



# Improving Bottom-Line Hospital Value Based Purchasing ("VBP") Revenue

In the midst of the Affordable Care Act ("ACA") legislated new business models transforming healthcare from the old "Volume" based revenue model to the new, "Performance, Quality and Value" revenue model, hospitals deal with highly increased risks, revenue challenges and uncertainty.

Discovering and implementing sound foundational success, rapid and long-term, for the new era of Pay-for-Performance healthcare is imperative for Healthcare systems as Standards and Poor's recently moved 25% of acute hospitals in the U.S. to "At-Risk."

HealthViZion has uniquely discovered high impact correlations and direct drivers, previously unknown and many hidden, now measureable and manageable, to scientifically improve VBP revenue and scores quickly through the most impactful healthcare entity on VBP revenue, the workforce – also the largest hospital budget item averaging over 60% of expenses.

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# **Executive Summary**



In an historic move, CMS as a result of the Affordable Care Act ("ACA") is transforming the revenue model from the old volume based "Fee-for-Service" to the new era of Performance, Value and Quality in Healthcare primarily through Value-Based Purchasing ("VBP").

Better, Smarter, Healthier: In this announcement, HHS sets clear goals and timeline for shifting Medicare reimbursements from volume to value and higher Risk.

January 26, 2015 – "In a meeting with nearly two dozen leaders representing consumers, insurers, providers, and business leaders, Health and Human Services Secretary Sylvia M. Burwell today announced measurable goals and a timeline to move the Medicare program, and the health care system at large, toward paying providers based on the quality, rather than the quantity of care they give patients.

HHS has set a goal of tying 30 percent of traditional, or fee-for-service, Medicare payments to quality or value through alternative payment models by the end of 2016, and tying 50 percent of payments to these models by the end of 2018. HHS also set a goal of tying 85 percent of all traditional Medicare payments to quality or value by 2016 and 90 percent by 2018 through programs such as the Hospital Value Based Purchasing and the Hospital Readmissions Reduction Programs. This is the first time in the history of the Medicare program that HHS has set explicit goals for alternative payment models and value-based payments."

Hospitals are facing unprecedented change, uncertainty and risks. Some risk isn't based on risk tolerance, and right now, most hospitals are already at risk for decreased reimbursement from CMS's value-based programs. For example, if a hospital performs poorly in all three programs (hospital-acquired conditions, high readmissions, and value-based purchasing), it is at risk for a 5.5 percent reduction during 2015. For hospital-acquired conditions alone, Medicare is reducing payments by one percent for 721 hospitals this year.

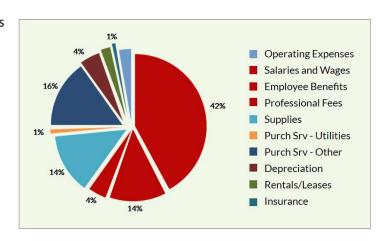
Financial viability continues to be a significant concern for healthcare CEOs. Standard & Poor's Financial Services forecasts more ratings downgrades in 2015. The agency is also updating its methodology for credit ratings of acute-care, stand-alone hospitals. Specifically, these new criteria assign ratings using a framework that considers enterprise risk (enterprise profile) and financial risk (financial profile) factors. The credit rating agency expects almost one-quarter of stand-alone hospitals to have non-stable outlooks.



HEALTHVIZION CLIENTS IN THE TOP 2
QUINTILES OF WORKFORCE DRIVERS
RECEIVE UP TO 89% HIGHER VBP
REVENUE AND 64% LOWER
REDUCTIONS FROM THE HOSPITALACQUIRED CONDITIONS AND HIGH
READMISSIONS PROGRAMS

The number one driver of VBP revenue scores is the workforce which also accounts for the largest share of budget averaging 62% of total expenses. Yet scientifically leadership has virtually no understanding of which workforce drivers, compositions, attributes and future trends positively and negatively impact VBP revenue and other ACA Pay-for-Performance programs."

HealthViZion Research Institute is the industry's first Big Data Intelligence company to research and define scientific "pure data-driven" intelligence solutions and best practices to successfully drive bottom-line increases in revenue and earnings through Value Based Purchasing ("VBP") and other CMS Pay-for-Performance programs: Hospital-Acquired Conditions and High Readmissions programs. HealthViZion is defining the optimal workforce profile to drive high VBP and Performance Revenue.



