WEB FEATURE

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using data analytics to transform care management and reduce clinical variation

Hospitals and health systems have entered a new era in which their survival will hinge on the extent that they are able to analyze data to identify and realize opportunities for improved performance.

AT A GLANCE

> With the healthcare industry's transition to a focus on value over volume, it has become a critical concern for healthcare organizations to be able to employ data analytics to improve performance both clinically and financially.
> Reducing excess length of stay is an important focus for data analytics aimed at improving performance.
> Another primary area of focus for data analytics is reducing clinical variation.

As the dynamics of the healthcare environment rapidly shift to a focus on value, hospital executives are compelled to focus constant attention on improving the coordination and quality of patient care while reducing its cost. Whether these efforts are focused on fixed or variable costs or direct and indirect costs—or all such costs—reducing healthcare costs is a perennial challenge, often exacerbated by fragmented data resources. As organizations respond to the imperative to use technology and data analytics to support qualified decisions and improve care, they encounter myriad questions regarding how to apply systems efficiently and effectively and redesign care management models to optimize value.

Many organizations are shifting attention away from traditional hospital care management models to patient-centric, integrated care coordination that spans the care continuum, including primary, acute, and post-acute care. The new models are focused on decreasing clinical variation, improving care coordination and population health, and optimizing the value quotient (better quality/better cost). Organizations require data analytics to support these efforts.

Simply put, to succeed in the evolving environment of value-based care, healthcare organizations must move forward deliberately with efforts to develop sophisticated data analytics capabilities that make use of the data they have to identify and analyze improvement opportunities and guide the steps required to realize those opportunities.

Key areas on which a health system's performance improvement team should focus when applying these data analytics include accuracy of medical necessity reviews, effectiveness of high-risk admission screening, timely discharge planning, active care coordination, tight communication in handoffs between episodes of care, efficiency in throughput and patient flow and high value patient care delivery.

Eliminating excess patient days (waste) and reducing clinical variation, in particular, have emerged as two primary objectives for any value-focused initiative. Here, therefore, we present a range of data analytical techniques focused on length of stay (LOS) and clinical variation that health systems can implement today to reduce costs and improve care.

LOS Focus

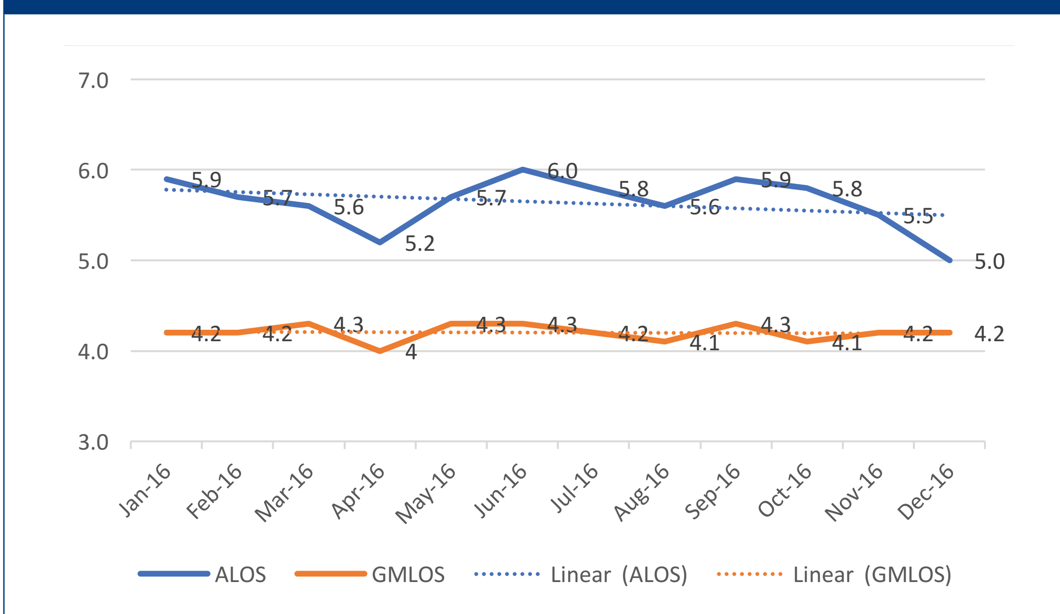
Fortunately, the data required for an analysis of excess day reduction is easily obtainable for most organizations. A health system's electronic health record typically will contain information for any inpatient on the number of inpatient days and DRGs. And for any given DRG and year, the corresponding case mix index (CMI) and expected LOS calculated by the Centers for Medicare & Medicaid Services (CMS) can be obtained.

To illustrate, the exhibit below presents the average LOS (ALOS), CMS's geometric mean LOS (GM-LOS), the ratio of the two, and the MS-DRG CMI for one hospital's fictitious sample of patients over a one-year period.[a] It is evident in the graph showing the trend in ALOS and GMLOS that ALOS has been above the GMLOS for this sample for the past 12 months, indicating a potential opportunity to reduce the LOS for MS-DRG.

Benefit opportunity assessment. The key is to accurately identify the benefit opportunity. For instance, based on the previous example, given the potential excess days in the sample shown in the exhibit on page 3, and assuming a cost per day of $400 for each day over the expected LOS,

a. A DRG's GMLOS refers to the LOS that CMS has determined should be expected for that particular DRG.

