Chapter 3
Measurements and Analysis in Transforming Healthcare Delivery: Terminology and Applications—Physician Performance

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Introduction

Performance is defined as the execution of a plan. For physicians, that plan is to keep or make patients healthy. How well physicians do this is described as "physician performance."

It is important to appreciate this fundamental definition of physician performance because it has—up until recently—been poorly understood. Internal data held by hospitals have not been shared publicly. Therefore in the past, performance measures were delineated with a 1–5-star consumer review, much the way a restaurant is reviewed. But this rating system is subjective and seriously flawed. It can include everything from the availability of parking to the attitude of the office staff. It does not offer a meaningful view of a physician's actual performance and it limits a patient's ability to evaluate their physician choices.

Government agencies are now requiring a more complete picture of physician performance, and consumers are seeking a more empowering tool for choosing their doctors. These demands are giving rise to physician performance transparency, an effective and useful means to evaluate the quality of a physician's work.

New technology is available to factually represent the historical performance of physicians—their experience, outcomes, and efficiency. The intelligent analysis of big data is, for the first time, giving consumers and health systems valuable new tools in rating and selecting healthcare providers.

Impartial, data-driven performance evaluations were once exclusively reserved for hospitals and health systems. From Leapfrog to the Joint Commission, organizations and mechanisms abound to determine the quality and effectiveness of a hospital. But within every medical center are physicians charged with delivering quality care.

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It is the physician who must make the right call in an emergency, the surgeon who must master their skills and the oncologist who must make the correct diagnosis in order for care to be deemed "good."

Data surrounding physician performance are finally reflecting that reality. It is aligning the industry understanding of quality with the way patients have always understood it: at the individual physician level.

Rather than solely focusing on institutional outcomes, consumers—along with the Centers for Medicare & Medicaid Services—are turning the spotlight on physician outcomes, and on comparing the fundamental differences between the expertise and experience of physicians who perform the same types of procedures.

At the end of 2015, CMS published its Quality Measure Development Plan, a framework to develop clinician quality measurements, which it touted as exemplifying the shift in Medicare payments "from volume to value" [1].

CMS plans to use these data to support a Merit-Based Incentive Payment System (MIPS), which will calculate Medicare payment adjustments on a composite performance score across four categories, including the quality of care. How well a doctor does his or her job seems like an obvious category to include in an incentive program, but until the advent of electronic medical records, quantifying quality was impossible. Now, it is a matter of ones and zeroes.

The result of all these performance data will be a better-informed consumer population that can make fact-based decisions about their healthcare. It will lead to lowered error rates, fewer readmissions, and lower healthcare costs. And it will likely inject a healthy dose of competition between providers, one that elevates the performance of all physicians.

The source of physician performance data is at once elegant and enormous. Billions of rows of claims data generated commercially are now available for anyone to see. Of course, sifting through dizzying amounts of data is not exactly easy and models for creating meaningful analysis of performance have come under scrutiny. Government models, in particular, are criticized for inaccuracies and misleading information. But other models exist that generate verifiable data reflective of the true level of physician performance quality.

Data scientists have developed industry-vetted algorithms that provide intelligent, *risk-adjusted* ratings of physician performance. These ratings are based on experience, outcomes, comorbidities, risk factors, caseloads, and a myriad of other factors. Complications, readmissions, length of stay, and patient experiences are also taken into account to provide a comprehensive view into the performance of nearly every physician in the country—giving patients and health systems the details they need to make informed decisions about healthcare providers.

Even before the Affordable Care Act, the healthcare industry has been interested in unlocking this information. Patients can learn nearly everything about the diseases that ail them, but nearly nothing about the physicians who treat them. Health systems are at the mercy of providers who either follow the standard of care or who do not. A surgeon's website can list awards, affiliations, and years out of medical school, but there is nothing in their CV that indicates whether they have great outcomes or not. Physician performance provides those critical details—the information that separates reputation from fact, and can mean the difference between life and death.