In this first report, HealthViZion Research Institute will unveil a few of its initial discoveries for hospitals to succeed in this new era of healthcare. HealthViZion Research Institute will make clear, measureable and manageable specific high impact workforce drivers impacting VBP revenue which previously were hidden, unknown and consequently unmanageable.



MRI, Cat Scan and other soft tissue internal imaging technologies essentially made risky and expensive explorative surgery obsolete.

SonarViZion does the same for dated workforce management processes in the Era of Value Based Care Revenue.





# Introduction

HealthViZion utilizes multiple Big Data tools to discover workforce drivers which impact VBP revenue scores, Hospital-Acquired Conditions and High Readmissions programs:

- Correlation Analysis
- Regression Analysis
- Simulation
- Modeling
- Matching
- Profiling

Over 120 Workforce Drivers of hospitals are compared to all of the following VBP Revenue Scores and at times to sub scores by The HealthViZion Research Institute. This research work unveils foundational drivers for driving VBP success in each of the scoring and penalty domains as well as containing or reducing labor costs while increasing actual workforce productivity and reducing accidents:

- Overall VBP Revenue
- Quality of Outcomes
- Efficiency
- Patient Satisfaction
- Process of Care
- Readmissions and Deaths

The remainder of this report will focus on Value Based Purchasing.

Of note: The HealthViZion Advisory Board and Focus Group composed of highly successful healthcare system executives including COOs, CFOs and CNOs reported that understanding which workforce drivers did not impact VBP Revenue Scores and Scoring Domains is nearly as valuable as knowing the high impact workforce drivers. As healthcare executives, they believe it is important to know these non-impacting workforce drivers as to not have to focus time and resources.



# Data and Research Methodologies

This report is based on aggregated and anonymous data from 40 U.S. based client Hospital organizations. HealthViZion researchers used HRIS, Payroll, Time and Attendance and Recruiting data. All the years had similar descriptive statistics. Results are shown here for the "rolling" years from 2010 through 2015. To maintain consistency and accuracy, all Value Based Purchasing Data including: scores by the four sub-domains, penalties, readmissions, deaths and overall, as well as all supporting sub-scores were imported from CMS and Medicare databases all mapped to each hospitals' unique NPI identification code. Additionally, during a 3-year period, over 160 hospital workforce standard entities were created in conjunction with Healthcare systems. Standardized entities were created and mapped to: departments, service lines, critical positions, compensation levels, performance review rankings and reasons for termination. Standardized definitions and formulas were agreed upon for workforce drivers including but not limited to: transfers, turnover, promotions, age distributions and tenure distributions.

The study captured information from approximately 5 million historical employee records plus over 2 terabytes of VBP data for every hospital in the U.S. By leveraging actual data from U.S. hospitals, the research presents the healthcare industry's first discovery of the actual workforce drivers, compositions, attributes, tendencies and future directions using predictive modeling to define exactly the specific workforce profiles of the top revenue earning VBP hospitals

For purposes of this report, the HealthViZion Research Institute made minimal changes in hospital locations as well as reducing the total number of hospitals in each Healthcare system by a defined factor across the board to keep complete anonymity of client hospitals. Furthermore, actual overall and domain scores are not included in these reports so that the systems and hospitals cannot be reverse matched against actual scores for identification by any 3<sup>rd</sup> party. In addition to the existing 61 hospital clients, once an additional 140 hospitals and 20 healthcare systems become clients, HealthViZion will be able to present more regional anonymous information. HealthViZion is starting in the U.S., but will shortly include global hospitals beginning with its Australian hospitals clients.

In the individual "Value Based Purchasing Collaborative Reports" for Members, all actual VBP scores are included for all of their hospitals as well as comparative hospital benchmarks to all workforce drivers.

HealthViZion Research Institute implements the highest standards of scientific research and by its mission, always leans to conservative interpretations. HealthViZion Research Institute realizes this is literally "healthcare industry changing intelligence" and respects that position. Since only hospitals in 4 metropolitan locations were included in this first research report, the results should be considered "early indicators," and not scientific standards. When the total number of VBP Collaborative client hospitals reaches 150-200, the results will be strong enough to become foundational management guidelines.

