

# Pay for Performance in Critical Care

A Position Paper by  
the Society of Critical Care Medicine\*

**Submitted By:**  
***The Pay for Performance Task Force of the Advocacy Committee***

Andrew Egol, DO, MBA, FCCM; Aryeh Shander, MD, FCCM; Lisa Kirkland, MD, FACP; Wall, Michael H. MD, FCCM; Todd Dorman, MD, FCCM; Joe Dasta, MSc, FCCM; Sandra Bagwell, MD, FCCM; David Kaufman, MD, FCCM; Paul Mathews, Jr., PhD, RRT, FCCM; Bruce M. Greenwald, MD, FCCM; Daniel L. Herr, MD, MS, FCCM; Cynthia Stavish, RN, MSN, CCRN; Carol Thompson, PhD, FCCM; Brenda G. Fahy, MD, FCCM

*Dr. Shander is a consultant for Bayer, Biopure, Hemo Concepts, Inc., NovoNordisk, OrthoBiotech, and Zymogenetics; has received grant/research support from Abbott, AstraZeneca, OrthoBiotech, and Zymogenetics; and has received honoraria from Baxter, Bayer, Pfizer, Hemo Concepts, Inc., NovoNordisk, OrthoBiotech, and Zymogenetics. Dr. Dasta has received consulting fees from Hospira, Abbott Point of Care, Vista, and Keimar and honoraria/speaking fees from Hospira and Astellas. The remaining authors have not disclosed any potential conflicts of interest.*

\* Executive Summary appears in September 2009 issue of *Critical Care Medicine* ([www.ccmjournal.org](http://www.ccmjournal.org))

# Pay for Performance in Critical Care

## Introduction

The US healthcare system is seen by many as a poorly controlled process with an average product. It commonly is quoted that the US healthcare system spends more per patient than any other but achieves only average outcomes. Politicians see this as an abomination and demand change without truly understanding the multifactorial etiologies of the underoptimized healthcare system. A few decades ago, the health maintenance organization (HMO) was thought to be the mechanism to help rein in cost while improving outcomes, but the grand HMO experiment has essentially failed.

Performance-based pay is a tenet of capitalism and thus a mainstay of industry. Recently, it has been suggested that a performance-based approach to US healthcare finance might achieve the laudable goals of improving the quality of care while controlling spiraling costs. Thus, the next grand experiment is about to be thrust upon the US healthcare system.

It is believed that such a pay-for-performance approach will incentivize hospitals and providers to provide high-quality effective and efficient care. In addition, it is felt that pay-for-performance methodologies will align those incentives so that healthcare can achieve the goal of more cost-effective care.

Understanding the strengths and weaknesses of the proposed pay-for-performance movement is essential for all aspects of the healthcare system. National organizations such as the Society of Critical Care Medicine (SCCM) must not only understand the movement but be involved in its development to help support its membership. The Council of the SCCM created the Pay-for-Performance Task Force as a component of the Advocacy Committee and charged the Task Force "to develop materials and articles for dissemination to the membership regarding pay for performance." This paper serves as primer on the present status of the pay-for-performance movement as it pertains to critical care services in the United States. Its intent is to inform SCCM leadership and subsequently to be disseminated to the membership.

## The History of Pay for Performance

*Your old road is rapidly agin'  
Please get out of the new one  
If you can't lend your hand  
For the times they are a-changin'*  
©1963, Bob Dylan

The words of Bob Dylan were poignant and powerful in 1963 and are just as appropriate for physicians in healthcare in 2007, 43 years later.

The evolution of pay-for-performance programs began with what some would describe as a confluence of forces leading to a “perfect storm.”

### ***Sustainable Growth Rate***

Since 1999, Medicare payments to physicians have been determined in part by a formula known as the *sustainable growth rate* (SGR). This formula sets a target for growth in Medicare expenditures for physicians' services largely on the basis of the growth of the national economy. From 1999 to 2001, the SGR led to annual fee increases from 2.3% to 5.5%. However, in 2002, when the economy slowed, the SGR calculated a levied reduction of 4.8%.<sup>1</sup> Since 2002, Congress has come to the rescue of physicians each year by authorizing temporary fixes that reversed scheduled payment reductions and increased payments by 1.7% in 2003 and 1.5% in 2004 and 2005. In 2006, the payment level remained stable at the 2005 level rather than the 4.4% cut that was proposed.<sup>2</sup> Further calculations dictate annual reductions in physician payments from 2007 through 2012. There have been proposals for repeal of the SGR from legislators, the Medicare Payment Advisory Commission, and organized medicine. Most proposals to change the SGR formula would cost Medicare billions more than current budget projections, which include the payment reductions that would have begun in January 2006.

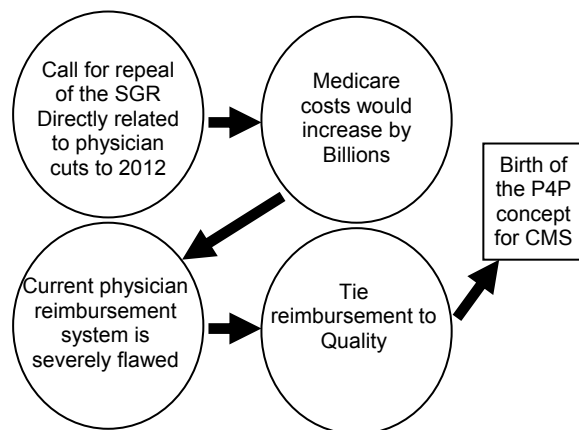
### ***Evolution of Pay for Performance***

While there has been no proposed solution to the current payment method, a bipartisan consensus exists that any change in the SGR formula must be combined with new requirements designed to enhance the quality of care provided by physicians. This movement has come to be known as *pay for performance*. In a testimony before the Subcommittee on Pay for Performance of the Institute of Medicine, John Tooker, Executive Vice President and Chief Executive Officer of the American College of Physicians (ACP), stated “Paying physicians on a per-visit or per-procedure basis for treating patients with acute illnesses is not a model that supports continuous improvement in the care of patients with chronic diseases.”<sup>3</sup> Dr. Mark McClellan, former administrator of the Centers for Medicare & Medicaid Services (CMS), said that the CMS planned to begin using Medicare claims data to measure the resources used by physicians, as recommended by the Medicare Payment Advisory Commission, and “to share

these results with physicians confidentially to educate them about how they compare” with their peers.<sup>4</sup> The “quality movement” in healthcare began many years ago; the missing piece has always been how to adequately incentivize physicians to participate. The existing fee-for-service payment system has always misaligned these incentives, creating an environment of paying more for doing more rather than paying more for better care. Epstein et al, in a *New England Journal of Medicine* Sounding Board article stated, “At this point no one argues that past payment models are ideal.”<sup>5</sup>

The federal government perceives a need to minimize increasing healthcare costs and is furiously pushing forward with plans to align physician/hospital payments to quality. This perception, along with the improved availability of health information technology for physicians and hospitals, has created the confluence of forces necessary to allow interest in “pay-for-performance” programs to dramatically take off (Figure 1).

**Figure 1. Forces influencing interest in pay for performance**



The impetus toward pay-for-performance programs steadily gained momentum. In late 2005, a joint House-Senate working agreement with the AMA (through the Physician Consortium for Performance Improvement) was created, stating that physician groups would come up with 140 quality measures in 34 specialties to be used in measuring physician performance.<sup>6</sup> As of July 2007, 184 of these measures had been completed. Very few of these measures are directly applicable to Intensivists. CMS expected that physicians would be reporting on three to five measures in 2007.

***Physician Voluntary Reporting Program***

CMS has rapidly moved toward the creation of pay-for-performance (P4P) programs for physicians, supporting and initiating numerous P4P demonstration projects, including the initial Physician Voluntary Reporting Program (PVRP), begun in January 2006. The goal of the PVRP program was to get a sense of which physicians intended to participate, and the program was the first step

toward pay for performance for physician practices. Using a set of 16 evidence-based performance measures that captured quality-of-care data, participating physicians voluntarily reported their performance. The data were collected via claims using CPT Category II codes and G-codes where CPT codes were not yet available. In December 2006, CMS provided confidential feedback reports containing reporting and performance rates to the physicians who had submitted performance data for the second calendar quarter of 2006. Though the PVRP ended December 31, 2006, feedback reports for services provided during the third and fourth calendar quarters of 2006 were made available in mid-2007. While there was no obligation to participate in the program, those who registered received assistance and feedback on their efforts. The success of the PVRP program throughout 2006 resulted in its evolution into the Physician Quality Reporting Initiative (PQRI), which began on January 1, 2007. The 2007 PVRP quality measures were posted on December 5, 2006 under the title "2007 Physician Voluntary Reporting Program (PVRP) Quality Measures." These were incorporated into the 2007 PQRI.

### ***Physician Quality Reporting Initiative***

The PQRI was established pursuant to the Tax Relief and Health Care Act of 2006, signed by President Bush on December 20, 2006. Section 101 under Title I authorized the CMS to establish a physician quality reporting system, the PQRI. The PQRI provided an incentive payment for physicians and other eligible professionals who successfully submitted quality data on any of the 74 measures for services paid under the Medicare Physician Fee Schedule and provided July 1 through December 31, 2007. The PQRI was built on and formed by CMS and provider experiences in the 2006 PVRP.

Most of these measures were developed and submitted by the American Medical Association (AMA) Physician Consortium for Performance Improvement. A list of the 74 measures and specifications can be found at:

[http://www.cms.hhs.gov/PQRI/33\\_2007\\_PQRI\\_Program.asp](http://www.cms.hhs.gov/PQRI/33_2007_PQRI_Program.asp) . Eligible professionals who successfully reported a designated set of quality measures on claims for dates of service from July 1 to December 31, 2007, could earn a bonus payment, up to 1.5% of total allowed charges for covered Medicare physician fee schedule services. A list of frequently asked questions (FAQ) regarding 2007 PQRI can be found at [http://questions.cms.hhs.gov/cgi-bin/cmshhs.cfg/php/enduser/std\\_alp.php?%20p\\_pv=&p\\_prods=0&p\\_cats=&p\\_hidden\\_prods=&prod\\_lvl1=0&p\\_search\\_text=2007+PQRI&p\\_new\\_search=1&p\\_search\\_type=answers.search.nl](http://questions.cms.hhs.gov/cgi-bin/cmshhs.cfg/php/enduser/std_alp.php?%20p_pv=&p_prods=0&p_cats=&p_hidden_prods=&prod_lvl1=0&p_search_text=2007+PQRI&p_new_search=1&p_search_type=answers.search.nl).

### ***Pay-for-Performance Growth***

The growth of pay-for-performance programs has been well documented by Med-Vantage, a consulting firm that has surveyed scores of healthcare plans. Med-Vantage estimates that the number of pay for performance programs have grown from 35 in 2003 to 115 in 2005 involving over 53 million Americans.<sup>7-9</sup>

According to one report, almost one third of health plans say that they have a P4P program in place, but most are in the earliest stages of development or implementation. A 2004 survey found that most P4P programs 1) targeted primary care physicians and 2) were confined to HMOs, fully insured products with annual bonus incentives based on National Committee for Quality Assurance Health Plan Employer Data and Information Set (HEDIS) performance measures. However, P4P programs have significantly expanded to include preferred provider organizations and consumer-directed healthcare products; clinical information technology adoption measures have significantly grown; P4P programs have expanded to specialists in more than 50% of the programs (most commonly obstetrics-gynecology, cardiology, and endocrinology)<sup>9</sup>; use of adjustable (tiered) fee schedules instead of annual bonus payments are increasing; and interest in using P4P performance results for public reporting is growing.<sup>10</sup> Additionally, the ACP released its position statement on P4P ([http://www.acponline.org/hpp/tooker\\_iom.pdf](http://www.acponline.org/hpp/tooker_iom.pdf)) at the same time that CMS released its Quality Improvement Roadmap (<http://www.cms.hhs.gov/councilontechinnov/downloads/qualityroadmap.pdf>), which it characterized as “a major, agency-wide effort to . . . achieve major improvements in the quality of health care.”

In the CMS Quality Improvement Roadmap, multiple mentions are made of its plans for evolving pay-for performance strategies. Some of these plans include: top-performing hospitals receiving incentive payments for the care of inpatients with any of five conditions (acute myocardial infarction, heart failure, community-acquired pneumonia, coronary artery bypass graft, or hip and knee replacement); pay-for-performance demonstration programs involving long-term care and dialysis; and working with state quality improvement organizations (QIO) to offer assistance to nursing homes, home health agencies, hospitals, and physician offices in measuring and actually improving the quality of care, with a new emphasis on performance-based evaluation and incentives within the QIO program itself. The Quality Initiative (originally known as the National Voluntary Hospital Reporting Initiative) used payment incentives to promote public reporting on 10 measures of healthcare quality for three medical conditions. Hospitals that did not submit performance data for the quality measures by July 2004 received 0.4% smaller Medicare payments in fiscal year 2005 than those that reported data. Nearly all acute care hospitals (98.3%) chose to participate in this voluntary program. The recent Deficit Reduction Act increased the financial incentive to 2% and allows the US Department of Health and Human Services to expand or replace measures.<sup>11</sup> The next CMS program to be implemented for hospitals will be the Hospital Value-Based Purchasing Program, scheduled to begin fiscal year 2009. This program applies to hospitals paid under the Inpatient Prospective Payment System. The program moves hospitals from the pay-for-reporting voluntary program to the pay-for-performance value-based purchasing (VBP) program and will impact both how and what hospitals are paid by CMS as well as public reporting. This will be a 3-year “phase-in” plan that will initially utilize 20 proposed measures.<sup>12</sup> As hospitals and CMS become more invested in the P4P

programs, hospitals will depend on the core measure performance of its medical staff initially. Eventually, when physician's performance in the core measures is tied to reimbursement, hospital and physician incentives will be aligned.

### ***Federal Use of Pay for Performance***

The legislative interest in pay for performance is nothing new to many physicians and managed care companies who have been trying similar quality incentives for some time. In 2002, the *New York Times* reported on a National Academy of Sciences study which proposed that six federal health programs should reward high-quality care by paying higher fees or bonuses to the best doctors, hospitals, nursing homes, and HMOs. The study recommended that the government establish standard measures of quality to assess the performance of each healthcare provider and publish comparative data for use by consumers. The six cited federal health programs (which serve 100 million Americans) included Medicare, Medicaid, Children's Health Insurance Program, the Defense Department's Tricare program, veterans health program, and Indian Health Service. What is new is the scope of the interest and the likely impact pay for performance eventually will have if fully implemented.<sup>13</sup>

Several factors account for the increased interest in financial rewards to physicians for providing care of high quality. Quality measurements and monitoring systems (i.e., information technology) have become sophisticated and affordable. Investment in a universal interoperable health information technology infrastructure is expected to result in significant return on savings, estimated to be between \$140 billion and \$170 billion each year, or close to 10% of total US health spending. The majority of these savings would be achieved by reducing duplicative care, lowering healthcare administrative costs, and avoiding costly medical errors. It is estimated that it will require \$10,000 to \$20,000 per physician per year to implement an electronic medical record system.<sup>5</sup> Thus, a core goal of the movement to reward quality is to create financial incentives that are large enough to motivate structural change. Anecdotal information suggests that the amount of money used as an incentive is growing substantially. Perhaps the real harbinger is the National Health System in the United Kingdom, which adopted a payment-for-performance initiative of unprecedented size and scope in April 2004. Nearly one third of a general practitioner's income depended on the practitioner's performance as defined by 146 quality indicators. British family physicians received additional salary payments averaging more than \$40,000 per physician in the program's initial year.<sup>11,14-15</sup>

### ***Health Professional Organizations and Pay for Performance***

In its 2005 position statement, the ACP views the pay-for-performance movement as evolutionary. The evolution begins with physician payments for achieving basic structural measures (pay for reporting), followed by payment for participating in quality improvement programs that use evidence-based clinical measures (pay for participation), and finally, payments for achieving quality gains according to evidence-based measures (i.e., pay for performance).<sup>3</sup> The ACP

believes that one of the first steps physicians need to take is to familiarize themselves with the use of “registries” and begin incorporating them into their practice.<sup>16</sup> A recent overview of registry products and tools, both free and fee-based can be found at:

<http://www.chcf.org/documents/chronicdisease/ChronicDiseaseRegistryReview.pdf> . A useful rundown on the function and use of computerized disease registries can be found at:

<http://www.chcf.org/topics/chronicdisease/index.cfm?itemID=21718>

### ***Real World Pay for Performance***

On June 20, 2006, Premier healthcare alliance announced the results of its pay-for-performance demonstration project with CMS. The study utilized quality process indicators collected as part of Premier's Hospital Quality Incentive Demonstration (HQID) pay-for-performance project with CMS, the first national project of its kind. Premier stated that improving the care of pneumonia and heart bypass patients could save millions of dollars and thousands of lives. According to the analysis, if all pneumonia and heart bypass patients nationally had received most of a set of basic, widely accepted care measures in 2004, costs would have been as much as \$1 billion lower. Other projected outcomes associated with improved process delivery included 3,000 fewer deaths, 6,000 fewer complications, 6,000 fewer readmissions, and 500,000 fewer days in the hospital. "This is important early evidence regarding a question that is central to the sustainability of both public and private health benefits plans - whether efforts to improve quality actually improve or worsen the affordability of care," said Arnold Milstein, MD, MPH, medical director at Pacific Business Group on Health and Medicare Payment Advisory Commission (MedPAC) Commissioner. "The predominant answer emerging from these results could not be more encouraging -- better care can indeed improve affordability." This is one of the first studies to show that improvements in healthcare quality can also result in improvement in healthcare costs.<sup>17</sup> This study included more than 260 hospitals and examined their performance on quality measures for five conditions, measured by 35 variables. Initial results of the Premier demonstration project show that using financial incentives to reward quality patient care results in better care and fewer costly complications. The median performance composite score, a measure of improvement for hospitals that combines the process of care and outcome measures from chosen clinical focus areas, increased 11.8% overall in the project's first 2 years, a finding announced in May 2007.<sup>18</sup>

In addition to the public programs that have been described, as previously mentioned, there are over 115 private P4P programs in place. One of the most well-known private initiatives is the Bridges to Excellence (BTE) program. This is a program to which CMS looked in designing its Medicare demonstration projects. BTE focuses on ambulatory care improvement. One of the components of the BTE program that could and should be translated to other public and private P4P programs is its incentive for physicians to install systems to handle electronic medical records (EMRs). The annual per-patient bonus was as much

as \$50 in 2004, which BTE says is equal to about half the projected savings that would come from using the health information technology (HIT) systems. This upfront investment by BTE is estimated to return about 4% to 5% of the total cost of care.<sup>10</sup> The Leapfrog Hospital Rewards Program, another private program that is less developed than BTE, measures the quality and efficiency of resource utilization in five clinical areas that represent a significant portion of hospital admissions and expenditures among the commercially insured population. Hospitals that demonstrate sustained excellence or improvement may be eligible for financial rewards or increased market share. Hospital performance can become the basis for financial incentives for consumers, such as waived co-pays or deductibles for choosing care at high-performing hospitals.