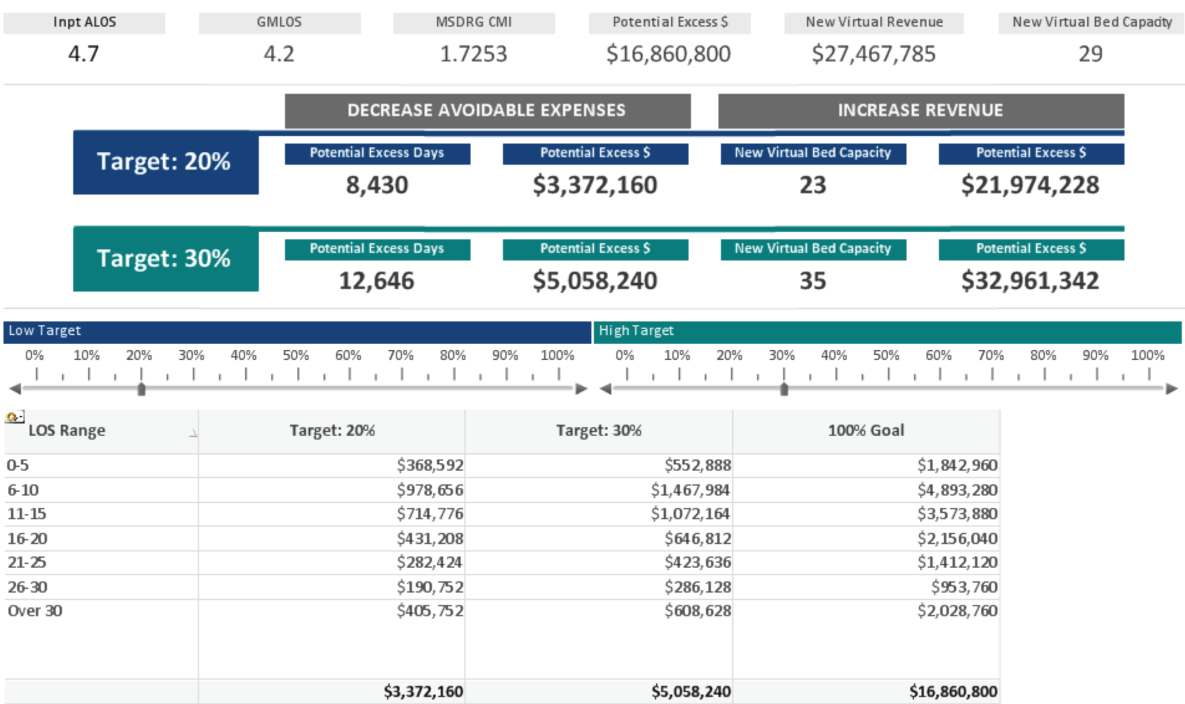
SAMPLE ANALYSIS: AVERAGE LOS COMPARED WITH GEOMETRIC MEAN LOS



ALOS = 5.6 Days
GMLOS = 4.2 Days
ALOS/GMLOS = 1.34 Days
MS-DRG Case Mix Index = 1.7703

This example shows a hypothetical analysis of length of stay (LOS) data. Average LOS (ALOS) for patients of a fictitious hospital with a MS-DRG case mix index of 1.7703 during calendar year 2016 is compared with the Centers for Medicare & Medicaid Services (CMS) geometric mean LOS (GMLOS)—i.e., the agency's expected LOS.

SAMPLE REPORT: ANALYSIS OF POTENTIAL SAVINGS FROM REDUCING AVERAGE LENGTH OF STAY (LOS) IN EXCESS OF CMS'S GEOMETRIC MEAN LOS (GMLOS), CY16



Inpt ALOS	GMLOS	MSDRG CMI	Potential Excess $	New Virtual Revenue	New Virtual Bed Capacity
4.7	4.2	1.7253	$16,860,800	$27,467,785	29

	DECREASE AVOIDABLE EXPENSES		INCREASE REVENUE	
	Potential Excess Days	Potential Excess $	New Virtual Bed Capacity	Potential Excess $
Target: 20%	8,430	$3,372,160	23	$21,974,228
Target: 30%	12,646	$5,058,240	35	$32,961,342

LOS Range	Target: 20%	Target: 30%	100% Goal
0-5	$368,592	$552,888	$1,842,960
6-10	$978,656	$1,467,984	$4,893,280
11-15	$714,776	$1,072,164	$3,573,880
16-20	$431,208	$646,812	$2,156,040
21-25	$282,424	$423,636	$1,412,120
26-30	$190,752	$286,128	$953,760
Over 30	$405,752	$608,628	$2,028,760
	$3,372,160	**$5,058,240**	**$16,860,800**