Additionally, even though HealthViZion collects and processes VBP "Efficiency" scores, no correlations are being analyzed because only 30% of the hospitals reported Efficiency data through Q2 2015 – not enough for scientific results.



HealthViZion only uses "real data," normalized and standardized to generate the highest controlled results. HealthViZion does not use survey data because of the inherent inaccuracies and bias listed below:

- Respondents may not feel encouraged to provide accurate, honest answers
- Respondents may not feel comfortable providing answers that present themselves in an unfavorable manner.
- Respondents may not be fully aware of their reasons for any given answer because of lack of memory on the subject, or even boredom.
- Surveys with closed-ended questions may have a lower validity rate than other question types.
- Data errors due to question non-responses may exist. The number of respondents who
  choose to respond to a survey question may be different from those who chose not to
  respond, thus creating bias.
- Survey question answer options could lead to unclear data because certain answer options may be interpreted differently by respondents. For example, the answer option "somewhat agree" may represent different things to different subjects, and have its own meaning to each individual respondent. 'Yes' or 'no' answer options can also be problematic. Respondents may answer "no" if the option "only once" is not available.
- Customized surveys can run the risk of containing certain types of errors

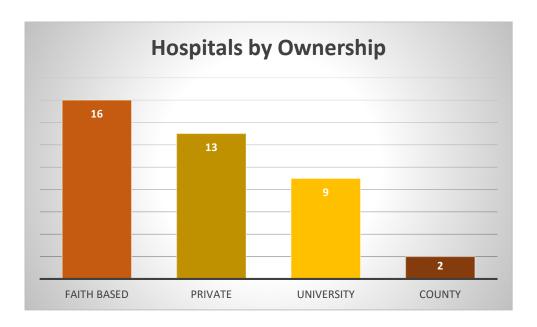
Non-Standardized partial data is also not-used by HealthViZion. For example, un-normalized, un-standardized Payroll or Time-and-Attendance data are technically not valid for the type of correlation impact analysis required to scientifically define industry standards and guidelines. The data must be:

- 1) Comprehensive including all available workforce data
- 2) Mapped to industry defined standards. This is a primary reason HealthViZion is partnered with the leader of the ANSI Healthcare Administrative Workforce Standards, University of Texas Medical Branch ("UTMB").