The Integrated Healthcare Association's (IHA) statewide pay-for-performance program is the largest in the country. IHA consists of seven California HMOs covering more than 35,000 doctors in 225 medical groups and more than six million patients. Gains were shown in all 14 measures of clinical quality in the program's second year. IHA is another group that is investing heavily in HIT. Of IHA's medical groups, 53% met some or all of the program's HIT criteria in the second year, a 20% increase over the previous year. Additionally, medical groups who received full credit on the HIT measures had average clinical scores that were nine percentage points higher than medical groups that showed no evidence of HIT adoption. Medical group-specific results will also be released to the State of California Office of the Patient Advocate for use in its annual public scorecard, showing a firm link between the programs and public transparency. Massachusetts' major health insurers, including Blue Cross Blue Shield of Massachusetts, Harvard Pilgrim Health Care, Tufts Health Plan and Fallon Community Health Plan, all claim many of their primary care physicians participate in P4P programs. The "side effects" of these programs are better record keeping, improved care, increased efficiency, and reduced costs for the plans. Harvard Pilgrim said it paid \$18.5 million in performance bonuses to a significant percentage of its network of 7,000 primary care physicians for 2004 work, representing a record after more than 10 years of bonuses. Average payments reached \$3.70 per patient member per month.<sup>10</sup>

While it is clear that P4P programs will continue to proliferate, likely will impact Intensivists, and affect an increasing percentage of a physician's payment, the details of these future programs remains unclear. However, it is always difficult to know where you are going, if you don't know where you have been.

## **Types of Programs and the Evidence of Benefit in Impacting Quality and Value**

### ***Incentive Mechanisms in Pay-for- Performance Programs***

Pay-for-performance programs are designed to maximize the quality of care and patient safety by using various incentives tied to quality improvement and, ultimately, patient outcomes. These programs came about when concern

mounted that traditional payment methods were more geared towards rewarding the volume of services, while ignoring the quality and efficiency of healthcare. Central to the idea behind P4P programs are performance measurement and incentive mechanisms. Here is an overview of incentive principles and models proposed and/or used in P4P.

### ***Principles***

The Joint Commission proposes the following principles for developing incentive mechanisms in P4P programs<sup>19</sup>:

- A combination of financial and nonfinancial incentives tailored to achieve program goals should be used. Incentives should recognize variations among providers with different environments and variations in performance in regards to quality of care.
- The measurement and reward mechanisms should achieve broad-scale behavior change and performance goals with flexibility and feedback from providers.
- Reward for continuous attention to the quality of healthcare in all related systems should be part of accreditation or its equivalent.
- An interconnected healthcare system with interoperable standards for collecting, transmitting, and reporting information should be supported.
- An objective periodic evaluation of the incentive system should be incorporated to examine its effects, with re-adjustment and realignment of goals accordingly.

Moreover, the incentives should be equitable and fair to program precipitants, timely, sufficient to motivate improvement, and structured to avoid unintended consequences.<sup>20</sup> Although combined financial and non-financial incentives have been shown to be superior over financial-only rewards,<sup>20</sup> questions remain whether a P4P program should reward only or penalize defined minimally accepted performance as well. Penalties might be stronger motivators than incentives,<sup>21</sup> but few current P4P programs penalize for consistently poor performance.<sup>21</sup>

Based on a study of current incentive programs, Rosenthal and Dudley have identified some of the most consequential aspects of incentive program design and listed some of the available options together with a rationale for and against each option (Table 1).<sup>22</sup> We review some of these elements and other issues to consider when dealing with P4P incentives below.

### ***What to Reward?***

While reviewing the mechanisms of incentive, it is essential to keep in mind the importance of measurement of quality/performance. Even the most elaborate incentive program is likely to fail if what is actually rewarded by the program is not an accurate and meaningful measure of improvements in quality of care and health.

**Table 1. Some of the main incentive issues ahead of pay-for-performance programs<sup>4</sup>**

Dimension	Main Options	What Programs Typically Look Like and Examples	Selected Evidence or Theory
Individual versus group incentives	<ul style="list-style-type: none"> <li>Advantages of targeting individual providers: clearly identifies accountability, natural unit of contracting payment for many providers and health plans.</li> <li>Advantages of targeting groups: bigger sample sizes, groups can share risk, invest in systems, tailor quality improvement to fit local needs.</li> </ul>	<p>14% of physician P4P programs focus on individual physicians alone; 25% target both individual physicians and groups.</p> <p>61% target groups alone.</p>	<p>Economic theory suggests that medical groups may serve an important risk-sharing function, but group incentives to perform are weaker for individuals.</p> <p>Sample sizes make performance measurement more difficult for individual physicians than for groups.</p> <p>A failure of systems rather than individual motivation is widely seen to be crux of quality problems.</p>
Paying the right amount	<p>Considerations: Cost of improvement, shared savings, and market share of sponsor.</p>	<p>Maximum performance bonuses averaged 9% for physicians in 2005.</p>	<p>Economic theory suggests that the recipient of an incentive must be compensated for the incremental net costs of undertaking the desired action.</p>
Making payment reward all high-quality care	<ul style="list-style-type: none"> <li>Single or multiple thresholds</li> <li>Reward significant improvement</li> <li>Reward for each patient who receives recommended care</li> </ul>	<p>70% of P4P programs use thresholds; 25% pay for improvement</p>	<p>Economic theory suggests that physicians will respond to the incremental payment associated with undertaking each task.</p> <p>An all-or-nothing bonus provides zero incremental payment for improvements that fall short of the threshold and for improvements beyond the threshold.</p>
Prioritizing quality improvement for underserved populations	<ul style="list-style-type: none"> <li>Directly or indirectly address higher costs for performance improvements in traditionally underserved populations.</li> <li>Pay patients to improve their motivation to follow treatment recommendations.</li> <li>Invest in system improvements, cultural competence</li> </ul>	<p>No statistics available to date, but emerging area of interest.</p> <p>Example: Blue Cross/Blue Shield of Massachusetts has integrated cultural competency training into its physician P4P programs</p>	<p>It is more difficult to improve the care for some populations; this implies higher costs that must be factored into the magnitude of reward.</p>

P4P, pay for performance

Measures should be based on established clinical and practice-based evidence. They should be transparent, acceptable to providers, based on reliable performance information, and provide accurate measures of changes in the behavior/practices in question.<sup>23</sup> This issue is discussed in the “Quality Measures” section.

### ***Whom to Reward?***

Incentives can target individuals, groups, institutions, or a combination of these. In designing the incentive program, it is helpful to consider the different types of providers (e.g., integrated systems, physician-hospital organizations, hospitals, medical groups, nursing/rehabilitation facilities, solo practices) and determine the most suitable targets by answering questions such as these<sup>24</sup>:

- Which types of providers drive quality in the areas under consideration?
- For which providers is performance currently measured?
- Do these providers work independently or in teams?

- With which providers is there more likely a collaborative relationship, common objectives for quality improvement, or leverage?

Some of the advantages of individual and group incentives are listed in Table 1.<sup>22</sup> Bokhour et al have discussed five ways of distributing rewards from groups to individuals and their impact on healthcare (Table 2).<sup>25</sup>

**Table 2. Mechanisms of distributing incentives and impact on quality of care<sup>7</sup>**

Mechanism	Potential Mode of Impact on Quality of Care
Equal distribution to all providers	May enhance group work May remove power of incentive from individual physicians
Dependent on individual provider performance on payer's quality targets	Most powerful incentive to directly affect provider behavior
Dependent on individual provider performance-based incentive schemes	Decreases power of incentive direct from payer May affect performance in other ways
Money retained wholly by organization	Least powerful incentives to physicians May effect change in quality of care by implementing systems-level changes
Hybrid approach	May effect change at provider level and at systems level to improve quality of care

The providers' organizational structure has a deep impact on incentives options and their effectiveness at the level of individual physicians. In an extensive case study of five various health plans with P4P programs across the nation, the Center for Health Care Strategies (CHCS) found out that many plans decided not to provide incentives directly to individual physicians because they found it impractical. One of the main reasons was the inadequate number of Medicaid patients enrolled in a specific plan who were eligible for the service targeted by the incentive at the physician level. Also, retrieving data from charts to measure the provided services and produce reliable indicators was considered too costly for small offices. Interestingly, one provider actually moved away from chart reviews to gather data, in part for this reason.<sup>26</sup> On the other hand, the number of plan patients in large group practices may be sufficient to provide a reliable sample of performance data, and the total amount of practice's incentives may be large enough to get attention.<sup>26</sup>

While practice managers may be able to use the incentive to improve the overall performance – even give credit or recognition to their high-performing physicians – many believe that incentives need to be passed down to the individual physician level in some meaningful way to affect behavior. In the CHCS case study, Health Now used pooled Medicaid and commercial members to allow most providers sufficient total members to obtain a reliable individual-level quality score.<sup>26</sup> Because many initiatives relate to the performance of interdisciplinary clinical teams, especially for high-quality care in patients with chronic disease or those receiving complex treatment regimens, fair allocation of rewards across team members is important.<sup>27</sup>

### ***When to Reward?***

Lump-sum payments that occur well after the service is provided can be larger and more visible, which can be both a positive and negative factor. Providers may be more likely to pay attention to large payments and change their behavior accordingly, but large payment amounts also may attract the scrutiny of legislators, the media, and others; thus, plans must be prepared to justify the payments with solid data on provider performance.<sup>26</sup>

These lump-sum payments may have less impact on day-to-day physician practice than smaller and more predictable per-service or per-month payments. In part, the impact of either approach may turn on how visible each form of payment is to the physician and his/her office staff. Operational details, like how the incentive payment shows up in the payment documentation provided to physician offices, can be important. A report of total incentives at the end of a quarter or a year can combine some of the benefits of smaller regular payments and larger lump-sum distributions.<sup>26</sup>

### ***How to Reward?***

Incentives must be easy to implement, administer, and understand. They should be meaningful for their target group. Table 3 lists the main options for designing rewards in a P4P program.<sup>28</sup> The first approach, rewarding the providers meeting a threshold, is most commonly utilized in P4P programs. One potential risk of this approach is redistributing funds from lower-performing providers to higher performers without changing overall performance and quality of care.<sup>29</sup> Also, this approach is not able to reward improvements in a uniform manner: A high-quality provider is likely to receive rewards without any improvements, while a low-quality provider might fail to receive rewards in spite of tremendous improvements just short of the threshold. Alternatives could include a tiered incentive mechanism linked to various performance thresholds or a mechanism for rewarding improvements in addition to or instead of benchmarks.<sup>28</sup>

When promotion of effective services (e.g., retinal exams for patients with diabetes) is the target behavior, another alternative could pay an additional fee for each appropriately managed patient or for each “recommended” service being targeted. Unlike setting a bonus threshold at a single level, under the additional fee-for-service model, physicians always do benefit by bringing more patients into compliance with the standard.<sup>28</sup>

Although incentives structured to reward improvement or performance of a service are preferable to a single fixed threshold, such measures can result in rewarding levels of performance that are below acceptable norms. To accommodate such concerns, a minimum threshold (e.g., 60% adherence to the evidence-based guideline in question) can be set below which providers are ineligible for any payment.<sup>28</sup>

**Table 3. Four general strategies for designing a bonus structure, with purchaser examples<sup>3</sup>**

Strategy	Examples
Rewarding only those providers who meet or exceed a single threshold of performance (one benchmark for all providers)	PacifiCare of California Quality Incentive Program, year 1: All medical groups that score above the prior year's 75 <sup>th</sup> percentile of performance in the network receive per member per month bonus.
Differentially rewarding providers for achievements along a graduated or tiered bonus based on more than one level of performance	PacifiCare of California Quality Incentive Program, year 2: All medical groups that score between the prior year's 75 <sup>th</sup> and 85 <sup>th</sup> percentiles of performance in the network receive 50% of the bonus potential; providers scoring above the 85 <sup>th</sup> percentile receive full bonus.  Bridges to Excellence Physician Office Link: Physicians receive per patient bonus for meeting a set of standards related to office systems that promote quality care; incremental rewards are associated with higher levels of achievement (basic, intermediate, advanced).
Combination of bonus for meeting threshold and bonus for improvements regardless of meeting the threshold	Premera Blue Cross of Washington State: Clinics are rewarded based on process and outcome measures of quality (as well as other efficiency- and access-related metrics). Points, which determine each clinic's allocation, are awarded based both on rank among peers <i>and</i> improvement.
Continuous rewards in proportion to achievement	Hudson Health Plan (a Medicaid-managed care plan in New York): Program pays \$200 for every 2-year-old who receives all recommended immunizations on time.

As mentioned earlier, both financial and non-financial incentives should be considered for promoting quality of care in P4P programs. Tables 4 and 5 summarize some options in use. To be effective, P4P programs should incorporate a combination of various incentive mechanisms.<sup>30,31</sup> Descriptions of some of the incentive models, as well as views from focus groups convened by Bailit Health Purchasing, LLC, are provided below.<sup>32</sup>

**Quality bonus:** Providers are offered a quality bonus based on performance in a limited number of quality measures. Bonuses are calculated by comparing a provider's performance to an absolute threshold, not by assessing relative performance within a peer group. Bonus levels increase gradually as performance improves. Providers rated below a minimal performance threshold do not receive any bonus. The target performance rate and the minimum performance needed to obtain a bonus are re-calibrated over time to provide ongoing incentives for improved performance. The bonus can be a set dollar amount, rather than a percentage of compensation. Alternatively, the organization can set aside money to establish a bonus pool; providers who reach established performance thresholds receive bonuses from the pool.<sup>32</sup>

Providers generally like the bonus model concept, but some argue that individuals should not receive additional financial compensation for meeting quality expectations because, on a philosophical level, all physicians should be expected to provide quality care. Others suspect that bonuses are simply a means of redirecting compensation rather than truly representing additional income. Insurers support the concept of some providers not receiving a quality bonus, noting that if everyone were to get one, it would defeat the purpose of an incentive program. Graduated bonus levels and re-calibration of expected performance over time to continue improvement are also emphasized, but some

**Table 4. Financial incentive options and examples<sup>11,12</sup>**

<b>Financial Reward</b>	<b>Description</b>	<b>Example</b>
Pay for participation	<ul style="list-style-type: none"> <li>• Reimbursement for participation in quality improvement activities</li> </ul>	The provider is reimbursed for time spent at state-sponsored collaborative quality improvement workgroup meetings focused on women's health or time spent attending meetings to review performance profiling information and developing quality improvement action plans.
Pay for process	<ul style="list-style-type: none"> <li>• Payment for every predetermined healthcare process performed</li> </ul>	The provider receives an automatic payment of \$10 every time age-appropriate female adult patient receives a biannual mammogram. A provider is paid \$10 for every telephone call to a patient who is due for a mammogram.
Pay for new quality services	<ul style="list-style-type: none"> <li>• Providers paid for "new" services focused on improving quality of care, efficiency of service, or accuracy of data</li> </ul>	The provider receives \$10 for completing an annual health risk assessment; communicating with a patient via e-mail; or creating an electronic medical record.
Bonus for meeting a threshold	<ul style="list-style-type: none"> <li>• Payment for achieving a predetermined threshold</li> </ul>	The provider receives a bonus payment if $\geq 80\%$ of age-appropriate female adult patients received a mammogram in the past 2 years.
Tiered bonus for meeting predetermined thresholds	<ul style="list-style-type: none"> <li>• Increasing payments for achieving higher in a predetermined set of thresholds</li> </ul>	The provider receives a bonus payment if $\geq 80\%$ of age-appropriate female adult patients received a mammogram in the past 2 years, and a larger payment if $>90\%$ did so.
Graduated bonus based on comparative ranking	<ul style="list-style-type: none"> <li>• Bonus based on provider performance</li> <li>• Best performers get highest bonus, lowest performers receive no bonus</li> <li>• Agreed-upon data sources and methodologies used to assess performance</li> <li>• Bonus set at a level of compensation meaningful to providers</li> <li>• Funding may come from savings or penalties</li> </ul>	The provider receives a bonus payment if ranked in the top 50% of providers for delivery of mammograms to age-appropriate female adult patients in the past 2 years, larger payment if ranked in the top 25% of providers.
Bonus for improvement	<ul style="list-style-type: none"> <li>• Payments for demonstrating significant improvements in performance</li> </ul>	The provider receives a bonus payment if demonstrates a statistically significant increase in the percentage of age-appropriate female adult patients receiving a mammogram in the past 2 years. Providers with rates $>90\%$ also receive the bonus since further improvement $>90\%$ might be extremely difficult to achieve.
Performance-based rate change	<ul style="list-style-type: none"> <li>• Provider rates adjusted to or based on performance</li> <li>• Multi-year or single-year rate increases based on performance on specific indicators</li> </ul>	The provider is paid 105% of the usual fee schedule if strong performance on several metrics distinguishes the provider from others.
Performance-based fee schedule	<ul style="list-style-type: none"> <li>• Fee schedules linked to provider performance</li> </ul>	For highest performing physicians, use highest fee schedule; for average physicians, use current fee schedule; for lowest performing providers, use lowest fee schedule.
Performance-based withholding	<ul style="list-style-type: none"> <li>• Certain amount of funds is withheld and released at year's end based on performance; some providers may receive a penalty while others receive a reward</li> <li>• Minimum performance requirements</li> <li>• Providers profiled, compared to peers and to target benchmarks</li> </ul>	All providers initially receive 80% of their payments for services. A provider with high performance will receive another 40% at the end of the year, while a provider with low performance will not receive any more payment at the end of the year.

