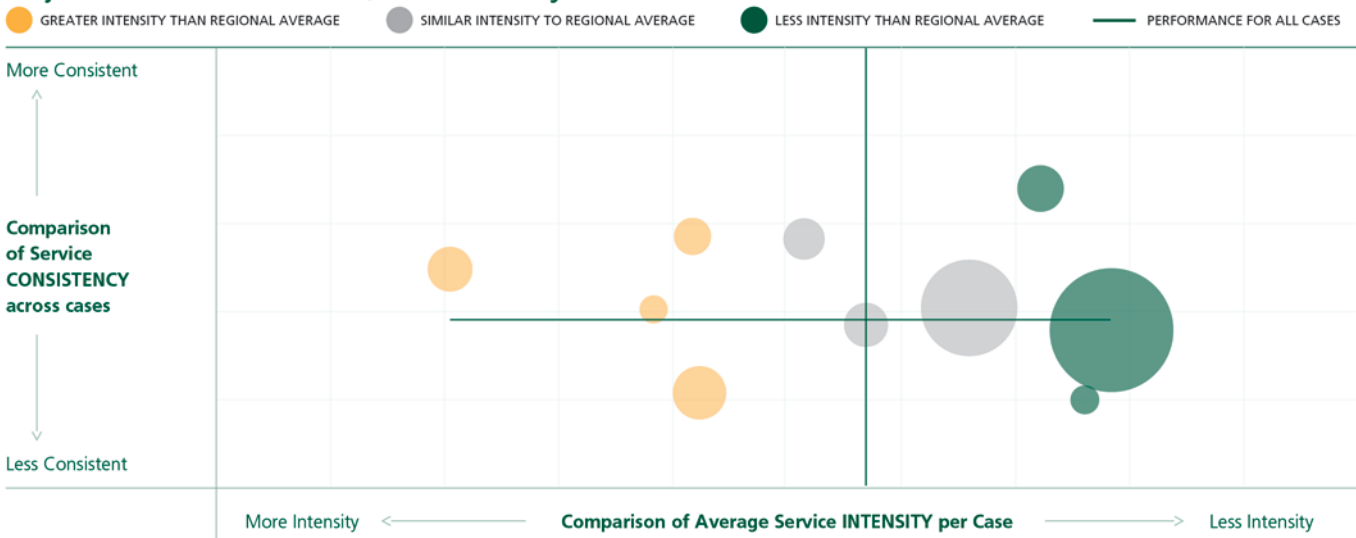
Findings:

In this example, the delivery system with the most cases also has the lowest service intensity per case. Four delivery systems have higher service intensity, three are lower, and three are not statistically different from the prevailing regional average.

Other findings based on data review by the Alliance:

1. On average, shorter hospital stays and less intensive professional surgical service levels account for a portion of the service intensity variation.
2. The difference in resource use between the most and least service intensive delivery systems is 18%. The Alliance estimates that on average the difference in cost per patient between the most and least service intensity delivery systems could range from \$2,600 to \$5,200.
3. If all delivery systems performed like the delivery system with the lowest average service intensity, our region could free about 7% of these resources for other services or cost savings.

Resource Use by Delivery System during: Major Male Pelvic Procedures, Minor Severity—APR DRG 480.1*



* Each bubble represents a single Delivery System (admitting hospital and professional care during the stay).
Bubble area represents case volume; commercially insured people, 2006–2009

Diverticulitis and Diverticulosis

Many people have small pouches in the lining of the colon and large intestine that bulge outward through weak spots. Each pouch is called a diverticulum (plural: diverticula). The condition of having diverticula is called diverticulosis; when the pouches become inflamed, the condition is called diverticulitis. People with diverticulosis may experience crampy pain or discomfort in the lower abdomen, bloating, and constipation. The most common symptom of diverticulitis is abdominal pain.