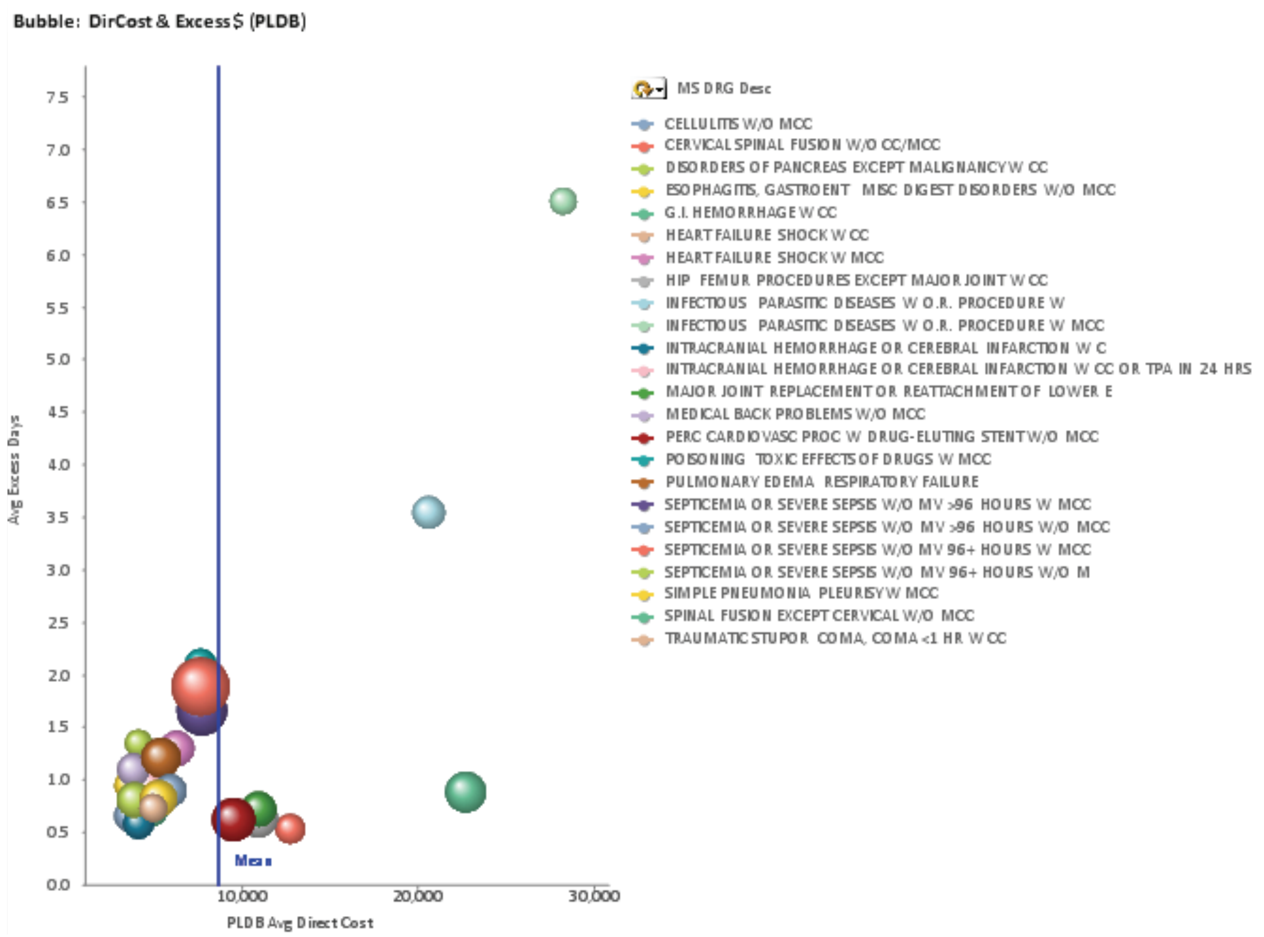
potentially $16.9 million in excess expense could have been avoided in this one-year period if every patient had been discharged exactly according to CMS's expected LOS. Because CMS payments are tied to the expected LOS, excess or avoidable days add cost to the hospitals without corresponding revenue.

In reality, some patients will have conditions that are more severe than indicated by the DRG. Perhaps the DRG has been miscoded, and it may not be possible to address every single patient and reduce every individual LOS. Executives may decide that a reasonable goal could be addressing 30 percent of the excess days versus 100 percent, over a specified period. The exact mix of patients won't return to the hospital in the following 12 months, and unless there is a significant change in mix over time, the hospital can track the ratio of ALOS to GMLOS over time to track any improvement, while also comparing the remaining potential excess days or dollars with those in a baseline time period.

Best practices for improving LOS include daily interdisciplinary care rounds to reduce unwarranted excess days from the system, transitioning patients from the acute care stay, and leveraging skilled nursing facilities, home health, rehab, long-term acute care hospitals, outpatient services, and other levels of service.

Analysis of excess cost. A potentially beneficial step when studying LOS is to review groupings of direct costs and excess costs associated with LOS greater than CMS's GMLOS. For example, in the exhibit on page 4, bubbles are placed in the chart for each DRG indicated, where the X-axis represents the average direct cost at the patient level and the Y-axis represents the number of excess days (inpatient days above the expected

SAMPLE ANALYSIS OF AVERAGE DIRECT COST FOR MS-DRGs COMPARED WITH AVERAGE LENGTH OF STAY (LOS) IN EXCESS OF CMS EXPECTED LOS (i.e., GEOMETRIC MEAN LOS)



Note: PLDB = patient level database.

GMLOS). The size of the bubble reflects the number of patients in each DRG.

This representation of data is visually appealing because the outliers having high direct costs and high excess days are immediately apparent in the top right quadrant of the graph. Moreover, by choosing a bubble for a particular DRG in this chart and displaying other dimensions of performance, such as ordering physician instead of DRG, executives can review outliers by physician within each DRG, thereby using hospital data not only to reduce LOS but also to address unnecessary clinical variation.

Scorecards and performance KPI analyses. To obtain a broader prespective, executives can use scorecards to identify other high-value and high-target performance improvement areas, as shown in the exhibit on page 5.

Another tool for measuring the level of improvements achieved is a report that shows the LOS key performance indicators (KPIs) for a baseline period as compared with the current period. Such a report can clearly depict whether the hospital has improved and to what extent over the designated period, as shown in the exhibit on page 6. It also is important to note that the exact mix of patients will not be repeated, as volume will likely change, making it preferrable to review volume-adjusted metrics. The potential excess days per discharge (i.e., volume adjusted) for the baseline is 1.7841. For the more current month in the actual time period, the same metric has been reduced or improved to 1.6237.

Focus on Clinical Variation

Efforts to reduce clinical variation involve assessment of different services and procedures and their costs, and how much variance in cost there is for the same condition or diagnosis within the same system. The differences derive from various factors, including the overuse or underuse of a healthcare service by certain healthcare providers and specialists. Other influencing factors may include patient demographics, comorbidities, severity of illness, risk of mortality, and intensity of service. By focusing on increasing the consistency of patient care delivery within a health system, variation can be decreased, resulting in improved quality and reduced costs.