Financial Reward	Description	Example
Compensation at-risk	<ul style="list-style-type: none"> <li>• Compensation tied to performance achievements</li> </ul>	The provider forfeits a Medicaid fee schedule increase unless the statewide Medicaid mean is achieved on several identified performance metrics.
Variable cost sharing (tiered co-payments)	<ul style="list-style-type: none"> <li>• Providers profiled and grouped into tiers, e.g., platinum, gold, or silver based on performance</li> <li>• Lowest co-pays assigned to highest performing providers (platinum) and highest co-pays to lowest performing providers (silver)</li> <li>• Strategy may work better for employer purchasers</li> </ul>	The patient pays no pharmacy co-payment when receiving services from a provider if strong performance on several performance metrics distinguishes the provider from others.
Quality grants	<ul style="list-style-type: none"> <li>• Eligible providers asked to submit quality improvement proposals</li> <li>• Proposals evaluated on set criteria, including ability to be replicated in network</li> <li>• Grants awarded for limited dollar amounts</li> <li>• No funding for large capital expenses</li> <li>• Providers manage quality improvement project and make staff and other in-kind resources available</li> </ul>	Provider may apply for a grant to implement a patient registry system to facilitate tracking of patients in need of a routine mammogram.

insurers are concerned that this incentive model may set them up to become victims of their own success. Finally, both sides are uncertain whether insurers could collect enough data on each provider’s practice patterns to make meaningful assessments at the individual level.<sup>32</sup>

**Compensation at risk:** A portion of a provider’s compensation is placed “at risk” based on his or her performance on quality measures. In other words, the organization applying the incentive withholds some of the provider’s total compensation and retains it in an account where interest accrues. Performance is evaluated based on a limited number of quality measures, and providers receive additional compensation according to their performance level. Those rated below a minimally acceptable floor of performance do not receive any withheld compensation. The target performance rate and the minimum performance floor are re-calibrated over time to provide ongoing incentives for improved performance. As an option, providers’ rate increases can be placed at risk based on performance. For example, if an insurer agrees to a 20% rate increase for a physician-hospital organization, the insurer could negotiate to place 15% of the additional compensation at risk.<sup>32</sup>

Providers usually do not favor this model due to the downside risk, while insurers like it because it could be budget neutral. However, insurers are skeptical about providers’ willingness to accept risk-based compensation. As with the bonus model, both sides have concerns about insufficient data to implement such a program at the individual provider level.<sup>32</sup>

**Table 5. Non-financial incentive options and examples<sup>11,12</sup>**

Non-Financial Reward	Description	Examples
Performance profiling	<ul style="list-style-type: none"> <li>• Analyze provider performance data</li> <li>• Compare performance across peer groups and to absolute standards</li> <li>• Adjust for case mix and volume</li> <li>• Share profiles with providers in an easily understood, graphic format</li> <li>• Regularly profile performance and discuss with providers</li> </ul>	The percentage of a provider's age-appropriate female adult patients who received a mammogram in the past 2 years is compared to statewide averages and shared with the provider.
Public recognition of performance	<ul style="list-style-type: none"> <li>• Inform providers of intent to publicize in advance and discuss format</li> <li>• Give providers performance results before they are shared publicly</li> <li>• Distribute performance results strategically via a published report, press release, Web site, award ceremony, stakeholder meeting, etc.</li> </ul>	The percentage of a provider's age-appropriate female adult patients who received a mammogram in the past 2 years is published on a Web site in conjunction with other measures and compared to statewide averages.
Offering technical assistance	<ul style="list-style-type: none"> <li>• Offer in-kind assistance to providers to improve performance</li> <li>• Focus outreach on high-volume providers</li> <li>• Meet with providers to share examples of best practices, compare performance</li> <li>• Broker meetings between lower and higher performing peer groups</li> </ul>	The state or its vendor offers the provider free practice consultation on how to increase the percentage of the provider's age-appropriate adult female patients receiving prescribed mammograms.
Reducing administrative requirements	<ul style="list-style-type: none"> <li>• Providers meeting best practice threshold not required to meet some existing administrative requirements</li> <li>• Waive requirements related to the performance being measured</li> <li>• Reinstate administrative requirements if performance declines</li> </ul>	If the provider demonstrates excellent performance on mammography and other defined preventive measures, the provider can undergo a quality audit every other year instead of annually.
Practice sanctions	<ul style="list-style-type: none"> <li>• Sanctions imposed on providers not achieving a minimum level of performance</li> </ul>	The provider is not assigned new patients until improved and acceptable performance demonstrated on specific performance metrics or completion of approved quality improvement initiatives.
Auto-assignment	<ul style="list-style-type: none"> <li>• Patients are preferentially assigned to providers with highest performance</li> </ul>	The provider is eligible to obtain member-panel assignments for female clients in mandatory programs who do not select a provider if the provider performs above a specific threshold on women's health measures.

**Performance fee schedules:** Provider fee schedules are linked to performance. Practice patterns are compared with standards to determine performance level, which is the basis for rewards. For example, highest quality physicians may be paid 115% of the Medicare fee schedule, whereas average quality physicians are paid 100% and the lowest performing providers receive 85%.<sup>32</sup>

**Quality grants:** Providers are asked to submit quality improvement (QI) proposals, which are evaluated based on their potential to improve performance

in targeted QI areas and to be replicated by other providers. The selected ones are supported. As an option, a portion of grant funding can be made contingent on providers' progress with the QI project.<sup>32</sup>

This model is favored among medical groups in part because they hope to receive funding for information system enhancements and other large capital expenses. However, many physicians and insurers believed that the grant model would favor experienced academic healthcare organizations and large medical groups with support staff who could help them develop a proposal. Hence, it is questionable if this model could lead to significant improvements in quality of care. Insurers consider the idea of soliciting QI proposals from providers "intellectually stimulating," but perhaps "too idealistic." They also view the model as administratively difficult and resource-intensive for the organization offering the grant awards. Yet, the grant model may be an effective way to pilot approaches, identify successful QI projects, and then roll them out to the rest of the plan.<sup>32</sup>

**Reimbursement for care planning:** Providers receive additional reimbursement for completing care planning tasks for people with chronic conditions, such as diabetes, asthma, congestive heart failure, and high blood pressure. Individual providers receive a small fee for completing an annual health risk assessment or developing an action plan for each patient with a chronic condition. As an option, providers can be reimbursed for preventive care screenings and receive a small fee for each member with a chronic condition to whom they provide specific screenings.<sup>32</sup>

Immediate financial reward for providers and the direct link between care planning and individual physician behavior make this a potentially effective incentive model. However, the financial incentive may be too small to produce significant behavioral change among providers, particularly if the insurer or purchaser does not represent a substantial portion of a physician's business. It also would be difficult for insurers and providers to accurately identify patients with chronic conditions. The effectiveness of the model may be increased if target patients are given an incentive for seeking care-management services, such as a gift for scheduling and completing risk-assessment appointments.<sup>32</sup>

**Variable cost sharing for patients:** Insurers offer products with tiered patient deductibles and co-payments. The deductibles are determined on the basis of the provider's performance, such that patients seeing physicians who score highest have the lowest cost sharing, and those who see the lowest-scoring providers have the highest. Such multiple-tier cost-sharing applies only in non-rural areas where patients have a choice of providers within a reasonable travel distance. In addition, it is used only for providers with whom the insurer or employer has sufficient volume or access to all-payer data to assess performance.<sup>32</sup>

Administration of this model requires extensive experience, and the program can be difficult to explain to members and providers. The model also can lead the members to choose the highest-cost (i.e., lowest performance) providers in the mistaken belief that high cost translates into providers with better, rather than worse, performance track records. It is questionable whether this model would affect referral and admission decisions of providers with multiple insurer contracts, as long as it is not implemented by dominant insurers in a market. Another issue in this model arises from the geographic distribution of providers and their relative rankings: Are high-performing medical groups able to handle the increased patient volume? Similarly, the increased patient volume may not be an effective incentive for providers operating at capacity.<sup>32</sup>

**Performance profiling:** This type of incentive requires access to performance data for a wide range of providers. Performance is compared across similar providers, taking into account significant differences in the volume and characteristics of patient populations and excluding providers with insufficient volume to support an assessment. Results of performance comparisons are presented in a graphic format that can be easily understood by providers.<sup>32</sup> The sharing of performance data can help physicians improve the quality of the care they deliver by helping them to better understand and gauge their own performance and to be better equipped to identify areas in need of improvement.<sup>33</sup>

One caveat here is that methodological challenges (such as small sample size or aggregation of data at the individual physician level) can hinder the ease of developing such reports.<sup>30</sup>

Providers and insurers alike acknowledge the importance of profiling as a building block for a wide variety of incentive models. The first step in rewarding good performance is being able to measure and recognize it. Performance data would need to be complete, accurate, and timely for this model to work. Effectiveness will increase if insurers and purchasers collaborate to develop common profiling measures and reports to address the issue of low patient volume, and if they use comparable data sources, methodologies, and formats for profiling performance. Some insurers recommended that performance profiles show provider performance over time and compare it to absolute benchmarks, while a few insurers believe that performance profiles should be linked to financial incentives or publicly distributed to create a meaningful and lasting provider incentive.<sup>32</sup>

**Publicizing performance:** With the advance knowledge of the providers, information on performance is publicly distributed. Potential positive or negative publicity is used to motivate providers to improve performance. Performance results can be presented at stakeholder meetings to hold providers.<sup>32</sup> Public performance reports can affect both the public and peer image of physicians, and concern for protecting reputations tends to motivate quality improvement among physicians.<sup>33</sup> Publicly sharing physician data also can be used to promote consumer engagement in healthcare decisions through publicity strategies

designed to educate members about variations in provider performance and to influence their choice of providers.<sup>30,32</sup> A growing number of states are providing consumers with “user-friendly” comparative information about physicians. Regardless of how data are used, public reports should have two main goals: informing the public and stimulating action (e.g., improving performance and sparking stakeholder interest in practice improvement).<sup>30</sup> However, thus far, current evidence does not indicate that publicizing information has significantly affected patient choice of provider.<sup>29,34</sup>

Providers and insurers support publicizing performance results as all agree that peer pressure and market forces create strong incentives for improvement. The potential to gain or lose patients and market share can be particularly powerful in competitive markets and among providers who are not operating at full capacity. This approach may be even more effective when applied to individual physicians. However, local medical leaders would need to support the model (e.g., by endorsing the validity of provider information) in order for it to be effective.<sup>32</sup>

**Technical assistance for quality improvement:** Technical assistance is offered to providers (especially high-volume providers who have relatively low performance on selected quality indicators) to help them achieve quality improvements. Organizations offering the technical assistance meet with low-performing providers to identify potential reasons for their performance. Assistance can include identifying best clinical or administrative practices, sharing examples of best practices, and brokering meetings between low- and high-performing peer groups. As an option, nonclinical quality improvement assistance (e.g., customer service, information technology, and billing procedures) can be applied. Alternatively, organizations can reduce malpractice premiums as an incentive for providers to improve. In another example, insurers or medical groups use administrative data to identify primary care patients who are overdue for preventive care services and offer to assist physicians in conducting outreach to these members. It is suggested that this type of technical assistance would be a significant incentive for physicians to increase their outreach to such patients.<sup>32</sup>

**Practice sanctions:** Provider performance on selected quality indicators is measured and a minimum performance level in targeted areas is established. Providers not meeting the minimum thresholds are required to implement quality improvement initiatives. If a provider’s performance remains below the threshold, the provider faces sanctions ranging from practice limitations to non-renewal of the contract.<sup>32</sup>

While providers generally find this model to be too punitive, insurers believe that provider sanctions can create a floor for acceptable performance. However, it is not known if provider sanctions can have a significant impact on improving quality of care within a short period. Providers should be given sufficient time to improve their performance before a contract is terminated. Moreover, it is unclear whether insurers would be willing and able to terminate contracts if providers did not meet the established thresholds.<sup>32</sup>

**Reducing administrative requirements:** An organization with administrative requirements for the provider implements this model by evaluating the performance of providers on targeted measures. Those who meet a best practice threshold are not required to meet existing administrative requirements. For example, a dominant insurer could exempt an obstetrician-gynecologist from pre-certification requirements if the physician's performance data demonstrate that the provider practices according to nationally accepted clinical guidelines for hysterectomies. However, if the insurer becomes aware of a potential negative change in the provider's performance on hysterectomy guideline compliance, the insurer reserves the right to reinstate the administrative requirement.<sup>32</sup> This model can be a strong incentive. However, reducing administrative requirements may be a greater incentive for office staff than for physicians. One issue raised by some insurers is that they have already eliminated many of the administrative requirements related to pre-certification and utilization review; they wondered what else they could do to ease providers' administrative burden.<sup>32</sup> An alternative approach that is gaining popularity is to link P4P to maintenance of board certification and recertification. Several health plans are working with the American Board of Internal Medicine and other board agencies to incorporate a board certification process into their incentive programs.<sup>35</sup>

To evaluate the effectiveness of various models of financial and non-financial incentives and financial penalties in improving performance, CHCS studied Medicaid managed care plans in five states.<sup>36</sup> The study found that:

- Both financial and non-financial incentives can be effective in motivating performance.
- Financial incentives can be effective at improving performance on specific indicators and at motivating contractors to implement untested quality improvement projects.
- Public presentation of data in an advisory group setting, or in meetings with stakeholders, is a particularly effective non-financial incentive for contractors.
- Financial penalties can be effective in maintaining a floor for contractor performance in specific areas and in obtaining more complete and timely data reporting from contractors.
- Incentive programs may be more effective with contractors for which the purchaser represents a significant portion of their business, or for which the performance incentives are consistent with other objectives of the contractor and its clients.
- Intrinsically motivated staff may respond to simple prioritization of performance measures and goal setting, but the contracted organization as a whole may need stronger extrinsic motivation to improve performance.
- Financial penalties may be less effective if plans budget for the loss, which takes away the potential motivating effect of the penalty.

- Strategies involving withholding or recouping funds are generally perceived as penalties by contractors, regardless of the extent to which performance-based financing is accounted for in the initial capitation rate.<sup>35</sup>

In designing incentive structure, the extent to which the selected measures and incentives relate to existing local and national market requirements should be considered as this may make them more effective. Conversely, other market parameters might attenuate the effectiveness of the incentives. Likewise, the concurrent market should be monitored on a continuous basis to identify likely opportunities and threads to incentive strategies.<sup>20</sup> Table 6 provides examples of incentive strategies that were challenged by concurrent market activities. Data on actual outcomes of P4P programs in terms of healthcare quality are scarce. Petersen et al reviewed studies assessing the effect of various financial incentives for improved performance on measures of healthcare quality (Appendix A)<sup>37</sup> and concluded that ongoing monitoring of incentive programs is critical to determine the effectiveness of financial incentives and their possible unintended effects on quality. Further research is needed to guide implementation of financial incentives and to assess their cost-effectiveness.<sup>37</sup>

**Table 6. Incentive and reward strategies that faced challenges due to concurrent market activities<sup>18</sup>**

Incentive Strategy	Sponsor	Confounding Market Activities
Physician bonus	Local Initiative Rewarding Results (LIRR), and Integrated Healthcare Association	<ul style="list-style-type: none"> <li>• Concurrent multi-HMO initiatives affecting common providers with separate measures for their incentives</li> </ul>
Tiered benefit design	Buyers Health Care Action Group	<ul style="list-style-type: none"> <li>• Hospitals were distracted by the national 100,000 Lives Campaign</li> </ul>
Tiered benefit design	HealthCare 21	<ul style="list-style-type: none"> <li>• Election year made public employers timid about implementing a change that faced political opposition</li> <li>• Health plans are developing high performance networks as a form of incentive and reward</li> </ul>

HMO, health maintenance organization

While P4P programs ideally use a combination of various incentive options, evaluation and comparison of the real-world effects of each individual incentive model in terms of quality improvement becomes complicated by the interaction of other incentives in place. The study by Peterson et al, for example, reviews the overall effectiveness of various P4P programs and not the individual incentive approaches. Other factors – such as various target groups, characteristics of patients, and market parameters – make it even more difficult to compare the effectiveness of incentive models across various P4P programs and call for more complicated methodologies (e.g., multivariate analysis, which necessitates a larger sample size).

Lindenauer et al used multivariate analysis to estimate the improvement attributable to financial incentives, comparing 207 hospitals with public reporting plus financial P4P programs to 406 hospitals with public reporting only.<sup>38</sup> The incentive consisted of a percentage bonus payment in addition to the usual Medicare reimbursement rate according to hospital's rank on a composite measure of quality; the additional payments were initially offset by financial penalties for the lowest ranking hospitals. The study showed that P4P hospitals had greater improvement in all measures of quality, ranging from 2.6% to 4.1% over a 2-year period, after adjusting for other differences.<sup>38</sup>

One particularly worrisome issue is the complicated nature of the interactions between populations' health and socioeconomic characteristics and P4P programs. As noted earlier, patient socioeconomic status can have a direct effect on provider performance. Because patients with lower socioeconomic status are likely to live in specific locations, carry heavier burden of disease, and be served by specific providers, it has been suggested that incentives based on performance can lead to lower payments to providers who are likely to be already challenged by sick patients with inadequate insurance coverage. This can effectively drive the providers out of the needy areas and/or result in "patient dumping" and "gaming" (i.e., manipulating the performance measurement by excluding patients for whom the targets have been missed).<sup>15,39</sup> While the reported effects of P4P programs on socioeconomic and health inequities might be small,<sup>40</sup> this issue is far too important to be ignored.