That is why understanding physician performance represents one of the most significant changes in healthcare—and one of the most important aspects of the healthcare overhaul.

What Is the Need for Performance Information?

To encourage performance transparency, we must first gather performance information. Government agencies have been working for years to collect as much data as possible, and commercial ventures, journalists, and advocacy groups have been clamoring for all the information they can gather.

The momentum toward collecting and publicizing performance information will only grow more powerful, as it should. Performance transparency improves outcomes, lowers costs, and enables consumers to make informed decisions [2]. Health systems that stay ahead of this movement will help decide the direction of this trend—and will benefit enormously from the improvements it yields.

For several years, the healthcare industry has been moving away from the fee-for-service model and toward accountable care and value-based pricing. In fact, the American Hospital Association reports that the majority of patients will be part of a risk-based contract, including initiatives such as bundled payments, by 2020 [3]. This will drive narrow networks to align with the highest-quality providers. And it places a greater emphasis on care that is thoughtful, efficient, and cost-effective.

Finding appropriate, high-value care will prove increasingly important. In its case study about the effectiveness of the transition to Accountable Care Organizations, the AHA reported, "Case study leaders unanimously agree that access to all clinical and claims data across the care continuum for their patient population was critical to success" [4].

In other words, without access to intelligent analysis of performance information, health systems cannot move their organizations toward higher quality and lower costs.

Physicians also benefit enormously from the analysis of performance information. The culture of medicine has historically put the physician in charge. They, after all, are the persons who have to lean on their substantial education and experience to make judgment calls about a patient's health. But not all doctors are created equal.

Evidence-based medicine is constantly changing the status quo, rendering obsolete the practices and procedures a physician learned in medical school or during residency. Those physicians who keep up with the evolving standard of care are more likely to benefit from innovation than those providers who are reticent to alter their clinical behaviors.

But change for the sake of change helps no one. Just as physicians need hard data proving the effectiveness of a drug or a procedure before trying it on patients, so will they require substantial data science to convince them of the benefits of performance transparency. Sound data proving transparency's role in reducing adverse outcomes are incredibly compelling and hard to refute.

It will also be critical that performance information solely be used to improve the standard of care—not to embarrass or punish individual doctors. It should be presented as practice-based aggregated data, and not a contest to judge doctors based on whether they are "good" or "bad."

Researchers at Johns Hopkins in 2015 found that by taking this fact-based, quality-improvement approach, hospitals were able to use real-time feedback and financial incentives to reach higher safety and quality levels in the prevention of venous thromboembolism (VTE) [5].

Physicians took the granular information about their own prevention protocol compliance and risk assessment techniques to identify what they were doing well—and what they needed to improve. The results were fewer cases of VTE developing during hospital stays, and far more compliance with existing protocols. In fact, the percentage of incidents of doctors failing to prescribe proper prevention of VTE dropped from 6.1 to 3.2 % with performance feedback.

While improved care and patient safety are paramount, the catalyst for all these data gathering is the government agencies charged with driving down healthcare costs.

The number most often quoted for representing the annual cost of medical errors is $17.1 billion [6]. In 2008, Medicare released a list of "never events," serious, costly errors in inpatient care that should never happen [7]. These included foreign objects left in the body after surgery, falls and traumas while at a hospital, catheter-associated urinary tract infections; mediastinitis, or inflammation in the area between the lungs, after coronary artery bypass grafting; and pressure ulcers. That same year CMS stopped paying the excess cost for inpatient stays complicated by "never events," but that did not stop the errors from occurring [8]. A 2013 study estimated that more than 4000 surgical "never events" still occur yearly in the United States [8].

Of course the biggest stakeholder in performance transparency is the patient. As consumers of healthcare shoulder more of the cost, patients are becoming savvier and more discerning about the price and quality of their care. They are questioning physicians with greater frequency and "shopping around" more for high-quality physicians who will deliver good outcomes with lower costs and less recovery time.