Although hospitals typically have various levels of cost data available for a clinical variation analyses, data availability often poses a limitation for organizations attempting to analyze clinical variation. The basis for the analysis can range from actual patient level data all the way down to actual charge items, depending on what data are available. Some hospitals can analyze actual charges and costs for items, whereas others can analyze only charges for items and are limited in their costing ability to analyzing costs according to department or revenue cost average (i.e., using a step-down methodology that allocates cost based on a ratio of cost to charges [RCC]). Any method that can provide only an allocated estimate of direct cost is not suitable for clinical variation analysis. In general, the deeper the dive into cost data provided, the better the analysis.

Analysis of direct costs. A hospital's direct costs are those costs directly associated with patient care. Typically, organizations can have a huge variation in such costs, even for similar patients with a similar diagnosis and similar procedure.

SAMPLE SCORECARD: PATIENT FLOW METRICS AND READMISSIONS

Length of Stay (LOS) Range	Discharges	Case Mix Index (CMI)	Inpatient Days	% One-Day Stays	Average LOS	Geometric Mean LOS	LOS Index	LOS/ CMI	30-Day Readmits	% 30-Day Readmits	Deaths	% Deaths	Average Discharges per Hour	Potential Excess Days	Potential Excess Days/ Discharge	% Potential Excess Days	Potential Avoided Cost
0-5	8,339	1.5815	22,597	24.2%	2.7	3.7	0.74	1.71	1,070	12.8%	194	2.3%	15.5	1,860	0.22	8.2%	$905,917
6-10	2,659	1.8879	19,965	0%	7.5	4.8	1.57	3.98	505	19.0%	51	1.9%	16.2	7,698	2.89	38.6%	$3,748,683
11-15	802	2.3658	10,186	0%	12.7	5.6	2.28	5.37	168	20.9%	25	3.1%	16.4	5,722	7.13	56.2%	$2,786,711
16-20	292	2.6824	5,136	0%	17.6	6.1	2.88	6.56	62	21.2%	7	2.4%	16.3	3,352	11.48	65.3%	$1,632,278
21-25	154	3.0365	3,521	0%	22.9	6.9	3.34	7.53	44	28.6%	8	5.2%	16.4	2,465	16.01	70.0%	$1,200,650
26-30	69	3.1126	1,924	0%	27.9	7.1	3.94	8.96	15	21.7%	3	4.3%	16.4	1,436	20.81	74.6%	$699,429
Over 30	132	3.5148	6,748	0%	51.1	7.8	6.59	14.54	35	26.5%	13	9.8%	16.8	5,723	43.36	84.8%	$2,787,296
Total	**12,447**	**1.7703**	**70,077**	**16.2%**	**5.6**	**4.2**	**1.34**	**3.18**	**1,899**	**15.3%**	**301**	**2.4%**	**15.8**	**28,257**	**2.27**	**40.3%**	**$13,760,963**

Areas of focus to achieve potential improvement opportunities are highlighted in red.

COMPARISON OF DATA UNDER PERFORMANCE-IMPROVEMENT INITITIATIVE WITH 1-YEAR BASELINE DATA

Month/ Year	Discharges	Case Mix Index (CMI)	Average LOS	Geometric Mean LOS	Potential Excess Days	Potential Excess Days/ Discharge	Average Potential Excess Days	% Potential Excess Days	% One-Day Stays	% 30-Day Readmits	Charges	Average charges/ Case	Potential Excess Charges	Average Potential Excess Charges/ Case
Baseline Data														
5/2015	747	1.8910	5.43	5.5	1,011	1.3531	3.17	24.9%	9.8%	7.4%	$59,220,179	$79,277	$404,312	$1,267
6/2015	758	1.9178	5.31	5.4	994	1.3109	3.33	24.7%	10.8%	6.6%	$64,073,576	$84,530	$397,456	$1,334
7/2015	740	1.9462	5.66	5.4	1,115	1.5069	3.57	26.6%	10.9%	6.6%	$64,556,972	$87,239	$446,028	$1,430
8/2015	760	1.9261	6.13	5.1	1,516	1.9953	4.54	32.6%	10.5%	10.4%	$68,597,194	$90,259	$606,564	$1,816
9/2015	694	1.8682	5.70	5.4	1,139	1.6411	3.67	28.8%	9.9%	6.2%	$59,111,886	$85,176	$455,564	$1,470
10/2015	717	1.9432	6.38	4.5	1,527	2.1294	4.97	33.4%	10.6%	12.0%	$65,900,232	$91,911	$610,724	$1,989
11/2015	685	1.9957	5.88	4.7	1,419	2.0718	4.27	35.2%	9.2%	13.3%	$58,949,555	$86,058	$567,668	$1,710
12/2015	745	2.0213	6.47	4.9	1,825	2.4492	5.01	37.9%	9.9%	13.6%	$66,572,702	$89,359	$729,852	$2,005
1/2016	735	1.8220	5.70	4.7	1,446	1.9674	4.29	34.5%	11.2%	12.9%	$59,055,575	$80,348	$578,420	$1,716
2/2016	744	1.8862	5.30	4.7	1,245	1.6736	3.68	31.6%	12.5%	13.3%	$58,252,532	$78,296	$498,052	$1,474
3/2016	829	1.8381	5.00	4.6	1,268	1.5295	3.61	30.2%	14.0%	14.2%	$62,517,457	$75,413	$507,188	$1,445
4/2016	717	1.9111	5.55	4.7	1,322	1.8434	3.96	33.2%	11.7%	13.5%	$59,367,594	$82,800	$528,696	$1,583
Total	8,871	1.9131	5.71	4.9	15,826	1.7841	4.02	31.3%	11.0%	10.9%	$746,175,814	$84,114	$6,330,524	$1,608
Actual Data														
5/2016	711	1.8963	5.46	4.6	1,315	1.8488	4.10	33.9%	13.5%	6.8%	$60,391,047	$84,938	$525,808	$1,638
6/2016	703	1.9221	5.41	4.8	1,190	1.6922	3.94	31.3%	12.8%	12.1%	$60,553,075	$86,135	$474,856	$1,576
7/2016	765	1.8375	4.81	4.4	1,069	1.3975	3.25	29.0%	11.8%	10.6%	$60,765,745	$79,432	$427,624	$1,300
8/2016	752	1.9054	5.53	4.6	1,424	1.8942	4.21	34.3%	11.2%	10.4%	$66,449,393	$88,364	$569,784	$1,686
9/2016	752	1.8696	5.53	4.7	1,428	1.8987	4.26	34.3%	13.6%	10.5%	$63,225,940	$84,077	$571,136	$1,705
10/2016	692	1.8863	4.88	3.5	864	1.2492	3.49	25.6%	12.9%	9.5%	$54,137,162	$79,233	$345,776	$1,394
11/2016	735	1.9819	5.26	3.5	1,007	1.3702	3.87	26.0%	11.2%	11.7%	$59,189,069	$80,529	$402,840	$1,549
Total	5,110	1.8992	5.27	4.3	8,297	1.6237	3.89	30.8%	12.4%	10.2%	$424,711,431	$83,114	$3,318,824	$1,556