### ***How Much to Reward?***

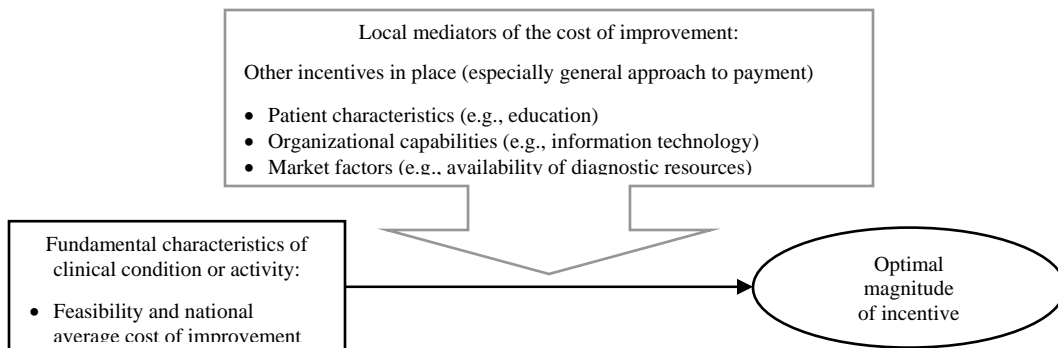
It is understandable that an incentive would be less likely to promote the desired improvement in performance if the payment is deemed insufficient in the eyes of the providers. The issue of payment amount, however, is a complicated one with many factors at play. After acknowledging the lack of a single answer to this question and the occasional disparity between incentive amounts and the resulting impact, the Agency for Healthcare Research and Quality identifies the key factors in deciding on the amount of rewards (Figure 2). Some key issues to consider here are the characteristics of the clinical condition or treatment, co-existence of other incentives, organizational capabilities, and patient/market variables.<sup>28,41</sup> The incentive target also should be considered.<sup>20</sup>

- **Characteristics of the clinical condition or treatment:** Some changes are easier than others (e.g., to get patients to take flu shots versus to quit smoking), and some interventions are less costly than others (e.g., Papanicolaou smears versus colonoscopies). Therefore, improving performance in areas with good feasibility and low cost should require smaller incentives.<sup>28</sup>
- **Other incentives already in place:** Incentives should be higher in capitated medical groups compared to those in a fee-for-service system in which providers already receive basic fees for the associated visits and procedures.<sup>10</sup> On the other hand, capitated services with salaried

physicians more easily adapt approaches aimed at reducing overuse of services.<sup>27</sup>

- **Organizational capabilities:** Large groups may have the resources to hire dedicated personnel to educate patients and ensure communication between specialists and primary care providers, whereas small groups/solo practices may find patient education and interprovider communication more challenging.<sup>28</sup>
- **Patient and market variables:** Providers with highly educated and affluent patients traditionally experience better patient adherence and cooperation, which may affect their performance ratings.<sup>42</sup> Market share of the payer should also be considered in determining the size of the bonus (particularly if investments in infrastructure or training are needed to achieve the quality goal). As such, a purchaser with large market share, like Medicare, may be able to promote change with a relatively smaller proportional bonus compared to a purchaser with small market share.<sup>28</sup>
- **The incentive target:** The nature of the provider (e.g., individual primary care physicians, small specialty group practices, large multispecialty group practices, hospitals) should be considered. Some believe that small cash payments can be effective with primary care physicians, whereas hospitals require larger rewards to change behavior.<sup>20</sup>

**Figure 2. Factors affecting the size of the incentives.**<sup>3,21</sup>



Due to uncertainty on this topic, many P4P programs place 5% or less of contracted revenues at risk for performance (and even lower amounts in hospitals). However, the amount at risk is on the rise,<sup>34,40</sup> and many insurers believe that financial incentives must equal approximately 10% of the total payments to be effective.<sup>43</sup> Similarly, Bridges to Excellence and others estimate that an incentive should be roughly 5%-10% of total provider annual income, and the Integrated Healthcare Association intends to increase the size of its financial bonus to 10% of physician group income by 2010.<sup>20</sup> On the other hand, the British National Health Service P4P program has provided for up to a 25% increase in a general practitioner's income through its incentives.<sup>15</sup>

Another consideration for the reward amount is based on shared savings. If quality improvement in a specific area is expected to result in savings, providers can be awarded with a part of the saved costs. For example, if hospitals reduce complication rates among patients receiving a particular procedure and the avoided complications save the purchaser \$10,000 in additional treatment costs, the hospital might receive 50% or \$5,000 of that saving.<sup>28</sup>

### ***Where Does the Money Come From?***

The main potential sources of funding for a P4P program include: existing funds, generated savings, and new money. Combinations of these sources are often used in current P4P initiatives, though new money is rarely agreeable to payers.<sup>44</sup> As such, no P4P program in effect in the United States was designed to increase the total expenditures to provide for the incentives.<sup>39</sup> Therefore, current incentives are usually budget-neutral and come from the existing funds rerouted away from the poor performers. Existing funds represent monies that are already projected to be part of the payment system. Payment incentives could be financed by reducing the base payments of all providers or by reducing scheduled payment increases.<sup>44</sup> Some of the approaches used to finance P4P incentives with existing funds include:

- Linking scheduled rate increases to providers meeting certain performance measures
- Funding “challenge pools” where unearned bonus monies or unearned withheld payments are paid to high performing providers
- Reallocating monies collected for penalties and redistributing them as incentives to high performers
- Withholding a portion of payments and redistributing it later according to performance level<sup>24</sup>

Another likely source would be the reduced cost of subpar performances targeted by the P4P program as discussed earlier.<sup>28</sup> The generated-savings model creates a reward pool through cost-reducing reforms and efficiencies; however, these efficiencies have not yet been adequately demonstrated in pay-for-performance efforts.<sup>44</sup>

Another source for incentives is the addition of funds to the system. The new-money model, for example, taps the Medicare trust funds or calls for a separate appropriation of general revenues that would be awarded as bonuses to high-quality providers in addition to the scheduled base payments and updates that all providers receive.<sup>44</sup> As another example, the P4P program of the National Health Service of the United Kingdom was funded by additional monies instead of restructuring payment systems. In its first year, however, providers’ performance far exceeded the predicted targets, achieving 97% of all possible points on average; this resulted in substantial costs to the taxpayers and added to the budget deficit.<sup>15</sup> It is still unclear if this exceptional performance was the result of

real improvements in care, targets that were too low and too easy to achieve, better documentation, or exclusion of unfavorable patients.<sup>27</sup> One possible alternative is providing credit to high performers in the form of tax reduction and other benefits. As a side note, funding for the development, implementation, and evaluation of activities related to P4P programs should be considered in the expenditures as well.<sup>30</sup>

### **Quality Measures in the P4P Process**

The ability to evaluate and measure quality is an important component in delivering and rewarding high quality care. One of the major components of any P4P program is the ability to measure quality accurately and consistently through the use of quality measures. CMS is collaborating with a variety of stakeholders to develop and implement uniform, standardized sets of performance measures for various healthcare settings. For example, ambulatory care improvement measures have been developed by CMS working with the AMA's Physician Consortium for Performance Improvement and the National Committee for Quality Assurance. The Physician Consortium for Performance Improvement consists of members from 79 national medical societies (including SCCM), 18 state medical societies, and 4 federal agencies. Late last year, the measures from this process were submitted for review and comment to the National Quality Forum, a nonprofit organization that represents a broad range of healthcare stakeholders and provides endorsement of consensus-based national standards for measurement and public reporting of healthcare performance data. Additionally, as mentioned earlier, a joint House-Senate working agreement with the AMA was established in December 2005, with two of the goals being the development of 140 physician performance measures covering 34 clinical areas by the end of 2006 and voluntary reporting to the CMS on at least three to five quality measures per physician in 2007.<sup>6</sup> As of July 2007, the Consortium had produced 184 measures in 27 clinical areas.

#### ***SCCM's Pay-for-Performance Task Force formed the Quality Measures***

Subcommittee and charged it as follows: "The quality subgroup, after examining all of the available evidence (mainly Outcomes Task Force results, VHA [Veterans Health Administration] and JCAHO [Joint Commission on the Accreditation of Healthcare Organizations] materials) will recommend three to five measures based on physician impact, evidence that quality is impacted, ease of measurement, etc. The criteria you use should be explicit and reproducible. The format of presentation should be similar to how VHA presented it, as well as the Consortium's newly released perioperative measures."

#### ***Process***

Based on the existing literature, the subcommittee members chose a variety of quality measures as potential measures to be included in the final recommendations. Initially, the subcommittee decided to recommend several simple measures applicable to a critical care practitioner (deep venous

thrombosis or stress ulcer prophylaxis), rather than measures requiring coordinated effort among hospital disciplines (ventilator-associated pneumonia prevention or early goal-directed resuscitation) or intensive care unit (ICU)/hospital outcomes (mortality, length of stay). The measures had to be evidence based, published in peer-reviewed journals, and have support statements of quality impact from a recognized clinical organization. In most cases, process measures were a better fit than outcome or structure measures, which may not be completely under the control of the Intensivist. As the measures were debated, they were operationalized into a standard format that would be both inclusive and portable, allowing their use by any P4P program. The AMA Physician's Consortium quality measures template served as a model for development.

### ***Results***

Five quality measures were developed as test measures to be considered for presentation by the Consortium or other representatives, and as educational items for SCCM members involved in implementing quality programs at their institutions (Appendix B). Each measure consists of three components: data elements (including questions to be answered and what the data sources are), the clinical performance measure (including the clinical measure, numerator, denominator, and denominator exclusions), and feedback per physician population (consisting of the percentage of patients where the measure was in place, suggested items for improvement, and acceptable variance criteria). References are also listed.

### ***Measures***

- Deep venous thrombosis prophylaxis
- Low tidal volume in adult respiratory distress syndrome
- Maximal barrier precautions for central venous catheter insertion in pediatric patients
- Prevention of catheter-related infection: preferential use of subclavian vein
- Stress ulcer prophylaxis

### ***Next Steps***

As the organization representing primary stakeholders in the ICU, SCCM – through its Pay for Performance Task Force and Physician Consortium representative – will work with other societies representing Intensivists, as well as the Physician Consortium, National Committee for Quality Assurance, and National Quality Forum, in an effort to establish a measure set that will accurately and fairly represent the quality of an intensivist's practice and can be readily adopted by any P4P program in which Intensivists participate.

It will be necessary for this quality measures group and SCCM to establish benchmarks of acceptable performance. Educational campaigns on the implementation and importance of these measures will be necessary to assure optimal performance and provider reimbursement.

The Society's role in defining quality measures in critical care does not stop with the individual physician. Institutional measures are important in ventilator-associated pneumonia, sepsis bundles, glycemic control, and ICU mortality, and would be appropriate for future areas of development.

### **Information Technology in P4P Programs**

There is a tremendous movement on numerous paths that are working diligently toward incorporating information technology (IT) totally and seamlessly into American healthcare. These efforts are coming from multiple sources, including governmental agencies, private organizations and vendors. In several State of the Union addresses, President George W. Bush stated, "Computerizing health records (will) reduce costs, improve care, and lower the risk of medical mistakes," and "We need to reduce costs and medical errors with better information technology." In fact the government has encouraged the expanded adoption of HIT by establishing both the position of National Information Technology Coordinator in 2004 and the National Health Information Infrastructure. This group issued a report in late 2006 entitled "Functional Requirements Needed for the Initial Definition of a Nationwide Health Information Network (NHIN)" (<http://www.ncvhs.hhs.gov/061030lt.pdf>).

Numerous bills concerning HIT have been written and can be tracked by federal initiatives

([http://www.ehealthinitiative.org/assets/documents/eHIHITLegislationCrosswalk09\\_1006.pdf](http://www.ehealthinitiative.org/assets/documents/eHIHITLegislationCrosswalk09_1006.pdf)) and state initiatives

(<http://ccbh.ehealthinitiative.org/communities/community.aspx?Section=288> ).

Additionally, two private organizations, eHealth Initiative

(<http://www.ehealthinitiative.org/>) and Connecting for Health

(<http://connectingforhealth.org/index.html>), exist to promote and propagate the expansion and interconnectivity of HIT.

Although none of these exists solely for the benefit of P4P programs, all are coming together to allow the IT component of P4P programs to become a reality, regardless of whether the data collection occurs in a physician's office, hospital, managed care organization (MCO), or governmental agency.

Thus, IT will continue to play a larger role as more organizations establish P4P programs. IT roles will include, but not be limited to, data collection and aggregation, benchmarking to preset quality standards, feedback processes for improvement, and disseminating information about best practices. This section will discuss healthcare IT development drivers, IT requirements for a P4P program, current available solutions and limitations, and potential interfaces with other electronic healthcare systems.

### **Vendors**

Just as quality measures will be an integral part of any P4P plan, so will IT. As with the evolution of quality measures, there will be a mosaic of vendors,

organizations, and ideas contributing to how IT will ultimately look in the P4P movement. A wide diversity of P4P programs is likely, based on physician practice (primary care, specialist, hospital-based), location (office, hospital), and payor (MCO, employer, governmental agency). Similarly a variety of IT programs will depend on point of data collection (physician, MCO, hospital, governmental agency), source of abstracted data (charts, electronic medical records [EMR], flow sheets, databases, or administrative claims data), and the data intermediary (vendors, MCOs, or governmental agencies).

As the P4P movement moves forward, several matters have become clear relevant to IT:

1. All IT solutions will be dependent on the P4P program and the quality measures that will be followed.
2. The most successful IT solutions will be those that present the lowest data burden on healthcare providers.
3. Physicians/hospitals will need financial assistance in adopting and implementing IT solutions for P4P programs.

Investment in a universal interoperable HIT infrastructure is expected to result in significant return on investment, estimated to be between \$140 billion and \$170 billion per year (close to 10% of total U.S. health spending), but no specifics have been discussed regarding how some of these savings could be used to increase the EMR penetration in physicians' practices. The majority of these savings would be achieved by reducing duplicative care, lowering healthcare administrative costs, avoiding costly medical errors, and optimizing quality care. It is also estimated that \$10,000 to \$20,000 per physician per year will be needed to implement an EMR system.<sup>5,45</sup>

To learn more about the plans of private vendors regarding P4P programs, the SCCM Pay for Performance Task Force queried all major domestic hospital IT providers. Information was requested regarding their specific plans and developed products for P4P programs and the measurement of core measure performance. Only one of five private vendors formally responded, and it became clear that most of the efforts have been conceptual without any formal work on a product or feature. This is not a surprise since there are no formal or described P4P programs for critical care physicians at the time of this writing. There would be little reason to design a product or feature that did not align with a program. However, it is clear that the company that did respond has a solid understanding of P4P and will be well positioned to act when the initiatives become clear.

In the interim, what can an Intensive care community do to begin the IT process in anticipation of P4P programs? One of the easiest to use and cheapest products is a *patient registry*. Simply put, a registry is a list of all patients in a practice who share a common characteristic, such as a specific disease (i.e., diabetes) or medication regimen (i.e.,  $\beta$ -blockers). Registries are not EMRs and would be only a short-term solution for physicians. They would be worthwhile in

Intensivist offices that also have an outpatient practice, as it requires following a patient base over a long time with recurrent visits. For those wishing to learn more about registries and what is in the public domain and commercially available, visit <http://www.acponline.org/journals/news/sep05/patient.htm>.

It is beyond the scope of this paper to discuss EMR functionality or standards as no known vendors (private, MCO, regulatory body, etc.) have a product for P4P programs specific to hospital-based physicians, including Intensivists. There is a significant problem with IT penetration in healthcare overall. Currently, less than 10% of US hospitals have adopted HIT,<sup>46</sup> while only 16% of primary care physicians use EMRs.<sup>47</sup> The healthcare industry spends only 2% of gross revenues on IT, whereas other information-intensive industries spend upwards of 10%.<sup>48</sup> One of the major obstacles to increasing the diffusion of IT in healthcare is Interoperability, which would involve standards that permit communication between existing and developing systems. The development of standards for EMR interoperability is at the forefront of the national healthcare agenda.<sup>49</sup> As previously mentioned, the Office of the National Coordinator for Health Information Technology (ONC) was established in 2004. This was created partly to address interoperability issues and to establish a National Health Information Network (NHIN). Under the ONC, regional health information organizations (RHIOs) have been established in many states to promote the sharing of health information. Congress is working on legislation to increase funding to these and similar programs.

It is hoped that some of the issues related to standards will be addressed and resolved by the Certification Commission for Healthcare Information Technology (CCHIT), a private nonprofit group that was funded in 2005 by the U.S. Department of Health and Human Services to develop a set of standards and certify compliant vendors. On July 18, 2006, CCHIT released its first list of 20 certified ambulatory EMR and electronic health record products,<sup>50</sup> then on July 31, 2006, announced that two additional products had achieved certification.<sup>51</sup> Although the initial standardization/certification thrust has been in the ambulatory arena, it is hoped that this process will soon encompass hospitals and systems.

For intensivists who also have an outpatient practice, the data collection and functionality will depend on the P4P program used. In some cases, the use of registries may make sense; in other cases, it may be necessary to evolve an EMR that is either office-based or tied to a hospital system. Physicians may receive significant financial incentives from either MCOs or regulatory agencies to invest fully in an EMR system with P4P/core measure reporting capabilities. This will be necessary to offset the estimated costs of \$10,000-\$20,000 per year per physician.