In 2013 alone, 16.4 % of healthcare spending per individual covered by employer-sponsored insurance was paid out of pocket. *Patients are spending more out-of-pocket on doctor's visits and specialists than ever before* [9]. They also have the most to lose. Every year as many as 440,000 people die in hospitals from preventable errors and poor judgment calls [10]. With the advent of better information gathering, needless deaths and injuries are starting to decline.

In fact, the Agency for Healthcare Research and Quality reported that about 2.1 million fewer patients were harmed in hospitals from infections, adverse drug events and other conditions between 2010 and 2014. The progress on hospital-acquired conditions alone resulted in 87,000 fewer deaths, improvements that the AHRQ largely attributed to a focus on performance information (Fig. 3.1).

Reliance on performance information has resulted in a reduction of some of the most dangerous—and expensive—hospital-acquired conditions.

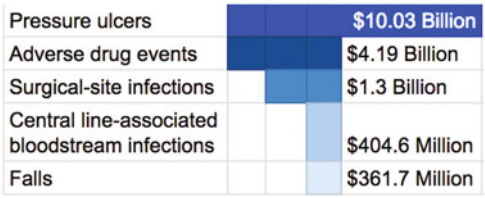

Fig. 3.1 Top five gains on hospital-acquired conditions by costs averted, 2011–2014

Helping patients find the most appropriate physician for them has another, unintended consequence: It improves the patient experience. Instead of wasting time with providers who lack the requisite training, do not have the proper expertise or are just not the right "fit" for a particular patient, patients who are immediately directed to the "best" doctor for them report far better outcomes and report a more satisfying experience.

The New Language of Quality Measurements

We have defined performance, but how do we measure it? As we previously saw, a scientific analysis of performance can help transform the healthcare industry. But because medicine is as much an art as it is a science, physician performance is vulnerable to subjective metrics.

It is imperative, therefore, to understand the existing and emerging quality measurements, their uses, and their limitations.

Quality

What are we talking about when we talk about quality? According to the Institute of Medicine's landmark 1990 report [11], quality is defined as "the degree to which healthcare services for individuals and populations increase the likelihood of desired health outcomes and are consistent with current professional knowledge."

In the 25 years since that report was released, "quality" has also come to mean outcomes, efficiency, value, and preventative health. The role of the physician is changing from treating illness to helping patients avoid getting sick in the first place. In a perspective published in the New England Journal of Medicine, *value* is seen as essentially synonymous with *quality*:

"Achieving high value for patients must become the overarching goal of healthcare delivery, with value defined as the health outcomes achieved per dollar spent. This goal is what matters for patients and unites the interests of all actors in the system," writes Michael E. Porter, Ph.D., a Harvard University economist. "There is no substitute for measuring actual outcomes, whose principal purpose is not comparing providers but enabling innovations in care" [12].

Even when "quality" is quantified with data, it can still be subject to bias or misinterpretation. When CMS released its updated Physician Compare data in December 2015 [13], for instance, the American Medical Association criticized it as incomplete and inaccurate because it only accounts for data submitted voluntarily by doctors [13].

For quality measures to truthfully reflect quality of performance, data must be risk-adjusted, standardized, and industry-vetted. It must also take into account experience and patient outcomes, including ancillary procedures and readmission rates.

Transparency

In the early days of reporting, transparency meant raw data. But that is not what consumers need. They need context and comparisons. *Does my doctor have a high mortality rate*? *Does my doctor have the latest technological advances to treat me in the most effective way possible*? That information then needs to be weighed against similar providers.

Many doctors bristle at the suggestion of comparisons or "grades," but they are unavoidable. Consumer sites as varied as Healthgrades and Yelp provide subjective physician reviews or ratings, based on consumer feedback. These reviews aggregate various aspects of the patient experience, including the pleasantness of the office staff and the number of parking spaces at the doctor's office, giving potential patients information that may or may not be relevant regarding the actual quality of care.