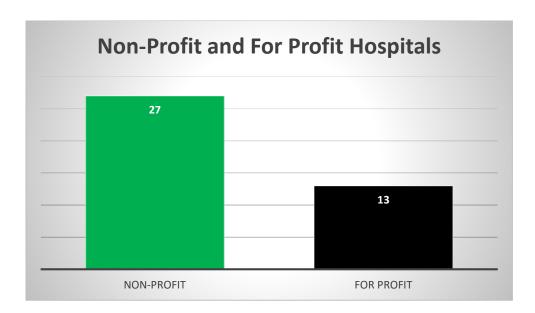


# Hospital Research Population Statistics

Types of hospitals by ownership structure

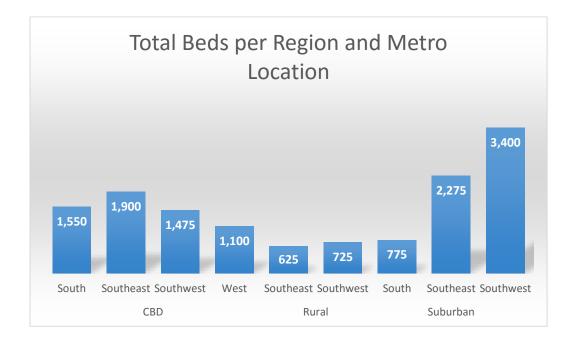


Non-Profit to Profit Hospital Breakdown

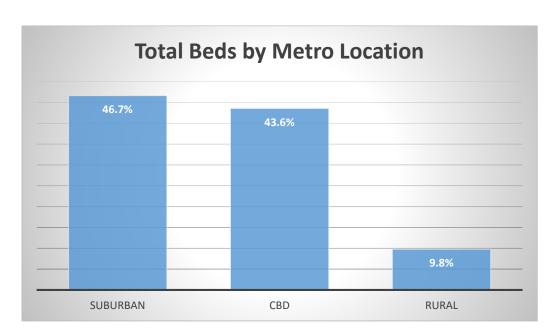




Total Beds per Region and Metro Location

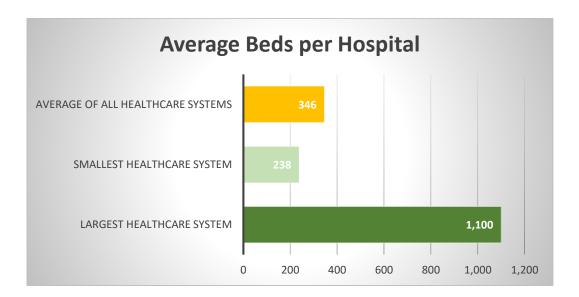


# Total Beds by Metro Location





# Average Beds per Hospital





# Findings and Results

### Overview of Lost Workforce Productivity

"Lost Workforce Productivity" is a HealthViZion proprietary metric built over the last 8 years and customized for Healthcare over the past 3 years. In early workgroup sessions related to the most significant executive workforce concerns and fears related to the new Era of Healthcare, the HealthViZion Healthcare Advisory Board and Healthcare Executive Focus Group ("Advisory Board"), singled out the hidden costs of Turnover. The Advisory Board agreed that as Healthcare executive they instinctively know turnover, especially in Direct Patient Care positions, creates losses, increases costs, reduces productivity, increases accidents due to human error and other unknown problems. The Advisory Board unanimously agreed these are "hidden" costs and problems that they could not previously understand, measure, manage or optimize.

Consequently, HealthViZion Research Institute's first research was focused on the VBP impact of Hidden, Lost Paid Workforce Productivity. The Advisory Board agreed that when hourly employees were lost from Turnover that additional Full-Time Equivalency ("FTE") employees were used to fill the void created and nearly all these FTEs and temporary labor had to be paid at "Premium" labor rates. Again, they did not have accurate or measureable data to define these increased labor costs acceptable to financial standards.

Over the past 8 years HealthViZion has focused on excess Lost Workforce Productivity days throughout the employee lifecycle, different from those currently measured and reported: Paid Time Off, Leave of Absence, Family Medical Leave and Workers Compensation.

The average hospital loses between 11%-14% for "Known" Paid Lost Workforce Productivity. HealthViZion research discovered that the "Unknown" Paid Lost Workforce Productivity accounted for an additional 8%-12% of Lost Productivity depending on Turnover levels of Direct Patient Care employees — nearly all replacements paid at premium labor rates. HealthViZion approached this Hidden Lost Workforce Productivity from an efficiency perspective and analyzed how each step could be improved resulting in reduction of Hidden Paid Lost Workforce Productivity. HealthViZion discovered that 15%-40% of this hidden Lost Workforce Productivity and the associated excess premium labor costs could be recovered through inexpensive workflows, software system automations and process improvements with little change management. The result is improving earnings/profits by 10% -200% in the 1st year.



The major difficulty herein was gathering normalized standardized data from all the required systems related to the employee lifecycle. The following is a partial list of the data HealthViZion uses to calculate hidden, paid Lost Workforce Productivity:

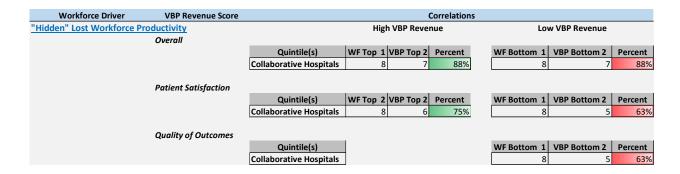
- Turnover
- Time-to-Approve replacement hire
- Time-to-build and price the job description
- Time-to-Post the job
- Time-to-Recruit
- Time-to-Start
- New-Hire Orientation Time
- Training Time
- And for RNs, the time required for "shadowing/mirroring"

# <u>Hidden Lost Workforce Productivity of Direct Patient Care Positions impact on VBP</u> Revenue

HealthViZion Research Institute analysts' uncovered high correlation usually exists at the two ends of the spectrum, high and low, with little or no correlation in the middle. In the majority of cases, more and stronger VBP correlations exist on the low end of the Workforce Driver spectrum. *In summary, Low Performing VBP hospitals have clear and common weaknesses in specific Workforce Drivers.* 

### Summary

Summary results of the data table are listed below.