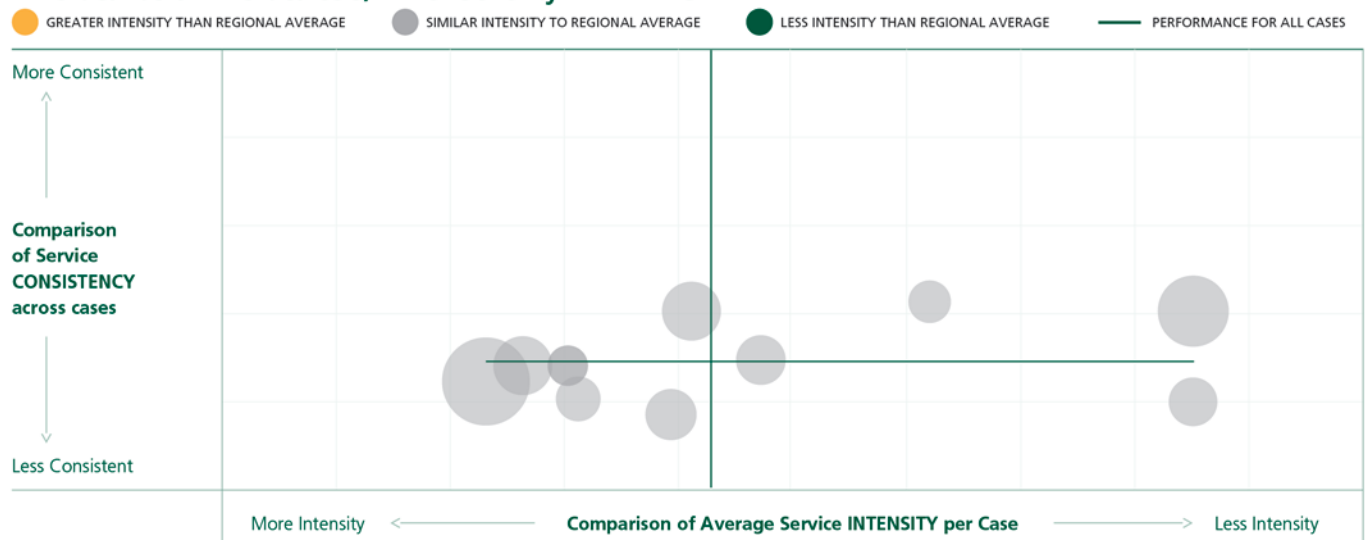
Diverticulitis can lead to bleeding, infections, small tears (perforations), or blockages in the colon. These complications require treatment to prevent them from progressing and causing serious illness. The dominant theory is that a low-fiber diet causes diverticular disease. If symptoms of diverticulitis are frequent, or the patient does not respond to antibiotics and resting the colon, the doctor may advise surgery. The surgeon removes the affected part of the colon and joins the remaining sections. This type of surgery (colon resection) aims to prevent complications and future diverticulitis.

About 375 patients of the lowest degree of illness severity are represented in the following graph.

Findings:

This example highlights the fact that variation is not consistently found across every procedure that the Alliance examined. In this case, none of the delivery systems is statistically different from the prevailing regional average for this treatment.

Resource Use by Delivery System during: Diverticulitis & Diverticulosis, Minor Severity—APR DRG 244.1*



* Each bubble represents a single Delivery System (admitting hospital and professional care during the stay).
Bubble area represents case volume; commercially insured people, 2006–2009

With its work on resource use, the Alliance is introducing two components of value in health care: appropriateness and intensity. They join process quality, the current emphasis of the Alliance's Community Checkup report. Future Alliance activities will target the measurement of three more value components: outcomes, cost, and patient experience of care.

The Alliance believes that this resource use data will have practical applications for both purchasers and providers. All else equal, delivery systems with more consistent, low-intensity service patterns will appeal to:

1. Employers who would like to see their employees return to productive work as soon as possible, and without having purchased medically unnecessary services
2. Hospitals and medical groups, for whom the Alliance's comparative service intensity results can help them to become more competitive, profitable, and efficient

The addition of data on outcomes and cost will provide additional important detail. Together all of these elements will help paint a fuller picture of care and help the Alliance move closer to its goal of making the Puget Sound region a model for the best care with the least waste, creating greater value for the entire system.



The Puget Sound Health Alliance was formed in 2004 as a non-profit, non-partisan regional collaborative with the vision of developing a state-of-the-art health care system that provides better care at a more affordable cost, resulting in healthier people in the Puget Sound region. Today, with over 150 participants, our mission is to build a strong alliance among patients, doctors and other health professionals, hospitals, employers, labor trusts and health plans to promote health and improve quality and affordability.

The Alliance has developed the regional Community Checkup report so that everyone in the community has comparative information that recognizes and encourages health care services and actions that are safe, effective in promoting or improving health, and affordable so everyone can access needed care. The Community Checkup will continue to be improved and expanded over time. We encourage everyone to use the report to learn more about specific health services that are known to be effective and to see that there is variation in how consistently effective care is provided in clinics and hospitals in the region.

For more about the Alliance:
www.PugetSoundHealthAlliance.org.

For the Community Checkup report:
www.WACommunityCheckup.org.