### ***IT Costs***

The IT systems must have the capability to track and report key performance data with the flexibility to respond to changing P4P parameters. Minimal

requirements will include, but not be limited to, the ability to analyze current data and compare them to previous performance data, but also to benchmark these data against national standards when available.

The costs associated with designing, implementing, and maintaining a computer-based infrastructure for P4P initiatives will vary among institutions. For an IT system to be successful, the process of collecting and reporting quality performance must be seamless to the end user. Additional steps that are added to a person's job responsibilities can result in increased costs, errors, and non-compliance. Appropriate data must be collected in a manner allowing easy analyses.

Factors influencing the design and associated costs of such a system include the type of existing software for patient-level (clinical) data and financial (billing) data. An important cost driver is the time needed to ensure that all current systems communicate with each other. For example, laboratory data and drug data should be linked so that both drug selection and proper laboratory monitoring parameters can be evaluated. If projected clinical and financial elements for performance reporting are not being collected electronically, additional programming will be needed. If data are not recorded (i.e., patient education for smoking cessation), then such information will need to be added into the system, which will increase costs.

Another scenario is a hospital that purchases a new clinical/financial information system from a vendor. These systems most likely have not been configured to comply with P4P requirements because they were implemented before P4P. They may not have the ability to allow data collection and manipulation to comply with requirements. As such, additional hardware, software, and personnel costs will be associated with this development. To complicate the situation, an information system that is used on ward patients may not be pertinent to the ICU environment. An information system must be applicable to both patient sets because many patients are transferred to and from the ICU, and future performance measures may need to be captured before or after the ICU stay. Attention will need to be paid to Health Insurance Portability and Accountability Act (HIPAA) and other regulatory compliance rules. Patient data will need to be de-identified, and this process will incur additional costs. Once an IT system is operational, there are costs associated with product upgrades and updates to the data needed for generating reports. For example, the system must be responsive to changes in P4P variables and associated disease states.

Once hardware and software costs, including licensing fees, are determined, the remaining costs will be personnel. Such costs will be difficult to determine precisely at the onset of the project, but they may be substantial and projections should be as inclusive as possible. Developmental cost elements include time required for clinical and administrative personnel to determine what data are needed and to communicate findings to the programmers. The total time

required to achieve the final product will be a function of the effectiveness of this iterative process. Effective communication is crucial. Once the system is developed, there may be training costs for the healthcare providers, information system personnel for maintenance, and support staff. A designated trainer may need to be employed. These costs will be high during the early years, but will eventually evolve into a steady-state mode with cost drivers such as software and hardware upgrades.

### ***Partnering with Hospitals and Other Resources***

One of the issues facing smaller organizations or those in a rural-based or low-volume system is the lack of IT infrastructure, which can make participating in P4P more challenging. Smaller groups and hospital systems may have neither the initial capital nor the support staff required to implement and maintain IT systems within their hospital-based work environment. However, some systems have created IT solutions that have applicability for P4P but also have the potential to be utilized for process improvement and efficiency, such as work flow or billing. Perhaps more crucial in this specialized circumstance, but critical for larger organizations as well, is the potential interface(s) with the current hospital system(s) for all end users. Ideally, IT should allow tracking of quality improvement initiatives with real-time feedback at the provider level to have significant impact.

With quality initiatives coming to the forefront on a national level and as P4P moves forward, other resources and potential partnerships are becoming available. One of the expectations of the Statement of Work for the Eighth Quality Improvement Organization (QIO) Contract cycle, in effect from August 2005 to July 2008, was the assistance to providers to help bring the right care every time to every person. To help providers achieve this, the QIOs will help providers begin to make changes in four key areas: measuring and reporting on quality, redesigning care processes, transforming organizational culture, and adopting and effectively using health IT to support these objectives.<sup>52</sup>

The latest document can be found at

[http://www.cms.hhs.gov/QualityImprovementOrgs/04\\_9thsow.asp#TopOfPage](http://www.cms.hhs.gov/QualityImprovementOrgs/04_9thsow.asp#TopOfPage).

Specifically mentioned is systems adoption and expectation to assist providers in these goals. This may provide an interface with the P4P initiative. The QIOs are working with a sample of at least 10% of the primary care practices within a QIO's region/state.<sup>53</sup> The specialist requirements for IT may be further addressed according to a white paper released by the Institute of Medicine (<http://www.iom.edu/CMS/3809/19805/33411.aspx>).

The QIO is seeking quality measures on four major clinical areas: acute myocardial infarction, heart failure, pneumonia, and the surgical complications improvement project (SCIP). In addition, recommendations for structural changes for rural/low volume hospitals include IT and patient safety processes. A key component is to facilitate adoption of health information technologies with

physicians receiving unbiased guidance with EMR selection and similar technologies.

Most of the work with the current IT platforms for P4P has involved outpatient care with preventive measures receiving a high priority. As the market demand increases for P4P IT solutions, especially in areas such as critical care units, companies will begin efforts to define standards and platforms within their own suite of products. Because critical care is an inpatient service and the costs of an EMR are financed by the hospital system, the EMR may provide a venue for the P4P performance measures. However, despite the Institute of Medicine deeming four key functions critical for electronic health records, estimates<sup>54</sup> are that only 1 in 4 community-based physicians use EMR, with only 9% incorporating at least four of the functions recognized as key.

Since the care providers and systems with which the EMR interfaces (i.e., laboratory systems) store the necessary data, it would seem a logical central place for P4P data generation. Registries manage only selected information relevant to one or more chronic diseases and thus data points are entered in required, preselected fields. In contrast, the EMR has initially been developed to meet the requirements for documentation and providing clinical care, not a data warehouse for such programs as P4P. Compared to a registry, the EMR contains more comprehensive information about patient's health problems, medical history, and treatment. While several electronic health record products can incorporate registry tools, the expense and initial investment may be cost prohibitive, especially for smaller systems. At the time of this writing, the search engines for the EMR that are affordable and efficient at data extraction have yet to be developed. Problems have been encountered with data acquisition tasks within the EMR include interoperability issues,<sup>55</sup> consistent terminology usage, and processing time in clinical reports that may interfere with clinical usage and productivity.<sup>56</sup>

With the development of the EMR, computerized provider order entry (CPOE) – initially developed to reduce medical errors, improve quality of care, and reduce cost – now provides an avenue to communicate with providers on health-related issues with their patients. The penetration of these CPOE systems is estimated to be only 1 in 20 hospitals.<sup>54</sup> CPOE systems can provide protocols or order sets unique to the ICU which can be initiated at a provider's request or triggered by certain parameters (e.g., clinical diagnosis, surgical procedures, specific medications). The system ideally should recommend subsequent actions after certain orders have been entered, which could cue the provider to ensure that P4P parameters were being met. In one study, hospitalized patients at risk for deep venous thrombosis without prophylaxis were identified using a computer program. The responsible physician was randomized to control (no alert) or intervention (physician received an electronic computer alert about ordering prophylaxis). The intervention group had more prophylaxis ordered (mechanical

or pharmacological) and a significantly reduced risk of thromboembolism at 90 days compared to the control group.<sup>57</sup>

This system could potentially provide links for decision support, including government and professional society Web sites and searchable databases. A recent study showed that only 40% of physicians use real-time computerized decision support.<sup>55</sup>

With the complexity of all the databases used within and between hospitals, there is an increasing demand for IT solutions as P4P moves forward. Implementing these systems requires not only the direct costs of the products and hardware but the technical and programming support and personnel training costs. Training will be required of the healthcare providers who enter data in to these systems. In a recent survey of American senior medical health plan executives, the majority with P4P programs being created or piloted stated that they have a program that actively promotes physician adoption of technology to improve care; despite these statements, only 33% actually implement physician adoption of technology as a P4P incentive.<sup>58</sup>

One additional concern is legal issues with the data obtained for this program. Some companies house the data in their own warehouse and legal establishment to ensure that data are protected to meet HIPPA and compliance regulations, as well as retained by the appropriate institutions and healthcare providers as needed. The long-term financial stability of certain vendors and their products makes this legal ownership and responsibility crucial. Appropriate security features must prevent unauthorized data access, privacy issues, and other HIPPA issues.

### ***IT Conclusions***

In a recent survey in Massachusetts, a state that has performance criteria incentives widely instituted by health care plans, the use of IT as part of these incentives was 52%.<sup>59</sup> As the demand for P4P IT solutions increases, the market will should drive the development of IT solutions. However, for the best performance, the data should be able to be gleaned from current medical systems without adding additional work for the end users.

The hardware and software requirements, as well as required training and support staff, are dependent upon particular clinical performance measures. The IT system must be able to measure and manage clinical service level outcomes for the P4P parameters. Additional capabilities should include, but not be limited to: comparative best practice benchmarking; rigorous comparisons using standard evidenced-based measures; statistical comparative and longitudinal reports, which would provide valuable information for monitoring improvement and which will need to be readily available for continuous accreditation and survey by the physician. The system also will need to have the flexibility to adapt to changing parameters with quality advancements in medicine.

Interfacing with IT systems available for patient care may provide rules engines for recommended quality measures as well as physician access to evidence-based medicine content. For example, with provider order entry, a pop-up window could serve to alert care providers of potential P4P parameters and additional orders that may be required. Using the EMR to provide the data for P4P will require further development of appropriate interfaces including search engines. IT continues to develop rapidly and more solutions should be available for the provider.

### **Position of SCCM and How the Programs Might Impact Intensivists – What We Feel the Programs Should Consist of and Why**

The SCCM is a multidisciplinary medical organization of healthcare professionals dedicated to the care of the most critically ill patients. The motto of the SCCM is “Right Care, Right Now.” which is very similar to the 2005 Centers for Medicare and Medicaid Services (CMS) Quality Improvement Roadmap vision of “the right care for every person every time.”<sup>4</sup> The CMS Roadmap’s aims were to “make care safe, effective, efficient, patient-centered, timely and equitable.”<sup>60</sup> The SCCM fully supports these aims as they relate to critically ill patients. One of the system strategies proposed by CMS for achieving the goals of the “Roadmap” was to “pay in a way that expresses our commitment to supporting providers and practitioners for doing the right thing – improving quality and avoiding unnecessary costs – rather than directing more resources to less effective care.” This strategy of paying in a way that reinforces a commitment to quality has been termed *quality-based purchasing*, *value-based purchasing*, or more commonly *pay for performance* (P4P).<sup>61</sup>

The American Medical Association, American Academy of Family Practice, American College of Physicians, and others have all published position papers or guidelines on P4P programs.<sup>10,62,63</sup> However, due to the complexity and acuity of critically ill patients and the multidisciplinary nature of critical care medicine, special considerations are needed when implementing P4P programs for intensivist physicians. Also, the setting of the care (ICU/hospital) is another issue for special consideration in critical care, because most of the available models/examples are based on primary care and/or care of chronic diseases carried out at private offices. Here, we are dealing with grave situations that can quickly lead to mortality or great morbidity, handled at a sophisticated center (as mentioned, with many different players working together) but with less long-term follow-up and care than in chronic disorders. The SCCM believes the following guidelines should be followed when implementing a P4P program directed at intensivist physician performance.

1. The goal of a P4P program is to improve patient care.
  - A. Quality measures must be evidence-based and be accurate indicators of patient’s care and outcomes.

- B. Quality measures must be developed, maintained, and reviewed in an open and transparent process.
  - C. Quality measures must be under the direct control of the intensivist physician.
  - D. Performance measures involving outcomes (i.e., mortality, morbidity, etc.) must be adjusted for risk.
  - E. P4P programs must demonstrate improved quality of patient care as a result of implementation of outcome measures.
  - F. Before implementation, P4P programs must be pilot-tested to ensure valid data collection and accuracy.
  - G. Quality measures must be reviewed at least every 2 years.
  - H. The best programs would provide expert opinion and discussion with suggestions for improvement.
2. Physician participation is voluntary.
    - A. Physicians must be able to opt-in or opt-out of a P4P program.
    - B. Opting-out must not have negative economic consequences.
    - C. Physician participation in P4P must not be linked to participation in other health plans or governmental programs.
    - D. Programs must be phased in to allow physician participation.
    - E. Physicians must be notified at least 6 months in advance, in writing, regarding new P4P opportunities or changes in existing programs or rewards.
  3. Data collecting must be simple and valid.
    - A. Patient privacy and security of all data must be protected at all times consistent with HIPAA.
    - B. Data collection and reporting must be simple and reliable.
    - C. Audit systems must be implemented to ensure accuracy of data.
    - D. Physicians must be reimbursed for any added costs incurred as a result of participating in the program.
    - E. Performance data should be aggregated and analyzed by an independent entity, audited by an independent third party, and reviewed by the reporting physician or group with all costs paid for by the program.
    - F. Feedback on performance data should be provided monthly and compared against historical norms, peers, and performance targets in a clear and easy to understand format.
  4. Confidentiality and public reporting are important.
    - A. Physicians should be assessed in groups or across systems rather than individually if possible.
    - B. Physicians must be able to see preliminary ratings and be given an opportunity to improve before ratings are publicly released.
    - C. There must be a formal appeal process before public release of ratings.
    - D. Results of P4P programs must not be used for health plan credentialing, hospital privileges, licensure, or board certification.
    - E. Individual physician P4P data must remain confidential and non-discoverable in legal proceedings.

5. Use of information technology (IT) should be encouraged, but not required for participation in P4P programs.
  - A. Programs must not favor physician practices by IT capabilities.
  - B. Programs must not require practices to purchase health plan-specific IT programs.
  - C. Programs must be designed to minimize financial and IT barriers to physician participation.
  - D. Programs must provide tools to facilitate participation.
  - E. Programs must provide funds to encourage the use of IT.
6. P4P programs should be based on rewards, not penalties.
  - A. P4P programs should utilize new money funded with a portion of the projected health plan savings.
  - B. There should be no reduction in existing fees paid to physicians as a result of implementing a P4P program.
  - C. P4P programs must provide additional incentives to purchase and utilize IT and electronic medical records.
  - D. Rewards must be greater than the costs associated with participation in the program.
  - E. Rewards should be of a significant magnitude to encourage desired behaviors and support continuous improvement.
  - F. Rewards should be provided for achieving program goals and for performance improvement.
  - G. Ranking with other physician participants or groups should not occur, and rewards must not be based on rank.

## **Conclusions**

The pay for performance “movement” has progressed extremely rapidly since the impetus was initiated by CMS and Congress in December 2005. This rapid movement has culminated with the Physician Quality Reporting Initiative, which began in January 2007, and the value-based purchasing program for hospitals, which began in October 2008. It has become clear that P4P programs are likely here to stay. Several unanswered questions include how much of a professional’s income will be controlled by P4P programs, where the money for the programs is coming from, and how much these programs will impact the quality of care delivered to patients. As quality measures mature and the IT systems needed for these programs proliferate at the practitioner level, some of these questions will be answered. It is the intent of the SCCM to remain active in this process during its evolution.

## **References**

1. Iglehart JK. Linking compensation to quality — Medicare payments to physicians. *N Engl J Med.* 2005;353:870-872.
2. 2006 Medicare physician payment update and claims processing— questions and answers. *AMA Bulletin.*

- <http://www.arkeyemds.org/medicare06qanda.pdf>. Accessed July 20, 2009.
3. Position statement of the American College of Physicians on Pay-for-Performance. Subcommittee on Pay-for-Performance. Institute of Medicine. July 25, 2005.  
<http://www.acponline.org/ppvl/policies/e001066.html>.
  4. Centers for Medicare & Medicaid Services. CMS quality improvement roadmap.  
<http://www.cms.hhs.gov/CouncilonTechInnov/downloads/qualityroadmap.pdf>. Accessed July 20, 2009.
  5. Epstein AM, Lee TH, Hamel MB. Paying physicians for high-quality care. *N Engl J Med*. 2004;350:406-410.
  6. Pear R. A.M.A. to Develop Measure of Quality of Medical Care. *New York Times*. February 21, 2006.  
[http://www.nytimes.com/2006/02/21/politics/21docs.html?\\_r=1&scp=1&sq=ama%20measure%20quality&st=cse](http://www.nytimes.com/2006/02/21/politics/21docs.html?_r=1&scp=1&sq=ama%20measure%20quality&st=cse). Accessed June 1, 2009.
  7. Adler D. P4P Promise. *Employee Benefit News*. June 1, 2006.  
<http://www.benefitnews.com/detail.cfm?id=9032>
  8. Med-Vantage Web site.  
<http://www.medvantage.com/Content/solutions.p4p.php4>
  9. Pay for performance programs for providers continue to increase, diversify in 2005. Med-Vantage Web Site.  
[http://www.medvantage.com/Pdf/Press\\_Release\\_Nov\\_17\\_P4P\\_Survey\\_Final.pdf](http://www.medvantage.com/Pdf/Press_Release_Nov_17_P4P_Survey_Final.pdf). Accessed July 20, 2009.
  10. American College of Physicians. Linking physician payments to quality care. Philadelphia, PA: American College of Physicians; 2005: Position paper.  
[http://www.acponline.org/advocacy/where\\_we\\_stand/policy/link\\_pay.pdf](http://www.acponline.org/advocacy/where_we_stand/policy/link_pay.pdf). Accessed February 10, 2009.
  11. Epstein AM. Paying for performance in the United States and abroad. *N Engl J Med*. 2006;355:406-408.
  12. CMS Hospital Value-Based Purchasing Workgroup with Assistance from the RAND Corporation, Brandeis University, Booz | Allen | Hamilton, and Boston University. U.S. Department of Health and Human Services Medicare hospital value-based purchasing options paper. April 12, 2007.  
<http://www.cms.hhs.gov/AcuteInpatientPPS/downloads/HospitalVBPOptions.pdf>.
  13. Pear R. Study tells U.S. to pay more for the best medical care. *New York Times*. October 31, 2002:A21.  
<http://www.nytimes.com/2002/10/31/us/study-tells-us-to-pay-more-for-the-best-medical-care.html>. Accessed June 5, 2009
  14. Shekelle P. New contract for general practitioners. *BMJ*. 2003;326:457-458.
  15. Doran T, Fullwood C, Gravelle H, et al. Pay-for-performance programs in family practices in the United Kingdom. *N Engl J Med*. 2006;355:375-384.