Hidden Lost Workforce Productivity of Direct Patient Care Positions impact on VBP Revenue

88% of hospitals with the lowest levels of Hidden Lost Workforce Productivity are in the top 2 quintiles of VBP Revenue. 75% of the hospitals with the lowest levels of Hidden Lost Workforce Productivity are in the top 2 quintiles of Patient Satisfaction scores.



63%-88% of hospitals with the highest levels of Hidden Lost Workforce Productivity are in the bottom 2 quintiles of VBP Revenue, Patient Satisfaction and Quality of Outcomes.

### Registered Nurses: Focus of Remaining Report Research

The three research projects below focus of Registered Nurses ("RNs"). HealthViZion Research Institute analyzes over 100 specific hospital position groups filtered into 5 Primary Position Groups:

- Registered Nurses
- Direct Patient Care
- Revenue Recovery
- Administrative
- Management

To this point, it appears that RNs have the highest impact on VBP Revenue and scores.

This may change as HealthViZion will incorporate 2015 Physician VBP scores after release in 2016. However, this is a complete unknown. The data show that some Healthcare systems are hiring more on-staff physicians; but, to this point in time, the numbers of on-staff physicians are so low that no scientific correlations can be yielded.

### Predicted 1-Year Turnover of Registered Nurses impact on VBP Revenue

HealthViZion Research Institute analysts started this research project using historical turnover: 1-Year, 3-Years and 5-Years. It was clear that 1-Year historical turnover of RNs produced the most accurate correlations. However, the analysts observed a number of what appeared to be false anomalies. The analysts then used "Predicted 1-Year Turnover of RNs" to assess potential accuracy. The correlations were much higher.

The research team brainstormed the results and realized that Historical Turnover by its nature, even 1-Year, can cover trends. For example, overall Turnover of RNs could be high for the year, but low over the past 3-4 months. HealthViZion's SonarViZion predictive technology utilizes 8 data points and weighting to discover these trends. Resultantly, Predicted 1-Year Turnover is noticeably higher in correlation scores and accuracy.

The results are quite controversial. The HealthViZion Advisory Board was unanimous in their belief that the lower the Turnover of RNs the better for all results. That was accepted as a norm in the old era of Volume based revenue. The initial research for VBP correlations in the new era of performance, value and outcome revenue tells a different story.

Of the Hospitals with Predicted 1-Year Turnover of RNs below 6%, the VBP revenue was low with over 80% being in the bottom 2 quintiles of VBP Revenue. Also, none of the other VBP scores were high. On the reverse side, Hospitals with high Predicted 1-Year Turnover of RNs in the lower 2 quintiles with Predicted Turnover of 22% or more score poorly in Overall VBP Revenue, Process of Care scores and Patient Satisfaction scores. The surprising result is that the hospitals in the 3rd, "middle," quintile of Predicted 1-Year Turnover of RNs score the highest in Overall VBP Revenue and Process of Care scores.



The HealthViZion Advisory Board discussed these results at length resulting in numerous opinions:

- The sampling size of 40 hospitals is simply too low for accurate results
- Additional data is needed to analyze the details of the RN Turnover including: experience levels, tenure levels, pay levels and Paid Time Off levels
- As HealthViZion has discovered in other industries when analyzing the business impact of Critical Position Turnover, some organizations grow stale and less efficient when extremely low turnover reduces the amount of fresh talent, fresh ideas and higher energy levels

No consensus was reached except that the data is inconclusive and additional data is required from more hospitals. This will be a key area of The HealthViZion Research Institute going forward.

Workforce Driver	VBP Revenue Score	Correlations									
Predicted 1-Year Turnover: Registered Nurses	Overall	High VBP Revenue				Low VBP Revenue					
		Quintile(s) Collaborative Hospitals	<b>WF 3</b> 7	<b>VBP 1</b> 5	Percent 71%	WF Bottom 2 VBP Bottom 3 Percent 8 7 88%					
	Process of Care	Quintile(s)	WF 3	VBP Top 2		WF Bottom 1 VBP Bottom 3 Percent					
	Patient Satisfaction	Collaborative Hospitals	8	6	75%	6 5 83%					
	·					WF Bottom 1 VBP Bottom 3 Percent 8 5 63%					

# Aging Demographics of Healthcare Workforce and the impact on the New Era of Performance, Value and Quality based revenue

Any conversation about Age in the U.S. workforce can be a risky conversation with the underlying legal caseload around discrimination. This perceived risk and the accompanying litigation fear must be overcome to address the issue of the aging workforce in healthcare.