The potential excess days per discharge (i.e., volume adjusted) for the baseline is 1.7841. For the more current month in the actual time period, the same metric has been reduced or improved to 1.6237.

Hospitals all too often are unaware of how much variation exists across patient populations with the same illness, procedure, or all-patient-refined (APR) DRG.[b]

It is in the variations in utilization and delivery that potential opportunities for reducing cost and improving population health exist. One way a hospital can identify such opportunities is by analyzing different levels of direct cost using data from various sources combined into a single report—for example, by comparing direct costs at the patient level. However, the usefulness of data depends on departmental, service line, and organizational effectiveness. Any data-driven project will benefit from a structure designed to ensure that goals are clearly understood, communicated, met, and sustained. Although providing guidance for creating such a structure is beyond the scope of this article, the need for such a structure should be well understood.

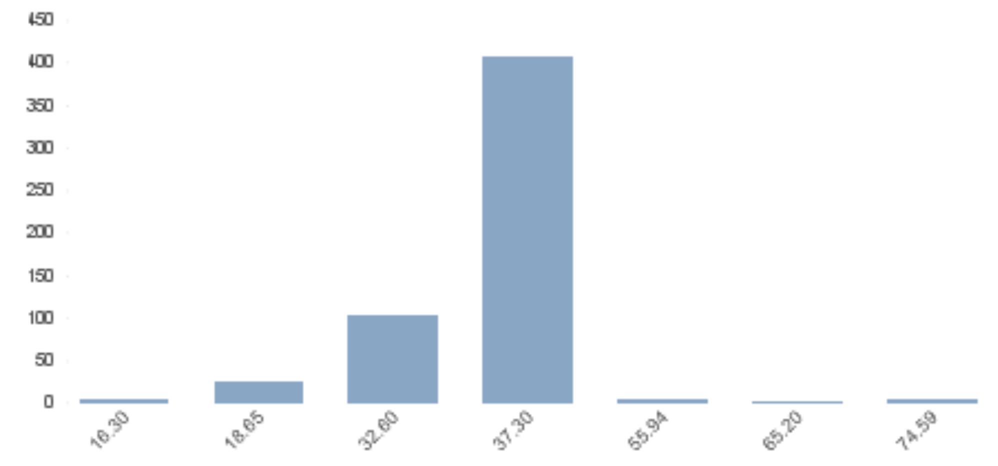
b. APR DRGs expand on basic DRGs by including four subclasses of patients that reflect differences among patients in terms of severity of illness and risk of mortality.

Segmentation analysis. Health system executives can use a *segmentation analysis* to determine where—i.e., in which segments of care—efforts to reduce direct cost are likely to provide the most value over time. Such an analysis, depicted in the exhibit below, enables executives to view variations in direct costs across a variety of dimensions. The exhibit shows, for a sample hospital, the number of discharges, the total direct cost, and the standard deviation in direct costs for several APR DRGs over a six-month period, where there were at least 50 discharges per procedure within that timeframe. The sample

COMPARISON OF AVERAGE DIRECT COST WITH THE STANDARD DEVIATION IN COSTS FOR 13 APR DRGS, 6-MONTH PERIOD

All-Patient-Refined (APR) DRG	APR DRG Description	Discharges	Average Direct Cost per Procedure	Standard Deviation in Direct Costs
174	Percutaneous Cardiovascular Procedures With Acute Myocardial Infarction	270	$947	$905
313	Knee and Lower Leg Procedures Except Foot	116	$694	$752
024	Extracranial Vascular Procedures	110	$1,553	$2,382
315	Shoulder, Upper Arm, and Forearm Procedures	97	$1,339	$2,855
301	Hip Joint Replacement	95	$2,289	$2,143
308	Hip and Femur Procedures for Trauma Except Joint Replacement	91	$921	$852
021	Craniotomy Except for Trauma	83	$1,101	$1,090
303	Dorsal Lumbar Fusion Procedures for Curvature of the Back	73	$2,763	$3,573
304	Dorsal Lumbar Fusion Procedures Except for Curvature of the Back	66	$2,385	$3,194
309	Hip and Femur Procedures for Non-Trauma Except for Joint Replacement	63	$901	$932
302	Knee Joint Replacement	52	$2,477	$2,435
173	Other Vascular Procedures	52	$1,890	$3,108
321	Cervical Spinal Infusion and Other Back and Neck Procedures Except Disc Excision and Decompression	50	$1,540	$2,257
	Total for All Procedures	**2,242**	**$1,463**	

SAMPLE ANALYSIS: NUMBERS OF PATIENTS BY DIRECT COST, BLOOD CULTURES WITHIN DRG 870 (SEPTICEMIA OR SEVERE SEPSIS WITH MV 96+ HOURS)