16. Darves B. Patient registries: a key step to quality improvement. ACP Internist. <http://www.acponline.org/journals/news/sep05/patient.htm>. Accessed July 20, 2009.
17. Premier Inc. releases groundbreaking evidence that improving patient care can reduce costs, save lives. June 20, 2006. Premier Inc. Web site. <http://www.premierinc.com/about/news/06-jun/p4p.jsp>. Accessed July 20, 2009.
18. Centers for Medicare & Medicaid Services (CMS)/ Premier Hospital Quality Incentive Demonstration (HQID) project. Findings from year two. May, 2007. <http://www.premierinc.com/quality-safety/tools-services/p4p/hqi/resources/hqi-whitepaper-year2.pdf>. Accessed July 20, 2009.
19. Principles for the construct of pay-for-performance programs. JCAHO Web site. April 28, 2009. <http://www.jointcommission.org/PublicPolicy/pay.htm>. Accessed July 20, 2009.
20. Bailit M, Dyer MB, Joseph M. Incentives and rewards best practices primer: lessons learned from early pilots. The Leapfrog Group. July 2006. [http://www.bailit-health.com/articles/bhp\\_incentives.pdf](http://www.bailit-health.com/articles/bhp_incentives.pdf). Accessed July 20, 2009.
21. Mood-Williams J. Legal and regulatory issues to consider when developing a pay-for-performance program. Centers for Health Care Strategies Web site. [http://www.chcs.org/usr\\_doc/Williams\\_Legal\\_Issues.pdf](http://www.chcs.org/usr_doc/Williams_Legal_Issues.pdf)
22. Rosenthal MB, Dudley RA. Pay-for-performance: will the latest payment trend improve care? *JAMA*. 2007;297:740-744
23. Highsmith N, Rothstein JR. Rewarding performance in Medicaid managed care. Centers for Health Care Strategies Web site. March 2006. [http://www.chcs.org/publications3960/publications\\_show.htm?doc\\_id=359986](http://www.chcs.org/publications3960/publications_show.htm?doc_id=359986). Accessed July 20, 2009.
24. Dyer MB. If money talks, who listens: developing your incentive program. October 12, 2006. Centers for Health Care Strategies Web site. [http://www.chcs.org/usr\\_doc/Dyer\\_Money\\_Talks.pdf](http://www.chcs.org/usr_doc/Dyer_Money_Talks.pdf). Accessed July 20, 2009.
25. Bokhour BG, Burgess JF Jr, Hook JM, et al. Incentive implementation in physician practices: a qualitative study of practice executive perspectives on pay for performance. *Med Care Res Rev*. 2006;63(1 Suppl):73S-95S.
26. Verdier J, Felt-Lisk S, Smieliauskas F, et al. Quality-related provider and member incentives in Medicaid managed care organizations. July 2004. Centers for Health Care Strategies Web site. [http://www.chcs.org/publications3960/publications\\_show.htm?doc\\_id=233880](http://www.chcs.org/publications3960/publications_show.htm?doc_id=233880). Accessed July 20, 2009.
27. Rowe JW. Pay-for-performance and accountability: related themes in improving health care. *Ann Intern Med*. 2006;145:695-699.
28. Dudley RA, Rosenthal MB. Pay for performance: a decision guide for purchasers. AHRQ Publication No. 06-0047, April 2006. Agency for

- Healthcare Research and Quality Web site.  
<http://www.ahrq.gov/qual/p4pguide.pdf>. Accessed July 20, 2009.
29. Lee TH, Zapert K. Do high-deductible health plans threaten quality of care? *N Engl J Med*. 2005;353:1202-1204.
  30. Llanos K, Dyer MB. Physician pay-for-performance in Medicaid: A guide for states. 2007. Center for Health Care Strategies Web site.  
[http://www.chcs.org/usr\\_doc/Physician\\_P4P\\_Guide.pdf](http://www.chcs.org/usr_doc/Physician_P4P_Guide.pdf). Accessed July 20, 2009.
  31. State financial and non-financial performance incentive models. Center for Health Care Strategies Web site.  
[http://www.chcs.org/usr\\_doc/Incentive\\_Model\\_Options.pdf](http://www.chcs.org/usr_doc/Incentive_Model_Options.pdf). Accessed July 20, 2009.
  32. Bailit Health Purchasing, LLC. Provider incentive models for improving quality of care. National Health Care Purchasing Institute. March 2002.  
<http://www.bailit-health.com/articles/NHCPI-incentive-models.pdf>. Accessed July 20, 2009.
  33. Hibbard JH, Stockard J, Tusler M. Hospital performance reports: impact on quality, market share, and reputation. *Health Aff (Millwood)*. 2005; 24:1150-1160.
  34. Rosenthal MB, Fernandopulle R, Song HR, Landon B. Paying for quality: providers' incentives for quality improvement. *Health Aff (Millwood)*. 2004; 23:127-141.
  35. Cassel CK. Pay-for-performance and accountability. *Ann Intern Med*. 2007;146:822-823.
  36. Dyer MB, Bailit M, Kokenyesi C. Are incentives effective in improving the performance of managed care plans? March 2002. Center for Health Care Strategies Web site.  
[http://www.chcs.org/publications3960/publications\\_show.htm?doc\\_id=211347](http://www.chcs.org/publications3960/publications_show.htm?doc_id=211347). Accessed July 20, 2009.
  37. Petersen LA, Woodard LD, Urech T, Daw C, Sookanan S. Does pay-for-performance improve the quality of health care? *Ann Intern Med*. 2006; 145:265-272.
  38. Lindenauer PK, Remus D, Roman S, et al. Public reporting and pay for performance in hospital quality improvement. *N Engl J Med*. 2007;356: 486-496.
  39. McMahon LF Jr, Hofer TP, Hayward RA. Physician-level P4P--DOA? Can quality-based payment be resuscitated? *Am J Manag Care*. 2007;13:233-236.
  40. Baker G, Carter B. The evolution of pay for performance models for rewarding providers. Introduction to: *Case Studies in Health Plan Pay-for-Performance*. Washington, DC: Atlantic Information Services; 2004.
  41. Dudley RA, Frolich A, Robinowitz DL, et al. *Strategies to Support Quality-based Purchasing: A Review of the Evidence*. Technical Review 10. (Prepared by the Stanford-University of California San Francisco Evidence-based Practice Center under Contract No. 290-02-0017). AHRQ

- Publication No. 04-0057. Rockville, MD: Agency for Healthcare Research and Quality. July 2004
42. Zaslavsky AM, Hochheimer JN, Schneider EC, et al. Impact of sociodemographic case mix on the HEDIS measures of health plan quality. *Medical Care*. October 2000; 38(10): 981-92
  43. Trude S, Au M, Christianson JB. Health plan pay-for-performance strategies. *Am J Manag Care*. 2006;12:537-542.
  44. Committee on Redesigning Health Insurance Performance Measures, Payments, and Performance Improvements Programs. *Rewarding Provider Performance: Aligning Incentives in Medicare (Pathways to Quality Health Care Series)*. Washington, DC: National Academies Press; 2007. <http://www.nap.edu/catalog/11723.html#toc>
  45. Wang SJ, Middleton B, Prosser LA, et al. A cost-benefit analysis of electronic medical records in primary care. *Am J Med*. 2003;114:397-403.
  46. Ringold DJ, Santell JP, Schneider PJ. ASHP national survey of pharmacy practice in acute care settings: dispensing and administration--1999. *Am J Health Syst Pharm*. 2000;57:1759-1775.
  47. Johnston D, Pan E, Walker J. The value of CPOE in ambulatory settings. *J Healthc Inf Manag*. 2004;18(1):5-8.
  48. Raymond B, Dold C. Clinical information systems: achieving the vision. Oakland, CA: Kaiser Permanente Institute for Health Policy; 2002. Available at : [http://www.kpihp.org/publications/docs/clinical\\_information.pdf](http://www.kpihp.org/publications/docs/clinical_information.pdf). Accessed July 20, 2009.
  49. Medical Records Institute. Boston, MA: 2007. Available from: <http://www.medrecinst.com>.
  50. Certification Commission for Healthcare Information Technology. CCHIT Announces First Certified Electronic Health Record Products. Updated July 18, 2006. <http://www.cchit.org/NR/rdonlyres/B1C2D376-8963-409E-B432-6420DB814B35/0/N60718CertificationAnnouncementFinal.pdf>
  51. Certification Commission for Healthcare Information Technology. CCHIT Announces Additional Certified Electronic Health Record Products. Updated July 31, 2006. <http://www.cchit.org/NR/rdonlyres/7CFDFCD6-A982-42B9-8268-7E21E857EEFC/0/N60726AdditionalCertificationAnnouncement.pdf>.
  52. Centers for Medicare & Medicaid Services. Quality Improvement Organizations: Medicare priorities. <http://www.medqic.org/dcs/ContentServer?cid=1097592510511&pagename=Medqic%2FMQLiterature%2FLiteratureTemplate&c=MQLiterature>.
  53. Centers for Medicare & Medicaid Services. Quality Improvement Organizations: Statement of Work. [http://www.cms.hhs.gov/QualityImprovementOrgs/04\\_9thsow.asp#TopOfPage](http://www.cms.hhs.gov/QualityImprovementOrgs/04_9thsow.asp#TopOfPage).
  54. Jha AK, Ferris TG, Donelan K, et al. How common are electronic health records in the United States? A summary of the evidence. *Health Aff (Millwood)*. 2006;25:w496-w507.

55. Hagland M. Interoperability conundrum: EMR implementation options go beyond core vendor and best of breed. *Healthc Inform.* 2005;22(5):28-30, 32, 34.
56. Zhou L, Hripcsak G. Temporal reasoning with medical data--a review with emphasis on medical natural language processing. *J Biomed Inform.* 2007;40:183-202.
57. Kucher N, Koo S, Quiroz R, et al. Electronic alerts to prevent venous thromboembolism among hospitalized patients. *N Engl J Med.* 2005;352:969-977.
58. Survey of healthcare payers reveals major setback with pay for performance (P4P) programs. Farmington, MA: Health Industry Insights; 2006 [updated 2007 May 2]. <http://www.healthindustry-insights.com/HII/getdoc.jsp?containerId=prUS20666607>.
59. Mehotra A, Pearson SD, Coltin KL, et al. The response of physician groups to P4P incentives. *Am J Manag Care.* 2007;13:249-255.
60. Medicare Drug Reimbursement Guide Web site. The Centers for Medicare and Medicaid Services Quality Improvement Roadmap. July 2005 Executive Summary. [http://www.medicarerxguide.com/MDRG/2005/CMS\\_quality\\_roadmap.pdf](http://www.medicarerxguide.com/MDRG/2005/CMS_quality_roadmap.pdf)
61. Agency for Healthcare Research and Quality. Technical Review Summary: Strategies to support value based purchasing – a review of the evidence. <http://www.ahrq.gov/clinic/epcsums/qpurchsum.pdf>. Accessed July 20, 2009.
62. American Medical Association. Guidelines for pay-for-performance programs. <http://www.ama-assn.org/ama1/pub/upload/mm/368/guidelines4pay62705.pdf>. Accessed July 20, 2009.
63. American Academy of Family Physicians. AAFP policy: Pay for performance. Available from: <http://www.aafp.org/online/en/home/policy/policies/p/payforperformance.html>. Accessed July 20, 2009.

## Appendix A

### Systematic review of literature assessing effect of explicit financial incentives on healthcare quality<sup>19</sup>

Study	Incentives	Quality Domain <sup>a</sup>	Results	Overall Effect <sup>b</sup>	Method Strength <sup>c</sup>
Norton et al (1992)	<p>Level: payment system</p> <p>Type: bonus</p> <p>Admission incentive: per diem bonus for type D (\$5) and E (\$3 to \$28) patients (vs. \$36 reimbursement)</p> <p>Outcome incentive: improved health status with 90 d (measured by ADL classification); \$126 to \$379 per case (range of bonus)</p> <p>Discharge incentive: timely discharge and resident did not return within 90 d; \$60 to \$230 (range of bonus) type A patients not eligible</p>	Access; outcome	<p>Experimental homes admitted more type D and E patients (sicker patients) than control homes</p> <p>Patients in experimental homes were more likely to be discharged to home or ICF and have less likelihood of hospital admission or death (<math>P &lt; 0.001</math>).</p>	Positive	3
Shen et al (2003)	<p>Level: payment system</p> <p>Type: PBC</p>	Access	<p>Significant decrease in the likelihood that an OSA patient was a "most severe user" after PBC implementation compared with the likelihood of a Medicaid (control) patient; coefficient = -0.74; t-value=3.26; <math>P \leq 0.01</math>.</p>	Negative	2
Clark et al (1995)	<p>Level: provider group</p> <p>Type: enhanced FFS</p> <p>Description: CMHCs received \$15.75 per 15 min spent in community settings delivering MIMS</p> <p>Payment frequency: FFS</p>	Access	<p>Average weekly time spent in community treatment per client increased after payment change (30.71 min vs. 38.61 min; <math>P &lt; 0.05</math>).</p> <p>Office-based case management weekly time per client decreased (32.96 min vs. 23.31 min; <math>P &lt; 0.001</math>).</p> <p>Total case manager average weekly time per client was not significantly different (63.68 min vs. 61.93 min).</p> <p>After payment change, center-based treatment time decreased (<math>P = 0.001</math>). Increase in community minutes was nearly significant (<math>P = 0.055</math>).</p> <p>Program type and Medicaid status were not associated with change in time in community vs. mental health center.</p>	Partial effect	2
Hillman et al (1998)	<p>Level: provider group</p> <p>Type: bonus</p> <p>Description: compliance with cancer screening for women age <math>\geq 50</math> y; aggregate compliance scores and</p>	Process	<p>Absolute increase in total mean compliance scores for intervention group from baseline was 26.3%; control group was 26.4%.</p> <p>No significant differences between groups.</p>	No effect	3

Study	Incentives	Quality Domain <sup>a</sup>	Results	Overall Effect <sup>b</sup>	Method Strength <sup>c</sup>
	improvement in scores over time; full and partial bonuses (20%; 10% of capitation); range of bonus per site \$570 to \$1260  Payment frequency: every 6 mo				
Kouides et al (1998)	Level: provider group Type: bonus  Description: influenza immunization rate (\$8 standard fee); if rate >70%, bonus of \$0.80 per immunization; if rate >85%, bonus of \$1.60  Payment frequency: one time (end of study)	Process	Absolute increase in immunization rates (from 1990 [baseline] to 1991) was 6.8%; $P = 0.03$ .	Positive	3
Hillman et al (1999)	Level: provider group Type: bonus  Description: pediatric immunizations; well-child visits; bonuses based on total compliance score for quality indicators; full and partial bonuses (20%; 10% of site's total 6-mo capitation for pediatric members age $\leq 6$ y); three highest-scoring sites received full bonus, next three received partial bonus; most improved sites received partial bonus; average bonus, \$2,000 (range, \$772 to \$4682)  Payment frequency: every 6 mo	Process	Absolute increase in total mean compliance scores from baseline: FB+I, 17.2%; FBO, 22.6%; control, 22.6%.  Differences in compliance score improvement between groups: FB+I vs. control, 5.9%; FBO vs. control, 11.3%  No significant differences between the groups	No effect	3
Christensen et al (2000)	Level: provider group Type: enhanced FFS  Description: \$4 for cognitive services interventions (<6 min); \$6 for $\geq 6$ min; cognitive services are judgmental or educational services provided by pharmacist to patient, such as consulting prescriber about a suboptimal dose  Payment frequency: FFS	Process	Mean rate, 1.59 interventions per 100 Medicaid prescriptions (study pharmacies) vs. 0.67 (controls); $P < 0.001$ .	Positive	2
Casalino et al (2003)	Level: provider group Type: better contracts with health plans; bonuses	Process	Receiving better contracts for quality was associated with increase of 0.74 CMP implemented ( $P = 0.007$ ).  Receiving a bonus for scoring well on quality measures was not associated with CMP implementation ( $P = 0.08$ ).	Partial effect	1

Study	Incentives	Quality Domain <sup>a</sup>	Results	Overall Effect <sup>b</sup>	Method Strength <sup>c</sup>
McMenamin et al (2003)	<p>Level: provider group</p> <p>Type: financial incentives; additional income; better contracts with health plans</p>	Process	<p>Receiving financial incentives from HMOs increased adjusted odds of having a smoking cessation intervention for 6 of 7 organizational supports (odds ratio, 2.13 to 14.46; <math>P &lt; 0.038</math>).</p> <p>Receiving additional income from health plans for performance on quality measures: 2 of 7 organizational supports (odds ratio, 1.49, 1.90; <math>P &lt; 0.033</math>).</p> <p>Receiving better contracts with health plans was not associated with supporting smoking cessation interventions.</p> <p>Examples of organizational supports include offering smoking cessation health promotion programs and giving providers nicotine-replacement starter kits to distribute to patients.</p>	Partial effect	1
Roski et al (2003)	<p>Level: provider group</p> <p>Type: bonus</p> <p>Description: 75% of patients with smoking status identified/documentated at last visit; 65% of patients with quitting advice documented at last visit (targets set at approximately 15% above average from 2 y before study); bonuses, \$5000 for sites with 1–7 providers and \$10,000 for sites with &gt;8 providers.</p> <p>Outcome measured: 7-d sustained abstinence from smoking (not associated with financial incentive)</p> <p>Payment frequency: one time (end of study)</p>	Process	<p>Change in tobacco use status identification: incentive group increased 14.1%; incentive + registry group increased 8.1%; control group increased 6.2%; <math>P = 0.009</math>.</p> <p>Change in providing quitting advice to patients: incentive group increased 24.2%; incentive + registry increased 18.3%; control increased 18.3%. No significant difference across study groups.</p> <p>The quitting rate (7-d sustained abstinence) was 22.4% for the incentive group; 21.7% for the incentive + registry group; 19.2% for the control group. No significant difference across the study groups.</p>	Partial effect	2
Rosenthal et al (2005)	<p>Level: provider group</p> <p>Type: bonus</p> <p>Description: incentive payout based on provider groups' ability to reach or exceed target rates for cervical cancer screening, mammography, and hemoglobin A<sub>1c</sub> testing for diabetic patients</p> <p>Incentive reward: \$0.23 PMPM</p> <p>Payment frequency: quarterly</p>	Process	<p>Improvement in cervical cancer screening rates before and after quality incentive program was statistically significant between intervention and comparison groups (difference, 3.6%; <math>P = 0.02</math>).</p> <p>Improvements in mammography screening rates and hemoglobin A<sub>1c</sub> testing were not statistically significant.</p>	Partial effect	2