HealthViZion is a company built upon scientific discovery and solutions from real data. When properly analyzed, data provide intelligence to make optimal business decisions. HealthViZion's core mission is to help provide higher quality healthcare at lower costs so that all our fellow citizens can receive quality care without bankrupting the future of our children.

To that end, we at HealthViZion have decided it is essential for us to address this topic. There may be risk herein for HealthViZion, but every one of our provider clients is facing a new domain of risk as their old "volume" based business model was completely changed by legislation to "performance, efficiency, value and quality."

We at HealthViZion uniquely know the data about the U.S. healthcare workforce. The healthcare workforce reflects the general population of this unprecedented aging mass into or reaching retirement and greatly decreasing the amount of hours in the healthcare workforce. However resulting from mass workforce supply problems, utilization of this aging healthcare workforce is not an option. It is imperative and an intrinsic piece of the healthcare workforce solution. For the new healthcare Performance business model to succeed, there can be no discrimination of the aging portion of the healthcare workforce. The only conversation herein is "optimization," "productivity," "longevity" and "knowledge transfer."

Because of the imperative nature, HealthViZion Research Institute has made this one its core areas of research. And initial research over the past 6 months appears to indicate that the aging workforce in healthcare actually drives better Vale Based Purchasing and Readmission Program scores.



# Average Age of Registered Nurses ("RNs") impact on VBP Revenue

### Summary

Summary results of the data are listed below. From an initial analysis perspective, HealthViZion assigned "Higher" age as positive workforce driver.

Workforce Driver	VBP Revenue Score	Correlations									
Average Age Registered Nurses			High VBP Reve	nue	Low VBP Revenue						
	Overall										
		Quintile(s)	WF Top 2 VBP Top 2	Percent	WF Bottom 2	VBP Bottom 2	Percent				
		<b>Collaborative Hospitals</b>	10 7	70%	10	10	100%				
	Patient Satisfaction										
		Quintile(s)	WF Top 1 VBP Top 2	Percent	WF Bottom 2	VBP Bottom 3	Percent				
		<b>Collaborative Hospitals</b>	5 4	80%	11	11	100%				
	Process of Care		_								
		Quintile(s)			WF Bottom 3	VBP Bottom 2	Percent				
		<b>Collaborative Hospitals</b>			7	6	86%				

### Average Age of Registered Nurses ("RNs") impact on VBP Revenue

70% of hospitals with the highest average age of RNs, 47 – 49 years old, are in the top 2 quintiles of VBP Revenue. When reviewed with the RN Tenure Turnover data below, it shows that the combination of highly experienced RNs along with low-turnover of New High RN's (2 Years or less of Tenure) generate high Patient Satisfaction scores.

The key insight from this analysis is that less experienced RN staffs are correlated with 86% - 100% low VBP Revenue and Scores including: Overall VBP Revenue, Patient Satisfaction and Process of Care.

This one Workforce Driver unveils one piece of the Optimal VBP Workforce. To effectively discover not only correlation but also causal effect, other workforce drivers must be co-analyzed, in particular both Tenure and Turnover must be added to age.

Consequently, HealthViZion Research Institute added "RN Turnover by Tenure" analysis below to add dimension.

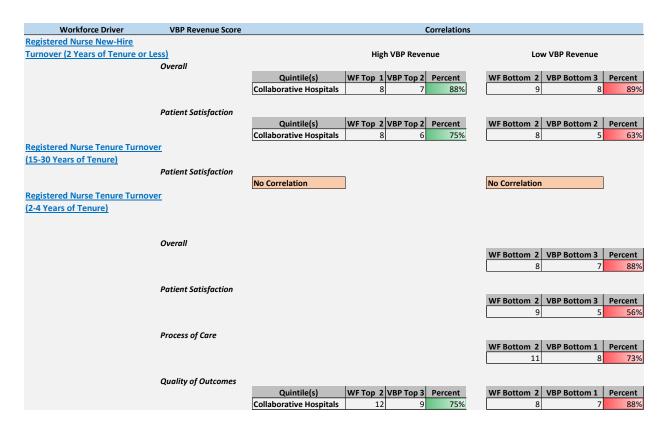
### RN Turnover by Tenure Distribution Groups

As discovered so far, in the majority of cases, more and stronger VBP correlations exist on the low end of the Workforce Driver spectrum. In summary, Low Performing VBP hospitals have clear and common weaknesses in Workforce Drivers. This is once again true in RN Turnover by Tenure Distribution Group.



