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Increasing the Value of Health Care: The Role of Nurses

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Increasing health care value has become a central objective of payment policies, insurance design and purchasing, and patient and provider decision-making. The word "value" appeared in the title of seven sections of the Affordable Care Act (ACA), and earlier this year CMS set a goal of having 50 percent of reimbursement based on value.

Nurses are the key contact for patients in all health care settings, and account for a large portion of the labor costs in many of those settings. Therefore, they have a direct link to value through both outcomes and cost.

This brief reviews nurses' contribution to value, highlighting evidence published by researchers in the Interdisciplinary Nursing Quality Research Initiative (INQRI), an 8-year program funded by the Robert Wood Johnson Foundation. It also looks at interventions designed to address outcomes targeted by ACA- or Medicare-related payment policies.

What does value mean in health care?

A common definition is the ratio of outcomes to costs, or its inverse, the cost-effectiveness ratio (cost per unit of outcome). But value is intrinsically a comparative concept—we can talk about the value of one course of treatment relative to another—and the simplest decision rule is to prefer the treatment with the higher value. There are two different value decision scenarios—one easy to make and one harder. The easiest case is when one treatment yields better or equivalent outcomes at a lower cost than the alternative. Then it is clear which option to choose, and measures of value involve estimates of the overall reduction in cost and outcome improvement (or stability). The more difficult case occurs when a more costly treatment provides better outcomes. The relative nature of the outcome-to-cost ratio is crucial to the definition of value, because it means that interventions that increase costs but improve outcomes by more than the cost can be value-creating.

When faced with the situation in which one treatment produces better outcomes but higher costs than another, economists commonly use a definition of value based on the population as a whole, rather than an individual decision-maker's perspective. The economic value of a product, service, or intervention is generally defined as the benefit that results from it, such as improved patient outcome, minus its costs, with both the benefit and the cost measured in monetary terms. This measure of "value"

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should probably be termed "net value" or "net benefit," to distinguish it from the gross benefit of the product or service for patient outcomes or well-being before costs are taken into account. This definition incorporates the scale or ubiquity of a treatment or service through its focus on the entire population and is therefore useful for guiding value-based decisions of policymakers, insurers or health care administrators concerned about the entire population.

Value is a broader concept than that of a "business case." In a business case, the focus is on what improves organizational outcomes rather than the population as a whole. If organizational incentives are aligned with value creation, then society as a whole will benefit. Prior to the ACA, hospitals had little direct incentive to incorporate reducing adverse events, hospital-acquired infections or readmissions in their decision-making, because they did not bear the costs of adverse events, nor were they rewarded for improving patient outcomes. In some cases, improved patient outcomes worsened the bottom line because providers were reimbursed for correcting previous errors and increasing the volume of billable services. Even outcomes with direct cost implications for the provider, such as shorter lengths of stay, only provide a financial benefit to hospitals if the admission is reimbursed under prospective payment (i.e., fixed fee per discharge). As Yakusheva, Wholey, and Frick (2013) note, the ACA provided an incentive to hospitals to incorporate the outcome of care and the consequences of poor outcomes into their business plans.

Nursing's role in creating value

Nursing is a fundamental driver of both outcomes and costs in most health care organizations. Nurses contribute to creating value in health care as 1) a key structural component in the provision of health care services, and 2) leaders and innovators in improving processes and the organizational environment in which health care services are delivered. In the following sections, we review the evidence of value for each of these roles.

THE VALUE OF NURSES AS HEALTH CARE PROVIDERS

As a structural component, nurse staffing has consistently been shown to influence outcomes. This growing body of evidence relates higher average levels of nursing human capital (in a hospital or inpatient unit) to improved patient outcomes, and recent studies have addressed estimated costs. These characteristics include a higher proportion of nurses with a baccalaureate degree, higher average nurse experience, nurse certification, and nurse dose (composite of education, experience, and skill mix).

Higher proportion of BSN nurses. A landmark study of 168 hospitals by Aiken et al. (2003) found that a 10 percent increase in the proportion of baccalaureate-prepared nurses resulted in a 5 percent decrease in patient deaths and complications.

Recent INQRI studies confirm these findings and allow us to consider their impact on value. Blegen et al. (2013) used data from 21 University HealthSystem Consortium

hospitals to analyze the association between nurse education level and patient outcomes, controlling for nurse staffing level and hospital characteristics. Hospitals with a higher percentage of BSN nurses had lower rates of congestive heart failure mortality, decubitus ulcers, failure to rescue, postoperative deep vein thrombosis, and shorter lengths of stay. The magnitude of improved outcomes suggests improved value, but a definitive answer relies on understanding the costs.