True performance transparency actually helps to counter both the complexity of raw data and the often questionable subjective online reviews. By mining the key information that actually pertains to patient care, physician performance transparency paints a complete picture of a provider's experience, quality, and cost.

(We mention cost because—while most people do not pick a doctor because he or she is the cheapest—cost is a measure that resonates with patients. When combined with expertise, experience, and outcomes, it proves to be an illuminating aspect of performance.)

Currently, outcomes and clinical data information are available from both commercial and CMS sources, but many hospitals are also starting to present their own in-house data for analysis to help improve performance and identify potential cost savings (more on that later). This growth in transparency enhances the sophistication and accuracy of the data, which in turn, leads to more "buy-in" from physicians for increasing transparency.

Patient-Reported Outcomes

While seemingly subjective, patient-reported outcomes help answer the simple question: "Did this doctor make you better?" This is a key quality measurement, and one that often matters most to patients.

Everyone wants to know about the end result. Did the back pain go away? Is the cancer in remission? CMS considers this measure so important, it is requiring long-term care hospitals to survey patients about their outcomes.

If patient satisfaction seems like more of a marketing ploy than an actionable measurement, consider this: An Italian study recently found that breast cancer patients who were given a 10-item questionnaire reported more treatment side effects than their physicians recognized during follow-up examinations—a discrepancy that speaks to the heart of why patient perspectives are so vital [14].

Patient Reported Outcomes (PRO) can help drive institutional changes that directly affect care. For instance, studies have found that patients who are engaged in their care tend to choose less costly but highly effective interventions, such as physical therapy for low back pain.

PROs can even help predict whether patients will be compliant with physician orders. The American Journal of Managed Care reported that at an American College of Cardiology meeting in March 2015 [15], researchers presented promising findings for the drug ticagrelor, used to treat acute coronary syndrome. The researchers noted that the drug reduced the likelihood of heart attacks but might produce "minor bleeding." The scientist dismissed the side effect as inconsequential [15]. But by November, at an American Heart Association meeting, a follow-up presentation found that one-third of the patients in the ticagrelor study stopped taking the drug, despite the fact that it worked [15].

According to AJMC: "Researchers suspect too many found the daily nosebleed insufferable. 'Often in trials we categorize events as non-serious, but they have importance for patients,' said Marc Bonaca, MD, of Brigham and Women's Hospital" [15].

When gathering PROs, it is important to keep innovation—not penalization—in the forefront as the goal. By focusing performance measurement on PROs that are directly related to end results—discomfort, ancillary procedures, quality of life—patient-reported outcomes will help provide an unbiased view of a subjective, but critical, component of physician performance.

After all, patients have the final word on whether an intervention "worked" or did not. Capturing patient perspectives on their own outcomes can help health systems accurately appraise the quality and efficiency of the care patients receive.

Best Practices

Best practices are those policies and procedures that get the right care to the right patient at the right time. By having health systems and physicians identify and implement best practices, government agencies are trying to reduce infections, errors, and preventable bad outcomes. And by following those best practices, the healthcare industry is seeking to standardize quality.

No two patients are exactly alike, so it stands to reason that no two treatment plans will be identical either. However there are gold standards by which it is safe to make blanket judgments: Do physicians wash their hands? Use checklists? Properly scrub

down patients before surgery? By paying attention to fundamental best practices, consumers are learning where to go and whom to trust with their care.

"Best" also means "evidenced-based." As medical technology evolves and knowledge advances, it can become difficult to keep track of exactly how well a provider keeps current with the latest evidenced-based medicine. This is where comparisons are particularly helpful: A provider's outcomes relative to her peers can help reveal how up-to-date she is with current advances.

Some of these advances are not even that advanced. In a study published in the *New England Journal of Medicine*, the implementation of a simple 19-item checklists resulted in fewer complications and a 40 % drop in death rates at eight medical centers worldwide [16].

Public Versus Private Transparency

These days, the public expects quality transparency; payers are demanding it and everyone from private industries to news organizations are clamoring to set up systems to provide it. If the healthcare industry does not lead this new era, a potentially less competent third party will.