Study	Incentives	Quality Domain <sup>a</sup>	Results	Overall Effect <sup>b</sup>	Method Strength <sup>c</sup>
Grady et al (1997)	<p>Level: physician</p> <p>Type: bonus (\$50 for a 50% referral rate)</p> <p>Description: "token" reward, based on the percentage referred for mammography during quarterly audit</p> <p>Payment frequency: 1 per quarterly audit; rewards given last 2 quarters</p>	Process	Financial incentive arm not significantly different from control arm.	No effect	2
Fairbrother et al (1999)	<p>Level: physician</p> <p>Type: bonus and FFS</p> <p>Description: patients' up-to-date coverage for pediatric immunizations</p> <p>Bonuses: \$1000 (20% improvement from baseline); \$2500 (40% improvement); \$5000 (80% up-to-date)</p> <p>Enhanced FFS: \$5 per vaccine given within 30 d of its coming due; \$15 for each visit at which &gt;1 vaccine was due and all were given</p> <p>Payment frequency: every 4 mo</p>	Process	Bonus group improved significantly in documented up-to-date immunization status, with an overall change of 25.3% ( $P < 0.01$ ), but none of the other groups improved significantly compared with controls.	Partial effect	3
Safran et al (2000)	<p>Level: physician</p> <p>Description: survey of health plan executives elicited information about use of financial incentives regarding patient satisfaction</p>	Patient experience	Financial incentives concerning patient satisfaction were related to increase in score on primary care scale completed by patients on 2 of 4 aspects of primary care assessed (access, physicians' knowledge of patients, clinician-patient communication, and interpersonal treatment). Access to care ( $\beta = 2.57$ ; $P < 0.01$ ) and dimensions of comprehensiveness of care ( $\beta = 2.00$ for knowledge of patient; $P < 0.05$ ) and preventive counseling ( $\beta = 3.50$ ; $P < 0.05$ ).	Partial effect	1
Fairbrother et al (2001)	<p>Level: physician</p> <p>Type: bonus and FFS</p> <p>Description: patients' up-to-date coverage for pediatric immunizations</p> <p>Bonuses: \$1000 (30% improvement from baseline); \$2500 (45% improvement); \$5000 (80% up-to-date); \$7500 (90% up-to-date)</p> <p>Enhanced FFS: \$5 per vaccine given within 30 d of its coming due; \$15 for each visit at which &gt;1 vaccine</p>	Process	Both bonus and enhanced FFS groups improved significantly in documented up-to-date immunization status, with an overall change of 5.9% ( $P < 0.05$ ) and 7.4% ( $P < 0.01$ ), respectively, compared with control group.	Positive	3

Study	Incentives	Quality Domain <sup>a</sup>	Results	Overall Effect <sup>b</sup>	Method Strength <sup>c</sup>
	was due and all were given  Payment frequency: every 4 mo				
Beaulieu and Horrigan (2005)	Level: physician  Type: bonus  Description: meeting target CS of $\geq 6.23$ ; CS of $\geq 6.86$ ; or overall 50% improvement in composite score. CS based on PCP's performance of process and outcome measures for diabetes care (e.g., LDL test, dilated retinal examination, LDL cholesterol level $< 2.59$ mmol/L [ $< 100$ mg/dL])  Incentive rewards: CS $\geq 6.86$ , \$3.00 PMPM (Medicare), \$0.75 PMPM (commercial); CS $\geq 6.23$ , \$1.50 PMPM (Medicare), \$0.37 PMPM (commercial); 50% improvement and CS $\leq 6.23$ , \$0.75 PMPM (Medicare), \$0.18 PMPM (commercial)  Payment frequency: conclusion of study	Process; outcome	Patients treated by physicians in demonstration project had statistically significant improvement (final -baseline performance) on the following process and outcomes measures ( $P < 0.001$ unless otherwise noted): second hemoglobin A <sub>1c</sub> test (25.5% difference); LDL cholesterol test (18.3% difference); diabetic retinal examination (25.6% difference); nephropathy test (37.0% difference); foot examination (45.4% difference); hemoglobin A <sub>1c</sub> level $< 9.5\%$ (13.9% difference); LDL cholesterol level $< 2.59$ mmol/L ( $< 100$ mg/dL) [10.5% difference]; LDL cholesterol level $< 3.37$ mmol/L ( $< 130$ mg/dL) [23.5% difference]; BP $< 130/80$ mm Hg (6.3% difference; $P < 0.05$ ). No significant improvement on performing 1 hemoglobin A <sub>1c</sub> test.	Partial effect	1
Pourat et al (2005)	Level: physician  Type: better contracts with health plans  Description: HMO contracts included reimbursements for quality-of-care dimensions, including patient satisfaction or peer review  Payment frequency: not ascertained in survey	Process	Primary care physicians reimbursed under salary and quality of care more often adhered to annual screening of sexually active adolescent girls aged 15 to 19 y, compared with physicians compensated by capitation and financial performance, salary and productivity, salary and financial performance, or FFS ( $P < 0.05$ ).  Physicians with salary and quality of care incentive also more often consistently screened women aged 20 to 25 y for <i>Chlamydia trachomatis</i> infection annually, compared with physicians reimbursed using other payment mechanisms ( $P < 0.05$ ).	Positive	1

<sup>a</sup>Domains of Quality:

- Access to care (patient's attainment of timely and appropriate healthcare)
- Structure of care (feature of the provider relevant to provision of healthcare)
- Process of care (healthcare service provided to or on behalf of patient)
- Outcomes of care (health state of patient resulting from healthcare)
- Patient experience of care (individual's or population's report concerning healthcare)

<sup>b</sup>Overall Effect:

- Positive: All measures of quality demonstrated statistically significant improvement with financial incentive

- Partial effect: Showed improved performance on some measures of quality but not others
- Negative: All measures of quality demonstrated statistically significant decrease with financial incentive

<sup>o</sup>Methodological strength of the studies was graded on a scale of 1 (poor) to 4 (excellent).

ADL = activities of daily living; BP = blood pressure; CMHC = community mental health center; CMP = care management process; CS = composite score; FB+I = feedback and incentive; FBO = feedback only; FFS = fee for service; HMO = health maintenance organization; ICF = intermediate care facility; LDL = low-density lipoprotein; MIMS = mental illness management services; OSA = Office of Substance Abuse; PBC = performance-based contracting; PCP = primary care physicians; PMPM = per member per month.

## APPENDIX B

### Sample Quality Measure for Critical Care Catheter-Related Infection: Preferential Use of Subclavian Vein

This quality measure is intended as an educational tool for SCCM members interested in or responsible for developing quality measures pertinent to critical care services.

<b>Clinical Setting</b>		
This measure is indicated in all critically ill adult patients undergoing non-tunneled, nondialysis central venous catheter (CVC) placement. Acceptable exclusions are listed in "Measure Explanation" section.		
<b>Data Elements</b>	<b>Clinical Performance Measure</b>	<b>Feedback</b>
<p><b>Per Patient, Per Procedure</b></p> <p>Subclavian site used for catheter insertion <b>Yes/No</b></p> <p>Documentation of medical reason(s) for not using a subclavian site <b>Yes/No</b></p> <p>Documentation of patient reason(s) for not using a subclavian site <b>Yes/No</b></p> <p><b>Sources</b></p> <p>Electronic medical record</p> <p>Paper medical record</p> <p>Flow sheet</p> <p>Administrative claims data<sup>a</sup></p>	<p><b>Numerator:</b> All critically ill adult patients in whom a non-tunneled, nondialysis central venous catheter is inserted into a subclavian site</p> <p><b>Denominator:</b> All critically ill adult patients in whom a non-tunneled, nondialysis central venous catheter is inserted</p> <p><b>Denominator Exclusion:</b> Documentation of medical reason(s) for not using the subclavian insertion site</p> <p>Documentation of patient reason(s) for not using the subclavian insertion site</p>	<p><b>Per Patient</b> Whether or not the patient had a central venous catheter inserted in a subclavian site</p> <p><b>Per Patient Population</b> Percentage of patients having central venous catheters inserted via a subclavian site</p> <p>Percentage of patients for whom medical reason for not using subclavian site is documented</p> <p>Percentage of patients for whom patient reason for not using subclavian site is documented</p>

<sup>a</sup>Adequate data source only if CPT category II codes are used.

#### **Clinical Recommendation**

*The following clinical recommendation statement is quoted verbatim from the referenced clinical guidelines and represents the evidence base for the measure.*

Use a subclavian site (rather than a jugular or a femoral site) in adult patients to minimize infection risk for non-tunneled CVC placement (Centers for Disease Control and Prevention).

#### **Measure Explanation**

To minimize the morbidity, mortality, and cost associated with catheter-related bloodstream infections (CR-BSIs), the Centers for Disease Control and Prevention (CDC) in 2002 published *Guidelines for the Prevention of Intravascular Catheter-Related Infections*. Some of the urgency surrounding the desire to minimize CR-BSIs stems from the following facts:

- Approximately 90% of the CR-BSIs occur with CVCs.
- There are 15 million CVC days per year in intensive care units, and CR-BSIs have an estimated mortality rate between 4% and 20%.
- Nosocomial bloodstream infections prolong hospitalization by a mean of 7 days.
- Estimates of attributable cost per bloodstream infection are between \$3,700 and \$29,000.

The CDC working group consisted of 13 experts representing nine disciplines and was endorsed by 13 professional societies. Additionally, as part of its 100,000 Lives Saved campaign, the Institute for Healthcare Improvement in 2005 proposed a central line bundle consisting of five evidence-based measures to minimize the risk of CR-BSIs. One of the bundle measures was “optimal catheter site selection, with subclavian vein as the preferred site for non-tunneled catheters.”

The CDC working group recommends that CVCs be placed in a subclavian site instead of a jugular or femoral site to reduce the risk of infection. Although no randomized trial has satisfactorily compared infection rates for catheters placed in jugular, subclavian, and femoral sites, catheters inserted into an internal jugular vein have been associated with higher risk for infection, and femoral catheters have been demonstrated to have relatively high colonization rates in adults as well as a higher risk for deep venous thrombosis – both of which are presumed to be factors contributing to an increased risk of infection. This CDC recommendation is categorized as category IA, “strongly recommended for implementation and strongly supported by well-designed experimental, clinical, or epidemiologic studies.” This measure applies to single-lumen and multi-lumen CVCs as well as pulmonary artery catheters. This measure **does not** apply to catheters used for hemodialysis and plasmapheresis where jugular or femoral vein placement is preferred to avoid venous stenosis. Catheters placed for these procedures should be exempt for medical reasons.

There are numerous contraindications to the placement of a subclavian CVC, including: coagulopathy, thrombolytic therapy, severe thrombocytopenia, inability to identify landmarks, infection or burn at planned site, superior vena cava thrombosis, upper extremity trauma, chronic obstructive pulmonary disease, asthma, and high levels of positive end-expiratory pressure. Ultimately it is the physician’s choice as to the insertion site. This choice should be guided by the risk of infection with the potential for mechanical complications, risk for subclavian vein stenosis, catheter-operator skill, and the presence of contraindications. When inserting CVCs into sites other than the subclavian vein, the physician should clearly document the contraindication for subclavian vein placement or other factors in the decision. Such documentation may fall under medical or patient reasons for not using the subclavian site.

**Evidence Grade 1A**

## References

- Centers for Disease Control and Prevention. Guidelines for the prevention of intravascular catheter-related infections. *MMWR Morb Mortal Wkly Rep.* 2002;51(No. RR-10).
- Goetz AM, Wagener MM, Miller JM, Muder RR. Risk of infection due to central venous catheters: effect of site of placement and catheter type. *Infect Control Hosp Epidemiol.* 1998;19:842–845.
- Mermel LA, McCormick RD, Springman SR, Maki DG. The pathogenesis and epidemiology of catheter-related infection with pulmonary artery Swan-Ganz catheters: a prospective study utilizing molecular subtyping. *Am J Med.* 1991;91(suppl):S197–S205.
- Merrer J, De Jonghe B, Golliot F, et al. Complications of femoral and subclavian venous catheterization in critically ill patients: a randomized controlled trial. *JAMA.* 2001;286:700–707.

Trottier SJ, Veremakis C, O'Brien J, Auer AI. Femoral deep vein thrombosis associated with central venous catheterization: results from a prospective, randomized trial. *Crit Care Med*. 1995;23:52-59.

## Sample Quality Measure for Critical Care Use of Maximal Barrier Precautions in Pediatric Patients

This quality measure is intended as an educational tool for SCCM members interested in or responsible for developing quality measures pertinent to critical care services.

<b>Clinical Setting</b>		
<p>This measure is indicated for all critically ill patients under 18 years of age who require central venous access. All procedure components described in the numerator are required for the provider to receive credit.</p>		
Data Elements	Clinical Performance Measure	Feedback
<p><b>Per Patient, Per Procedure</b></p> <p>Maximal barrier precautions utilized <b>Yes/No</b></p> <p>Documentation of medical reason(s) for not using maximal barrier precautions <b>Yes/No</b></p> <p>Documentation of patient reason(s) for not using maximal barrier precautions <b>Yes/No</b></p> <p><b>Sources</b></p> <p>Electronic medical record</p> <p>Paper medical record</p> <p>Flow sheet</p> <p>Administrative claims data<sup>a</sup></p>	<p><b>Numerator:</b> All critically ill pediatric patients in whom a central venous catheter is inserted using maximal barrier precautions (cap, mask, sterile gown, sterile gloves, sterile drape<sup>b</sup>)</p> <p><b>Denominator:</b> All critically ill pediatric patients in whom a central venous catheter is inserted</p> <p><b>Denominator Exclusion:</b> Documentation of medical reason(s) for not using maximal barrier precautions</p> <p>Documentation of patient reason(s) for not using maximal barrier precautions</p>	<p><b>Per Patient</b></p> <p>Whether or not the physician utilized maximal barrier precautions when inserting a central venous catheter</p> <p><b>Per Patient Population</b></p> <p>Percentage of patients where maximal barrier precautions were utilized during central venous catheter insertion</p> <p>Percentage of patients for whom medical reason for not using maximal barrier precautions was not documented</p> <p>Percentage of patients for whom patient reasons for not using maximal barrier precautions was not documented</p>

<sup>a</sup>Adequate data source only if CPT Category II codes are used.

<sup>b</sup>Head to toe for internal jugular and subclavian vein site, neck to toe for femoral vein site

### Clinical Recommendation

The following clinical recommendation statement is quoted *verbatim* from the referenced clinical guidelines and represents the evidence base for the measure.

Use aseptic technique, including the use of a cap, mask, sterile gown, sterile gloves, and a large sterile sheet, for the insertion of CVCs (including PICCS) or guidewire exchange (Centers for Disease Control and Prevention).

### **Measure Explanation**

To minimize the morbidity, mortality, and cost associated with catheter-related bloodstream infections (CR-BSIs), the Centers for Disease Control and Prevention (CDC) in 2002 published *Guidelines for the Prevention of Intravascular Catheter-Related Infections*. Some of the urgency surrounding the desire to minimize CR-BSIs stems from the following facts:

- Approximately 90% of the CR-BSIs occur with central venous catheters (CVCs).
- There are 15 million CVC days per year in intensive care units and CR-BSIs have an estimated mortality rate between 4% and 20%.
- Nosocomial bloodstream infections prolong hospitalization by a mean of 7 days.
- Estimates of attributable cost per bloodstream infection are between \$3,700 and \$29,000.

The CDC working group consisted of 13 experts representing nine disciplines and was endorsed by 13 professional societies. Additionally, as part of its 100,000 Lives Saved campaign, the Institute for Healthcare Improvement in 2005 proposed a central line bundle consisting of five evidence-based measures to minimize the risk of CR-BSIs. One of the bundle measures was “maximal barrier precautions.”

The CDC working group recommends that aseptic technique, including the use of a cap, mask, sterile gown, sterile gloves, and a large sterile sheet, be utilized for the insertion of CVCs (including peripherally inserted central catheters [PICCs]) or guidewire exchange CVCs. In two studies, the odds of developing a central line infection increased if maximal barrier precautions were not used. In a prospective randomized study, Raad et al found that this rate was six times higher for placement of central line catheters.

**Evidence Grade** 1A

### **References**

Centers for Disease Control and Prevention. Guidelines for the prevention of intravascular catheter-related infections. *MMWR Morb Mortal Wkly Rep.* 2002;51(No. RR-10).

Raad II, Hohn DC, Gilbreath BJ, et al. Prevention of central venous catheter-related infections by using maximal sterile barrier precautions during insertion. *Infect Control Hosp Epidemiol.* 1994;15:231–238.

## Sample Quality Measure for Critical Care Low Tidal Volume Ventilation in Adults with Acute Respiratory Distress Syndrome

This quality measure is intended as an educational tool for SCCM members interested in or responsible for developing quality measures pertinent to critical care services.