DATA ANALYTICS: A CNO PERSPECTIVE

The importance and value to health organizations of implementing comprehensive data analytics to support clinical team efforts in reducing clinical variation, improving care coordination, and raising the quality of care delivered to patients is an important undertaking that can deliver tremendous value to healthcare organizations. One organization that has implemented such data analytics is Centura Health, Denver. Commenting on her organization's experience, Linda Goodwin, group chief nursing officer, has the following advice for other organizations that are contemplating embarking on such an effort:

"One recommendation for hospitals and health systems adopting a data analytics platform would be to clearly identify the key stakeholders and data consumers that will best drive the actionable data and alignment with effective workplans."

includes only procedures with severity codes 1 and 2 as a risk-stratification approach, because including the most severe cases cause the standard deviation in direct costs to be much higher. Ideally, the segmentation analysis also would allow executives to look at each severity-adjusted APR DRG by attending physician, activity code, and various other fields within the database.

The exhibit on page 7 shows a wide range of both average direct costs and standard deviations within the DRGs shown. Note that smaller-volume APR DRGs in the exhibit show a tendency toward having a higher variance (i.e., a wider standard deviation from the average direct cost per procedure). Such information could provide a starting place for identifying potential opportunities to reduce variation in direct costs at the APR DRG level. In the middle of the chart, for example, the two DRGs for dorsal lumbar fusion both have high means and high standard deviations, as well as some significant volume, suggesting this area might be a good place to drill down into the data and investigate the cause of the variation.

More detailed analyses. On a more detailed level, analyses of charge-level direct costs for specific procedures, accounting for various factors such as number of patients and number of items used, can disclose opportunities to reduce clinical variation.

For example, the exhibit above displays direct costs by number of patients for sample blood cultures taken within the DRG of Septicemia over a one-year period. The X-axis represents the dollars of direct cost and the Y-axis is the number of observations or patients. As shown, more than 400 of the roughly 500 procedures cost $37.30, which represents the mode in this sample (the mean is a slightly lower $36), while very few procedures show a cost exceeding $37.20, indicating that there is no significant clinical variation associated with this particular clinical activity.

In contrast, the exhibit on page 9 hows a sample of costs for charge items associated with a procedure. For most individual procedures (shown by the individual bars), only one of the items was used, but in several instances six items were used, and in one, the items numbered seven. More noteworthy is the range of costs associated with the usage.

This range of costs and the various numbers of items point to a high degree of clinical variation: There is no clear pattern or consistency within the data, and there is significant dispersion about the mean, with relatively high standard deviation. The data suggest a deep investigation should be undertaken to analyze the drivers of the clinical variation.

Analyses such as those described here are likely to uncover many patterns of clinical variation, and some judgment is necessary to determine which subsets of data should be measured for this purpose.

Other metrics and KPIs can be examined to select target areas. For example, significant opportunities for improvement can be identified using a simple chart showing the top 10 direct costs by activity or revenue code. Another effective way to analyze practice variation among physicians might be to review the highest-volume activities or revenue codes by physician.

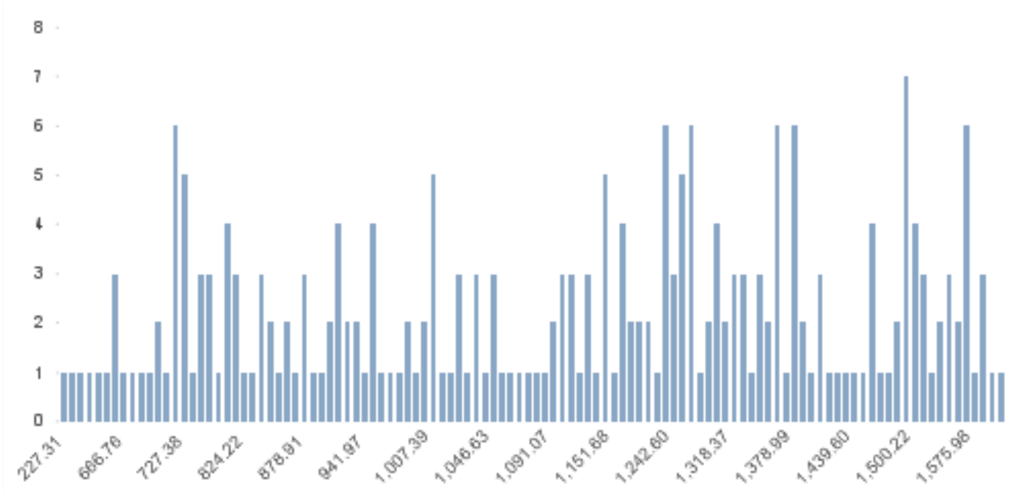
Bubble charts are particularly useful for detecting anomalies and outliers related to clinical variation. The sample bubble chart in the exhibit on page 10 shows, by physician, the average direct cost for a particular procedure on the X-axis compared average units per patient on the Y-axis. Each physician's overall cost for the procedure is indicated by size of the bubbles. Using this type of exhibit, a few clear outlier physicians can be spotted that have average direct costs and in some cases higher units than average. Treatment of outliers can include investigation and even possible removal from the analysis.