The question is not what information will be made public, but who will control that information. It is therefore important to understand the distinction—and distinct uses—of public versus private transparency.

Public physician performance transparency gives patients aggregated data that empowers them to make informed choices about their providers. Private transparency digs much deeper, giving providers the technical, granular details that can help them to evolve and improve their own performance.

Public transparency is happening all around us, from word-of-mouth recommendations by friends to online reviews to news stories about physician performance in mainstream media. Unfortunately, much of this public transparency is inaccurate, incomplete, and misleading.

In 2015 for instance, investigative journalism site ProPublica published the "Surgeon Scorecard," which used Medicare data to calculate "Adjusted Complication Rates" for surgeons performing eight in-hospital surgical procedures. These included unblinded, surgeon-level performance [17].

The scorecard found complication rates varied wildly among different providers, a finding that would give any patient pause.

The Rand Corporation ran a critique of the public transparency report, calling into question the journalists' methodology and the report's validity. In particular, the Rand Corporation highlighted the journalists' failure to properly adjust for patient risk factors and variations in hospitals' resources [18].

While many physicians and medical experts applauded ProPublica's efforts to provide patients with a physician quality transparency tool, several were quite critical of the site's methodology, including Dr. Peter Pronovost, senior vice president

for patient safety and quality and director of the Armstrong Institute for Patient Safety and Quality at Johns Hopkins Medicine, who noted:

> The ProPublica measure is not valid. Though the methodology does account for some of the potential biases that might unjustly influence findings, it fails to account for another significant bias. For the ProPublica method to be a valid measure of surgical quality, all patients facing a potential readmission should have the same probability of being readmitted. Only then could readmission rates serve as a surrogate for complication rates and thus surgeon quality [19].

The journalism site retorted that its scorecard "intentionally focused on simpler elective procedures with very low complication rates and patients that were generally healthy" [20]. But clearly the questions raised underscore that there is sometimes a fine line between data that are useful to consumers and helpful to physicians and data that are harmful and irresponsible.

"A valid performance report can drive quality improvement and usefully inform patients' choices of providers. However, performance reports with poor validity and reliability are potentially damaging to all involved," the Rand Corporation wrote [18].

For public data to be truly useful, it must be comprehensive and industry-vetted. That is vetted, not censored. Collaborating with stakeholders ensures a more robust methodology that accurately reflects the reality of healthcare today.

Only slightly less controversial is private transparency. Also known as "performance feedback reports," health plans and medical groups use performance transparency internally to improve quality of care.

While little research has been done on the effectiveness of private transparency, the work that has been done has found that confidential reporting enables clinicians to assess their performance relative to peers, benchmarks, and evidence-based practice guidelines. The goal is to motivate providers to improve their performance relative to their own past efforts and to their peers—thus elevating the standard of care for all [21].

In order to be most effective, private reports should also provide doctors with access to improvement tools and resources, according to the Agency for Healthcare Research and Quality, which has studied private transparency [22].

Both public transparency and private transparency have the potential to guide innovation and improve the entire healthcare industry by revealing healthcare's needless errors, costs, and deaths. With the health system ailing, it is important to remember the old adage: Sunlight is the best disinfectant. With finely calibrated algorithms, data scientists are working to create public and private transparency tools that will result in a safer, better healthcare system.

How Performance Transparency Improves Quality of Care

U.S. healthcare spending is out of control. In 2010 healthcare spending represented 17.7 % of GDP, compared to the OECD average of 9.5 % [23, 24]. Medical costs are a significant driver of personal bankruptcies [25].