<p><b>Clinical Setting</b> The indication for use of low tidal volume ventilation is the diagnosis of acute lung injury/acute respiratory distress syndrome (ALI/ARDS). Diagnostic criteria include: acute onset, bilateral pulmonary infiltrates, pulmonary capillary wedge pressure &lt;19 mm Hg or no cardiogenic etiology of lung infiltrates, and PaO<sub>2</sub>/FiO<sub>2</sub> &lt;300 for ALI and &lt;200 for ARDS. Acceptable exclusions are listed below.</p> <p>The measure includes both delivery of tidal volume equal to 6 mL/kg predicted or ideal body weight and maintenance of end inspiratory plateau pressure &lt;30 cm H<sub>2</sub>O.</p> <p><b>Once ALI/ARDS resolves, low tidal volume ventilation is no longer indicated as a lung protective measure and should be discontinued unless other clinical indications remain.</b></p>		
Data Elements	Clinical Performance Measure	Feedback
<p><b>Per Patient, Per Procedure</b></p> <p>Patient meets clinical criteria for ALI/ARDS <b>Yes/No</b></p> <p>Ventilator tidal volume set at 6 mL/kg predicted or ideal body weight in critically ill adult patients diagnosed with ALI/ARDS <b>Yes/No</b></p> <p>Documentation of medical reason for not starting low tidal volume ventilation <b>Yes/No</b></p> <p>Documentation of patient reason for not starting low tidal volume ventilation <b>Yes/No</b></p> <p>End inspiratory plateau pressure maintained &lt;30 cm H<sub>2</sub>O <b>Yes/No</b></p> <p>Documentation of medical reason for not maintaining end inspiratory plateau pressure &lt;30 cm H<sub>2</sub>O <b>Yes/No</b></p>	<p><b>Numerator:</b> Critically ill adult patients with ALI/ARDS receiving mechanical ventilation with 6 mL/kg predicted or ideal body weight tidal volume</p> <p><b>Denominator:</b> Critically ill adult patients with ALI/ARDS receiving mechanical ventilation</p> <p><b>Denominator Exclusion:</b> Documented reasons as below<sup>b</sup></p> <p>Documentation of medical reason(s) for not using low tidal volume ventilation</p> <p>Documentation of patient reason(s) for not using low tidal volume ventilation</p> <p><b>Numerator:</b> Critically ill adult patients with ALI/ARDS receiving low tidal volume ventilation with end inspiratory</p>	<p><b>Per Patient</b></p> <p>Whether or not the patient with ALI/ARDS received low tidal volume ventilation</p> <p>Whether or not the patient receiving low tidal volume ventilation maintained end inspiratory plateau pressure &lt;30 cm H<sub>2</sub>O</p> <p><b>Per Patient Population</b></p> <p>Percentage of patients with ALI/ARDS receiving low tidal volume ventilation</p> <p>Percentage of patients receiving low tidal volume ventilation with end inspiratory plateau pressure &lt;30 cm H<sub>2</sub>O</p> <p>Percentage of patients for whom patient reasons for not using low tidal volume ventilation AND maintaining end inspiratory pressure &lt;30 cm H<sub>2</sub>O not found</p>

Documentation of patient reason for not maintaining end inspiratory plateau pressure <30 cm H <sub>2</sub> O <b>Yes/No</b>  <b>Sources</b>  Electronic medical record  Paper medical records  Flow sheet  Administrative claims data <sup>a</sup>	plateau pressure <30 cm H <sub>2</sub> O.  <b>Denominator:</b> Critically ill adult patients with ALI/ARDS receiving low tidal volume ventilation  <b>Denominator exclusion:</b> Documented reasons as below <sup>b</sup>  Documentation of medical reason(s) for not maintaining end inspiratory plateau pressure <30 cm H <sub>2</sub> O  Documentation of patient reason(s) for not maintaining end inspiratory plateau pressure <30 cm H <sub>2</sub> O	Percentage of patients for whom medical reason for not using low tidal volume ventilation AND maintaining end inspiratory plateau pressure not found
--	---	--

<sup>a</sup>Adequate data source only if CPT Category II codes are used.

<sup>b</sup>Acceptable exclusions include: intracranial hypertension; death anticipated within 24 hours; clinician not managing ventilator settings, clinical judgment of potential for harm.

### Clinical Recommendation

The following clinical recommendation statement is quoted *verbatim* from the referenced clinical guidelines and represents the evidence base for the measure.

High tidal volumes that are coupled with high plateau pressures should be avoided in ALI/ARDS. Clinicians should use as a starting point a reduction in tidal volumes over 1–2 hrs to a "low" tidal volume (6 mL per kilogram of predicted body weight) as a goal in conjunction with the goal of maintaining end-inspiratory plateau pressures <30 cm H<sub>2</sub>O (Surviving Sepsis Campaign Guideline).

### Measure Explanation

Multiple center randomized trials of limited inspiratory pressure and tidal volume have had differing results. However, the largest trial demonstrated a 9% decrease of all-cause mortality in patients ventilated with 6 mL/kg predicted body weight with plateau pressure <30 cm H<sub>2</sub>O. In a Cochrane Database systematic review, five trials involving 1202 patients demonstrated that mortality at day 28 was significantly reduced by lung-protective ventilation with a relative risk of 0.74 (confidence interval, 0.61 to 0.88); however, long-term effects are uncertain at this time.

**Evidence Grade 1B**

### References

Dellinger RP, Carlet JM, Masur H, et al. Surviving sepsis campaign guidelines for management of severe sepsis and septic shock. *Crit Care Med.* 2004;32:858-873.

Petrucchi N, Iacovelli W. Ventilation with lower tidal volumes versus traditional tidal volumes in adults for acute lung injury and acute respiratory distress syndrome. *Cochrane Database Syst Rev.* 2007;3:CD003844.

## Sample Quality Measure for Critical Care Stress Ulcer Prophylaxis in the ICU

This quality measure is intended as an educational tool for SCCM members interested in or responsible for developing quality measures pertinent to critical care services.

<b>Clinical Setting</b>		
<p>Absolute indications for stress ulcer prophylaxis (SUP) are: mechanical ventilation for &gt;48 hours or severe sepsis or septic shock. Patients with absolute indications should receive SUP until the indicator has resolved. Acceptable exclusions are listed below.</p> <p>Unnecessary administration of SUP is also a quality measure, as overuse increases risk of patient morbidity and healthcare costs. Failure to discontinue SUP when the patient no longer requires the ventilator or is no longer in severe sepsis or septic shock constitutes a variance, unless the rationale to continue SUP is documented by the clinician. For example, relative indications for SUP such as Glasgow Coma Score &lt;11, &gt;35% burn surface area, partial hepatectomy, or coagulopathy are acceptable reasons for variance.</p> <p>No specific agent or class agent is recommended by this measure.</p>		
Data Elements	Clinical Performance Measure	Feedback
<p><b>Per Patient, Per Procedure</b></p> <p>Critically ill patients who received SUP during stay in intensive care unit if the following criteria are met:</p> <ol style="list-style-type: none"> <li>1. Patients require mechanical ventilation &gt;48 hours</li> <li>2. Patients have severe sepsis</li> </ol> <p><b>Yes/No</b></p> <p>Patients received SUP only as long as indication criteria are met. <b>Yes/No</b></p> <p>Documentation of medical reason(s) for not using SUP <b>Yes/No</b></p> <p>Documentation of patient reason(s) for not using SUP? <b>Yes/No</b></p> <p><b>Sources</b></p> <p>Electronic medical record</p> <p>Paper medical records</p> <p>Flow sheet</p> <p>Administrative claims data<sup>a</sup></p>	<p><b>Numerator:</b> Critically ill adult patients receiving appropriate SUP</p> <p><b>Denominator:</b> Critically ill adult patients who meet criteria for SUP</p> <p><b>Denominator Exclusions</b> Acceptable exclusions for not utilizing SUP<sup>b</sup></p> <p>Documentation of medical reasons for not using SUP</p> <p>Documentation of patient reasons for not using SUP</p> <p><b>Numerator:</b> Critically ill adult patients receiving SUP who no longer meet criteria</p> <p><b>Denominator:</b> Critically ill adult patients receiving SUP</p> <p><b>Denominator Exclusion</b> Critically ill adult patients with relative indications for SUP</p>	<p><b>Per Patient</b></p> <p>Whether or not patient was assessed for criteria for use of SUP</p> <p>Whether or not patient was receiving SUP unnecessarily</p> <p>Whether or not documentation of reason for either variance was recorded</p> <p><b>Per Patient Population</b></p> <p>Percentage of patients meeting criteria for use of SUP</p> <p>Percentage of patients receiving SUP longer than criteria were met</p> <p>Percentage of patients where reason for variance was documented</p>

<sup>a</sup>Adequate data source only if CPT Category II codes are used.

<sup>b</sup>Acceptable exclusions: patients who have significant adverse reactions to proton pump inhibitors, histamine-2 receptor antagonists or sucralfate, clinician assessment of harm.

### **Clinical Recommendation**

The following clinical recommendation statement is quoted *verbatim* from the referenced clinical guidelines and represents the evidence base for the measure.

Stress ulcer prophylaxis should be given to all patients with severe sepsis (Surviving Sepsis Campaign guidelines).

### **Measure Explanation**

These measures related to the use of stress ulcer prophylaxis (SUP) are created to support the Surviving Sepsis Campaign Guidelines from the Society of Critical Care Medicine and Institute for Healthcare Improvement 100,000 Lives Saved campaign for the prevention of ventilator-associated pneumonia. The importance of SUP is noted in various articles, but no recent meta-analysis or a specific agent or class of drugs is recommended.

There are data to support the use of pharmacologic agents for the prevention of stress-related mucosal bleeding in the intensive care unit (ICU) setting; however, controlled trials identify the best class of drugs, duration of therapy, and exact patient population. In fact, histamine type-2 agonists and antacids have been previously identified as risk factors for ICU-acquired pneumonia.

Recent articles have emphasized the concept of utilizing bundles to assure best care. Ventilator bundles, as described by the Institute for Healthcare Improvement, include recommendation for administration of an agent to provide SUP, although a single specific agent has not been identified.

The Surviving Sepsis Campaign guidelines state that SUP should be given to all patients with severe sepsis. Again, a specific agent or class of agents is not recommended.

There is expert opinion that tube feeding tolerance reduces the risk of stress ulceration and that this tolerance be considered as a mitigating factor for the development of stress ulceration and that additional SUP may not be warranted. This opinion also appears to be controversial in the literature.

Finally, as important as it may be to initiate SUP, it should be discontinued when the patient no longer meets administration criteria. Significant overuse of acid suppressive therapy occurs in hospitalized patients. Inappropriate hospital use causes continued inappropriate use upon patient discharge.

**Evidence Grade 1A**

### **References**

Cook DJ, Fuller HD, Guyatt GH, et al. Risk factors for gastrointestinal bleeding in critically ill patients. *N Engl J Med.* 1994;330: 377-381.

Cook DJ, Witt LG, Cook RJ, Guyatt GH. Stress ulcer prophylaxis in the critically ill: a meta-analysis. *Am J Med.* 1991;91:519-527.

Cook D, Guyatt G, Marshall J, et al. A comparison of sucralfate and ranitidine for the prevention of upper gastrointestinal bleeding in patients requiring mechanical ventilation: Canadian Critical Care Trials Group. *N Engl J Med.* 1998;338:791-797.

Daley RJ, Rebeck JA, Welange LS, Rogers FB. Prevention of stress ulceration: current trends in critical care. *Crit Care Med.* 2004;32:2008-2013.

Dellinger RP et al. Surviving Sepsis Campaign guidelines for management of severe sepsis and shock. *Crit Care Med.* 2004;32:858-873.

DePriest JL. Stress ulcer prophylaxis [letter]. *Crit Care Med.* 2004;32:1626.

Kollef MH. Prevention of hospital associated pneumonia and ventilator associated pneumonia. *Crit Care Med.* 2004;32:1396-1405.

Nardino RJ, Vender RJ, Herbert PN. Overuse of acid-suppressive therapy in hospitalized patients. *Am J Gastroenterol.* 2000;95:3118-3122.

## Sample Quality Measure for Critical Care Deep Vein Thrombosis Prevention in the Critical Care Unit

This quality measure is intended as an educational tool for SCCM members interested in or responsible for developing quality measures pertinent to critical care services.

<b>Clinical Setting</b>		
<p>The major risk factors of deep vein thrombosis (DVT) are: trauma, orthopedic surgery or surgery lasting more than 30 minutes, age older than 40, obesity, malignancy, prior history of thromboembolism, immobilization, pregnancy, peripartum state, oral contraceptive use, varicose veins, congestive heart failure, stroke, nephrotic syndrome, thrombocytosis, polycythemia, systemic lupus erythematosus, and infection.</p> <p>Both assessment of risk factors of DVT and appropriateness of prophylactic agent are required to complete this measure.</p> <p>Acceptable exclusion criteria are listed in "Measure Explanation" section.</p>		
Data Elements	Clinical Performance Measure	Feedback
<p><b>Per Patient, Per Procedure</b></p> <p>Patient assessed for risk factors <b>Yes/No</b></p> <p>Appropriate<sup>a</sup> prophylactic measure order document in chart <b>Yes/No</b></p> <p>Documentation for reason for variance <b>Yes/No</b></p> <p><b>Sources</b></p> <p>Medical record</p> <p>Paper flow sheet</p> <p>Electronic medical record</p> <p>Administrative claims data<sup>a</sup></p>	<p><b>Numerator:</b> Critically ill adult patients assessed for DVT risk factors</p> <p><b>Denominator:</b> All clinician's critically ill adult patients</p> <p><b>Denominator Exclusion:</b> None</p> <p><b>Numerator:</b> Critically ill adult patients with appropriate<sup>b</sup> prophylactic measure ordered</p> <p><b>Denominator:</b> All clinician's critically ill adult patients meeting clinical recommended criteria</p> <p><b>Denominator Exclusion:</b> None</p>	<p><b>Per Patient</b></p> <p>Whether or not patient was assessed for DVT risk factors</p> <p>Whether or not appropriate<sup>b</sup> prophylactic measure for individual patient</p> <p><b>Per Patient Population</b></p> <p>Percentage of patients assessed for DVT risk factors</p> <p>Percentage of patients with appropriate<sup>b</sup> prophylactic measures ordered</p> <p>Percentage of patients for whom documentation of reason for variance not found</p>

<sup>a</sup>Adequate data source only if new codes are developed specific to this measure.

<sup>b</sup>Appropriate prophylactic measures per patient group are outlined in American College of Chest Physicians' Conference on Antithrombotic and Thrombolytic Therapy reference.

### **Clinical Recommendation**

*The following clinical recommendation statement is quoted verbatim from the referenced clinical guidelines and represents the evidence base for the measure.*

The Agency for Healthcare Research and Quality has published the report *Making Health Care Safer: A Critical Analysis of Patient Safety Practices*. This systematic review ranked 79 patient safety interventions based on the strength of the evidence supporting more widespread implementation of these procedures. The highest ranked safety practice was the "appropriate use of prophylaxis to prevent VTE in patients at risk." This recommendation was based on overwhelming evidence that thromboprophylaxis reduces adverse patient outcomes while, at the same time, decreasing overall costs. There is good evidence that appropriately used thromboprophylaxis has a desirable risk/benefit ratio and is cost-effective.

"We recommend, on admission to the intensive care unit, all patients be assessed for their risk of VTE. Accordingly, most patients should receive thromboprophylaxis (Grade 1A)."

### **Measure Explanation**

The American College of Chest Physicians' (ACCP) Conference on Antithrombotic and Thrombolytic Therapy has consistently published excellent summaries of graded evidence-based recommendations for prophylaxis of deep venous thrombosis and pulmonary embolism, or venous thromboembolism (VTE). The 8<sup>th</sup> conference, summarized in *Chest* 2008, provides the most recent comprehensive summaries and recommendations of the ACCP.

In addition, the UMass Center for Outcomes Research states "it is estimated that one in 100 patients admitted to a hospital dies because of PE. It appears possible than more than one-half of these at-risk patients could be saved if effective prophylaxis was used."

All patients admitted to the intensive care unit should be assessed for risk of VTE, and most will require prophylaxis (Grade 1A), as they are likely to have one or more risk factors. Risk stratification and appropriate prophylactic agents for risk category are now defined with Grade 1 evidence for almost all patient groups. Aspirin alone is not appropriate as prophylaxis in any patient group.

VTE risk assessment is incumbent upon all providers involved in a patient's care. Therefore, no variance exists allowing this measure to fall outside the provider's purview. However, some leeway must be provided as to the type of prophylactic agent, as specific patient characteristics may require variance from the evidence-based recommendations. Acceptable variances for type of prophylactic agent may include, but not be limited to: excessive bleeding or risk; allergic or adverse reactions to heparin, heparinoid agents, or warfarin; physician assessment of harm. The reason for variance and evidence of ongoing clinical risk assessment and re-evaluation of prophylactic agents must be documented periodically.

**Evidence Grade 1A**

### **References**

Evidence Report/Technology Assessment No. 43. *Making Health Care Safer: A Critical Analysis of Patient Safety Practices*. AHRQ Publication No. 01-E058.

<http://www.ahrq.gov/CLINIC/PTSAFETY>. Accessed July 21, 2009.

Geerts WH, Pineo GF, Heit JA, et al. Prevention of venous thromboembolism :the Seventh ACCP Conference on Antithrombotic and Thrombolytic Therapy. *Chest*. 2004;126:338S-400S.

Anderson FA, Audet A-M. Best practices preventing deep vein thrombosis and pulmonary embolism: a practical guide to evaluation and improvement. UMass Medical School Center for Outcomes Research.

[http://www.outcomes-umassmed.org/dvt/best\\_practice](http://www.outcomes-umassmed.org/dvt/best_practice). Accessed July 21, 2009.