Impact of Reduced Variation

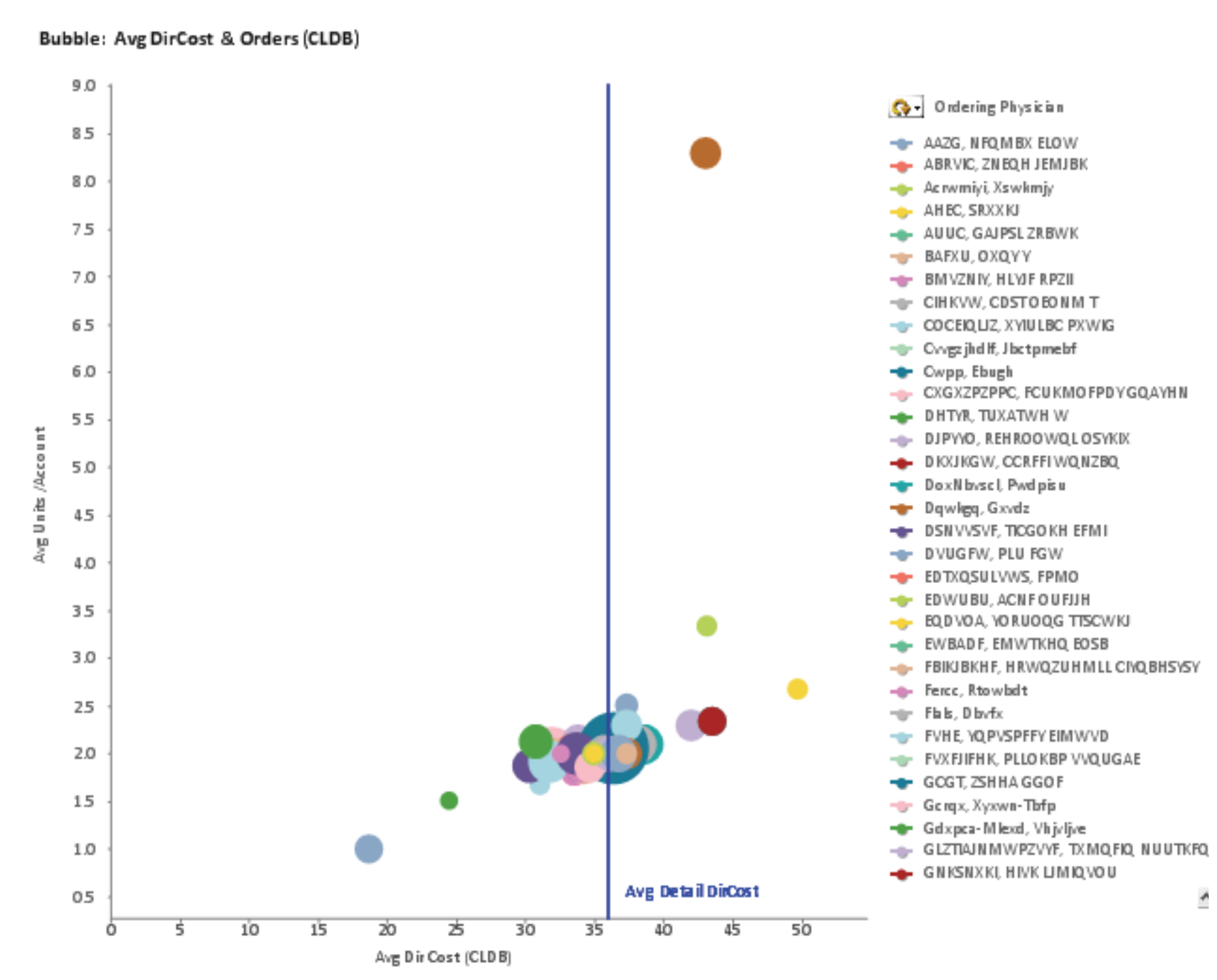
As hospital executives analyze opportunities to significantly reduce clinical variation associated with large variances in direct costs, they also should consider the effects of reducing variation in direct costs on the organization's contribution margin. Therefore, once they are capable of defining and measuring clinical variation, they also require a standard means for analyzing that variation and determining the potential impact from reducing variation on the hospital's direct costs and contribution margin.

The exhibit at the top of page 11 illustrates the preliminary step in such an analysis. This hypothetical example shows risk-adjusted charge-level direct costs for items used, and the numbers of items used at each level of direct cost, for patients admitted to the hospital under a specific DRG in the most recent 12-month

SAMPLE ANALYSIS: NUMBERS OF ITEMS FOR A PROCEDURE BY DIRECT COST



HYPOTHETICAL COMPARISON OF ITEMS ORDERED AND AVERAGE DIRECT COST BY PHYSICIAN

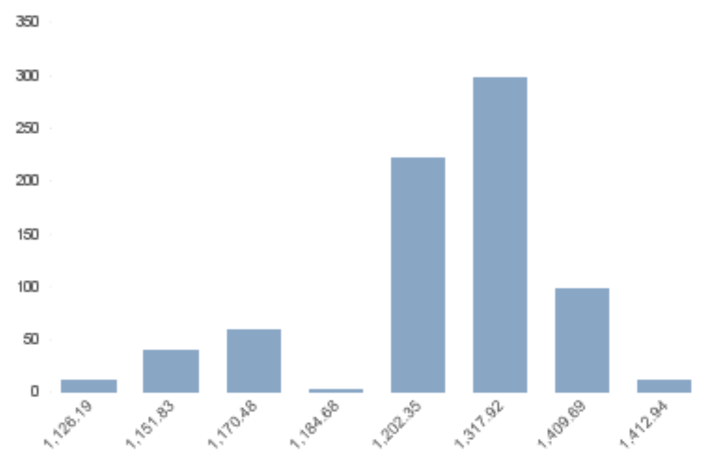


period. The objective of the larger analysis is to identify the potential reduction in direct costs that a hospital can reasonably be expected to achieve by reducing clinical variation for a similar mix of patients admitted to the hospital in a subsequent 12-month period. Stated otherwise, the results aim to show how much savings a hospital might have realized if it could have delivered care to the same set of patients represented by the data but with reduced clinical variation.

The next step is to apply a methodology to analyze the potential impact from reducing the direct costs. Again, such a methodology could be used for analysis of patient-level direct costs or charge-level direct costs, and some judgment would be needed based on the homogeneity of the data and the purpose of the analysis.