Yet, according to a 2015 Yale University study [26], the United States is not getting what it pays for in terms of healthcare quality. In a study of 19 developed nations, the United States has the highest rate of deaths from conditions that could have been prevented or treated. U.S. patients receive only about half of the care recommended for their condition, and nearly 30 % of the care delivered each year is for services that may not improve their health. The Yale study notes:

> Despite significant consequences of uninformed consumption of healthcare, evidence suggests that healthcare consumers do not spend much time determining the price and the quality of their healthcare options. But for the most part it is not because they do not want to—it is because they cannot [26].
>
> In a Kaiser Family Foundation phone survey of 1517 respondents, 64 % stated that it is difficult to find information comparing the cost of different treatments and procedures offered by different doctors and hospitals [27].

Researchers argue (quite effectively) that by shedding light on what it is, exactly, that consumers are paying for, treatments will become more relevant, effective and affordable [28].

In particular, study after study has shown that quality transparency motivates health providers to change their internal policies, while enabling consumers to make informed decisions about which providers to select. And quality transparency can also have a positive effect on a health system's bottom line; hospitals that go up in their ranking by the U.S. News and World Report see an increase in non-emergency patient volume and revenue—thanks to the perception that those are "quality" institutions [29–31].

As it has in industries as varied as automotive and food manufacturing, performance transparency in healthcare elevates the entire system—lowering costs, improving quality, and creating the kind of healthy "competition" between doctors that drives innovation and excellence.

Where healthcare can improve:

- An estimated 440,000 a year die from preventable errors made during hospital stays, including treatments that should have been given but were not [32].
- As many as 11,000 deaths could have been prevented between 2010 and 2012 if patients who went to the lowest-volume hospitals had gone to the highest-volume instead [33].
- Wound infection is the leading cause of hospital readmission, affecting about 167,000 patients a year [34].

These are simple examples of areas where performance transparency can help to make quality metrics visible to consumers, help to create competition between physicians to provide better care, and help to improve overall quality.

That competition will benefit patients by matching them to the providers who are most appropriate for them. Using experience as the foundation for quality, data scientists are working to create physician performance quality scores that weigh number of cases performed, as well as the variety and severity of those cases, to offer recommendations to meet particular patients' needs.

As it is now, patients generally do not know what they are "buying" when they walk into a doctor's office or a hospital. Unless a knee replacement patient drills doctors about their experience, he would not know if they have performed 1000 knee replacements or five.

Physician performance transparency empowers patients to choose providers who are best suited to their needs, have the most experience with a particular procedure and are most likely to lead to a positive outcome and lower medical costs.

What Does It Take to Make Physician Performance Transparency a Reality?

We have now seen that physician performance transparency is a key factor in lowering the cost and increasing the quality of healthcare in the United States. But making such transparency a reality will take a confluence of great forces—patients, policymakers, and economic models all dedicated to driving progress forward.

Consumer Demand

Patients are often puzzled by healthcare. Open enrollment periods in particular are marked by confusion and misinformation. Patients are asked to choose primary care physicians without being given enough information to make a decision that "fits" them and their families. Overwhelmed by options and underwhelmed by meaningful information, patients often base their choices on little more than a surname and a photograph.

If consumers are given access to user-friendly, factual methods for choosing quality providers, they will take advantage of them. Research out of Yale found that when information is presented in a clear, concise format, a preponderance of patients make the high-quality healthcare choice [26]. Unfortunately, that is not currently how information is presented—if it is presented at all.

Here hospitals and health systems have an opportunity to do more than list their awards on their websites. They can drill deep and offer patients the real information they want to know: Which orthopedic surgeon should I go to for my hip replacement? Which one of your neurosurgeons has the most expertise with pituitary tumors? Presented clearly and concisely, healthcare information can help consumers make better choices.

The information that is available is often not useful enough to help consumers make informed decisions. In 2015, the Kaiser Family Foundation found that 31 % of consumers report seeing information comparing doctors, hospital, and health insurance plans in the past 12 months, but only 1 in 5 recall seeing any information that offers comparisons based on quality [35].

Consumer advocacy groups and consumer-industry coalitions are agitating for exactly this level of granular data, including the Clear Choices Campaign, a consumer-industry group that includes AARP, several health insurance providers, the National Council for Behavioral Health, and others.