### Summary

Summary results of the data table are listed below. From an initial analysis perspective, HealthViZion assigned "Higher" Years of Tenure as a positive workforce driver and "Low" Turnover is also considered a positive workforce driver.



### New-Hire RN Turnover (2 Years or less of Tenure)

Unexpected to the HealthViZion healthcare advisory board and healthcare executive focus group, New-Hire Turnover impacted both Overall VBP Revenue and Patient Satisfaction scores. In review, the advisors believe the high impact on Patient Satisfaction scores is likely a reflection of the excitement of New-Hires.

### RN Tenure Turnover: 15 -30 Years of Tenure

For comparison, HealthViZion Research Institute analyzed the impact of RN Turnover with high levels of tenure to Patient Satisfaction VBP scores. No correlation is evident.

#### RN Tenure Turnover: 2 - 4 Years of Tenure

Of the 10 Tenure Distribution Groups by Years, the one group where Turnover has the highest impact on VBP Revenue and scores is in the "RN Tenure Turnover: 2-4 Years." The only area where Low Turnover of this Tenure Distribution group is positive is in Quality of Outcomes. Whereas, High Turnover of this Tenure Distribution group negatively impacts 4 of the VBP Scores including: Overall VBP Revenue, Patient Satisfaction, Process of Care and Quality of Outcomes.



# Conclusion

There is little question that the workforce is the top driver of Value Based Purchasing revenue. It is scientifically evident that key workforce drivers dramatically impact Value Based Purchasing revenue. In no way is the workforce the sole driver; however with accurate and robust intelligence, it is the entity which can be most quickly adjusted to increase revenue in the New ACA Era of Performance, Value and Quality revenue and lay the foundation for other successful VBP and performance revenue improvements.

Workforce drivers which were successful in the old volume based revenue model are not all successful in this new performance era. In fact, numerous workforce drivers, attributes, compositions, distributions and trends from the old Volume era are either ineffective or harmful to VBP and Performance revenue.

Improvement in the high-impact workforce drivers not only increases Value Based Purchasing revenue, but also improves the VPB scoring domains: Quality of Outcomes, Patient Satisfaction, Efficiency, Process of Care and Readmissions – all essential to attracting and retaining customers in the now competitive landscape for patient revenue.

Improving the workforce drivers which drive higher VBP revenue and scores will also lead to improving: net adjusted revenue recovery, labor costs reductions, workforce productivity, and bottom-line profitability paramount to non-profit hospitals currently running at low profit margins.





# About HealthViZion Research Institute and HealthViZion

### HealthViZion Research Institute

HealthViZion Research Institute is the industry's first Big Data company to research and define, scientific "pure data-driven" intelligence, solutions and best practices to successfully drive bottom-line increases in revenue and earnings through Value Based Purchasing ("VBP").

HealthViZion has built the largest Big Data repository of "standardized" and normalized U.S. hospital Value Based Purchasing scores, all VBP scoring domains, all sub scores by departments and DRGs as well as comprehensive workforce data. With its proprietary strategic workforce business impact and management platform, SonarViZion4 (SVE4), HealthViZion Research Institute uniquely and scientifically discovers the first specific workforce drivers, all measureable and manageable, which the top VBP reimbursement hospitals have in common.

This is the first report by HealthViZion Research Institute publishing break-through discoveries for the new era of performance, value and quality healthcare.

Why did HealthViZion start with the workforce? The workforce accounts for over 60% of all hospital budgets expenses and has the most direct impact on VBP scores.



### HealthViZion

HealthViZion is the only company purely focused on scientifically uncovering with real Standardized and Normalized data the specific workforce drivers which result in highest VBP revenue. HealthViZion offers an array of solutions to accomplish this goal: Collaboratives; Rapid High ROI solutions to decrease labor cost without reducing headcount; Increase Revenue Recovery; Increase workforce productivity without increasing labor costs; Reduce accidents and readmissions; Workforce VBP Management and Optimization solutions for COOs, CNOs and CFOs; and along with research partners, deliver the industry defining standards for this new era of healthcare.