There are different approaches to analyzing potential reductions in direct costs. Some executives examine a uniform percentage reduction in all direct costs no matter what size or magnitude, and others prefer an approach in which only the larger costs (i.e., those above the mean) are reduced, which assumes that there is not as much opportunity or ability for the hospital

SAMPLE ANALYSIS 2: NUMBERS OF ITEMS FOR A PROCEDURE BY DIRECT COST



to reduce costs that are already small. Another option is to implement a blended approach that allows for percentage reductions in costs that are different above and below the mean. For purposes of this analysis, the percentage reduction in costs above the mean refers to reducing only the *excess* portion above the mean—i.e., bringing the cost of items that have higher costs than the mean down to the mean cost.

In determining what percentage reduction in direct costs would be most viable for a hospital, it can be useful to test various percentages to get a sense of the impact on results. Smaller reductions in direct costs also are possible, but they will produce a smaller magnitude impact. The methodology aims to approximate what a hospital can actually accomplish, and the appropriate method should be a reasonable proxy for the type of reduction that a hospital could achieve over the one-year period. The results need not be exact; rather, they should simply give an idea of what a hospital could be expected to achieve overall from reducing direct costs over a specified timeframe.

The methods described here are straightforward and have the advantage of requiring few assumptions. It also should be noted that other reasonable methods exist. Another approach might be to choose a cohort of selected physicians and examine the impact of reducing other direct costs to the target level of that cohort. That said, a full discussion of all methods is beyond the scope of this article.

The exhibit below shows the results of three methods relative to what is shown in the previous exhibit. Method A looks at a reduction of only those costs above the mean, Method B represents the blended method, and Method C looks at a reduction of all costs by a uniform percentage. For the purposes of this example, the exhibit shows a 25 percent reduction in excess costs above the mean in Method A, a 20 percent for costs below the mean in Method B, and 20 percent for the reduction in all costs in Method C.

COMPARISON OF METHODS FOR DETERMINING THE FOCUS AND ASSESSING THE IMPACT OF EFFORTS TO REDUCE DIRECT COSTS

Potential Savings
$7,112

Method A | Population Above Mean	
Total Direct Cost (Actual)	$944,837
Average Direct Cost CLDB	$1,273
Slider: Percentage of Direct Cost Change	-25%
New Adjusted Direct Cost	$937,725
New Average Direct Cost	$1,264
IMPACT	7,112
Length of Stay Impact @ $400	$118,496
IMPACT minus estimated overlap w/ LOS	$123,992

Potential Savings
$86,229

Method B | Total Population (Split)	
Total Direct Cost (Actual)	$944,837
Average Direct Cost CLDB	$1,273
Slider: Direct Cost Change Above Mean	-25%
Slider: Direct Cost Change Below Mean	-20%
New Adjusted Direct Cost	$858,609
New Average Direct Cost	$1,157
IMPACT	86,229
Length of Stay Impact @ $400	$118,496
IMPACT minus estimated overlap w/ LOS	$185,135

Potential Savings
$188,967

Method C | Total Population (Single)	
Total Direct Cost (Actual)	$944,837
Average Direct Cost CLDB	$1,273
Slider: Percentage of Direct Cost Change	-20%
New Adjusted Direct Cost	$755,870
New Average Direct Cost	$1,019
IMPACT	188,967
Length of Stay Impact @ $400	$118,496
IMPACT minus estimated overlap w/ LOS	$264,534

Not All Clinical Variation Can Be Eliminated

Comparing the results of the three methods, Method A produces the lowest potential savings because it is focused only on reducing the excess costs above the mean by 25 percent. Meanwhile, Method C, which reduces all costs by 20 percent, gives the highest potential savings.

It's important to select a realistic factor and not overestimate the results that can be achieved at the hospital. Depending on the hospital's resources, several identified target areas could be managed in an upcoming year by dedicated case managers and staff education. The number and potential magnitude, of course, depends on factors such as available resources and the size of the potential impact relative to the effort needed to reduce the costs.

Because of the unique characteristics of each patient, not all clinical variation can be eliminated. However, evidence-based and data-based approaches to reducing clinical variation can enable providers to realize significant reductions in unnecessary or unwanted variation.

Implementation Considerations

After reviewing the potential impacts from clinical variation and LOS initiatives, the process of implementing changes begins. To be successful, implementation efforts should begin with the development of specific action plans for the top areas targeted for reduced LOS and clinical variation. Specific, attainable goals should be developed and shared with the key stakeholders across the organization. Regular follow up and monitoring is required to ensure that goals remain on track and readjusted if necessary.

A hospital's processes for improving the quality and reducing the cost of patient care should be continuous and ongoing, and addressing unwanted clinical variation and reducing LOS are among the primary means for achieving those improvements.

In any care management transformation initiative focused on reducing clinical variation, improving patient care, and lowering cost reduction, data transparency is imperative. The goal is not simply to cut costs; ultimately, it is to create a highly reliable health system in which efforts to deliver value are proactive and collaborative, and in which data are effectively used as a strategic asset.

In summary, hospitals and health systems can best meet their strategic goals for value-focused care, including reducing excess LOS and clinical variation, by adhering to the following structure used by leading organizations:

> *Step 1: Define.* Key metrics and targets of success are identified and defined.
> *Step 2: Measure.* Clinical variation and overall direct costs are measured for selected target segments after a review of the areas with the largest potential impact on cost reduction.
> *Step 3: Analyze.* The impact of a potential reduction in variation and direct costs is estimated.
> *Step 4: Implement.* Action plans are created and interdisciplinary teams established throughout the hospital to achieve reduced variation.
> *Step 5: Control.* Direct costs are monitored on an ongoing basis throughout the project, and variation is compared with the baseline to ensure that both the variation and direct costs—particularly in selected target segments—are both being effectively reduced. ■

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