According to the Clear Choices Campaign: "More and better healthcare choices mean nothing if consumers don't have the tools to make informed decisions" [36].

Government Support

In 2006, President Bush signed an Executive Order to increase the transparency of the healthcare system in the United States [27]. The Executive Order directed federal agencies that administered or sponsored federal health insurance programs to increase transparency in both pricing and quality, encourage adoption of health information technology standards, and provide options that promote quality and efficiency in healthcare. A press release announcing the order explained:

> To spend their healthcare dollars wisely, Americans need to know their options in advance, know the quality of doctors and hospitals in their area, and know what procedures will cost. When Americans buy new cars, they have access to consumer research on safety, reliability, price, and performance—and they should be able to expect the same when they purchase healthcare [27].

In the intervening years, progress in physician performance transparency has been halting and inconsistent. Patients still do not have the same access to safety information for their doctors that they do for their new cars.

Government support is helping to move transparency in the right direction. Healthcare.gov and state-based health insurance exchange websites are beefing up the amount and type of information they provide consumers. And the CMS Physician Compare site now lists physician performance data for those physicians who elected to provide it.

But these are baby-steps. While the CMS reported that it had paid more than $380 million in incentive payments through its physician-quality reporting system and electronic-prescribing programs, more than 400,000 providers shrugged off the extra money—and some even accepted penalties, figuring incentives were not worth the trouble of participating [27]. As of the end of 2015, only 6 in 10 providers participated in the program [38]. Clearly much more needs to be done to incentivize and require performance transparency.

Business Models

The economics of quality care is clear. Health systems benefit from lower readmission rates, fewer ancillary procedures, and a decrease in the severity of cases as patients receive better, more appropriate preventative care.

As provider organizations begin to offer risk-based services, such as health plans, bundled payments, and ACOs, the goals between the patient, provider, and payer are becoming more aligned. This will cause quality to go up and costs to go down—but only in a world of physician performance transparency.

Physician leaders recognize that in order to make smarter business decisions, they need better information about the quality of their peers. According to a survey of providers by the American Association for Physician Leadership and the Navigant Center for Healthcare Research and Policy Analysis, 78 % of physicians described knowledge in evaluating risks associated with acquisitions or new businesses as "important or very important" [39]. In order to evaluate risks, they need data.

Finding high-quality, low-risk providers will be as important to a system's financial health as it is to the health of the patients in its care. Precise algorithms that gauge patient–doctor interactions, expertise, and other elements vital to positive healthcare outcomes, will help health systems align with "good" doctors who offer "good" care.

Conclusion

We have seen countless times in medicine that the right tools can lead to seemingly miraculous changes. Laparoscopic technology led to minimally invasive heart surgery. Our understanding of genomics is resulting in targeted cancer therapies. Just as these advances transform the capabilities of medicine, so, too, can the healthcare industry use scientifically derived advances to transform healthcare delivery.

Instead of laparoscopes or genome mapping, of course, the tool that will lead this transformation is information.

By throwing back the curtain on quality measures, big data is poised to elevate the delivery of healthcare in this nation. To effectively improve healthcare delivery, the industry needs to shift toward safer, evidenced-based, quality care. Healthcare needs to become more efficient, with fewer readmissions and unnecessary procedures. And care should be patient-centered, with well-informed consumers empowered to take a leading role in the direction of their own care.

All of that is possible, but only with proper information.

That is what makes physician performance transparency so exciting. The entire healthcare industry stands to benefit from more and more useful information about physician performance and quality. Physicians will use performance information to improve their own practices. Health systems can turn quantifiable data into actionable information that will allow them to make smarter business decisions and gain a competitive advantage.

And, of course, patients will be able to use an improved system of physician performance transparency to find the most appropriate providers for them. This will result in better outcomes and more satisfied patients.

Performance is defined as the execution of a plan. The plan for all of us—health providers, health systems, and patients alike—is to transform healthcare for the better. The key to that transformation is transparency.

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