Yakusheva, Lindrooth and Weiss (2014) analyzed a unique dataset from one urban magnet hospital that linked patient information to information about the nurses responsible for their care. They found that patients who were treated by health care teams in which at least 80 percent of the nurses were BSN-prepared (the threshold recommended by the Institute of Medicine) had decreased mortality rates, fewer readmissions, and shortened length of stay. Taking higher wages for nurses holding BNSs into account, the researchers estimated that the total cost of attaining the 80 percent BSN threshold for all patients in the sample would have been $1.8 million. However, estimated cost savings of such an increase in the BSN proportion was projected at $5.6 million a year as a result of reduced readmissions alone, making this a case for value from a societal perspective. But from the hospital's perspective, a financial analysis would only favor attaining the 80 percent threshold if the hospital, was responsible for the cost of readmissions. If hospitals have a sufficiently high Medicare payer-mix then the ACA's value-based purchasing provisions on readmissions would shift incentives towards hiring BSN nurses, and thereby improve the value of health care for their patients.

Nurse staffing. Higher levels of nurse staffing are strongly associated with better outcomes. In a systematic review, Kane et al. (2007) found that an increase of one full time equivalent RN per patient day was associated with lower odds of mortality and complications in intensive care units, in surgical patients, and in medical patients.

An INQRI study addressed the question of value of increased staffing, and pointed out the need to align incentives with net value. Weiss, Yakusheva, and Bobay (2011) examined the impact of nurse staffing on unplanned 30-day readmissions and emergency department (ED) use in a large integrated health care system. They estimated that higher nurse staffing was associated with lower 30-day readmission and ED use rates. A cost analysis projected that increasing RN non-overtime staffing by 45 minutes would cost hospitals nearly $200 per patient (in staffing costs and loss of revenue from fewer readmissions), while it would save payers more than $600 per patient in reduced post-discharge utilization. With improved outcomes and a cost savings of $400 per patient, increasing the proportion of nurses is an easy call to make; however, in the absence of hospital incentives to reduce readmissions, it is not possible to make a compelling business case for such a move.

Rogowski et al. (2013) examined nurse staffing and hospital-acquired infections rates in neonatal intensive care units (NICUs). They compared nurse staffing levels to those suggested by acuity-based guidelines to identify NICU shifts that were understaffed. They found that very low birth weight infants in understaffed NICUs had significantly higher odds of acquiring a nosocomial infection. They recognize that without value-

based purchasing the hospital does not have a direct financial incentive to staff according to guidelines. Similarly, Park et al. (2012) examined nurse staffing in adult ICUs and non-ICUs and found that low nurse staffing was associated with failure-to-rescue (an established outcome measure), especially when patient turnover was high (i.e., when patients are moving in and out rapidly). They suggest that patient turnover be considered when setting nurse staffing levels, although they did not assess the net value of the trade-off between staffing and failure-to-rescue.

Mandated nurse ratios. One way to improve nurse staffing is through mandated minimum nurse staffing ratios at hospitals. California is the only state to have passed such legislation. Aiken et al. (2010) compared 30-day mortality rates in California to two states without a mandate: New Jersey and Pennsylvania. Overall, they found that nurses in California care for an average of one fewer patient than nurses in the other states. They estimated that hospitals in New Jersey and Pennsylvania would have 13.9 percent and 10.6 percent fewer surgical patient deaths, respectively, if they had staffed up to California's level. That's roughly 486 fewer deaths over two years in just two states. This suggests net value, although the costs of the additional staffing must be taken into account.

Spetz et al. (2013) took a different approach and compared changes in nursing-sensitive patient safety outcomes across hospitals using quartiles of pre-mandate nurse-staffing levels. Hospitals in the highest quartile of pre-mandate nurse staffing were used as a benchmark for hospitals in the lower three quartiles. The mandate-related increase in staffing translated into lower mortality among patients with complications and shorter length of stay among patients with infections. There was no evidence that the mandate affected outcomes of the other nursing-sensitive indicators. While the mandate increased nurse-staffing levels, the change in outcomes was relatively muted, and it is unclear whether net value improved relative to hospitals with high pre-mandate staffing levels. Cost data, including distribution of costs, are needed to answer this question.

THE VALUE OF NURSES IN IMPROVING PROCESSES AND ORGANIZATIONAL ENVIRONMENT

Several recent studies emphasized the importance of organization and management in creating an environment that enhances the productivity of existing staff through engaging nurses in the quality improvement process; encouraging communication between nurses, physicians, and other clinicians; and creating a culture that recognizes, appreciates, and rewards high performance.

Transitional care. Transitional care refers to evidence-based care interventions incorporating a range of services that complement primary care and are designed to ensure continuity of the quality of care provided across settings by multiple providers. Multiple clinical trials conducted by Naylor et al. (2012) have consistently demonstrated the effects of the Transitional Care Model, an advanced practice nurse led, team-based intervention, in improving patients' care experiences, improving their health outcomes, reducing all-cause rehospitalizations and decreasing total health

care costs. One such trial conservatively estimated that, after accounting for the costs of the intervention, this care management innovation resulted in costs savings at 12 months of $5,000 per Medicare beneficiary. The larger scale value of multiple evidence-based models may emerge from a CMS Center for Medicare and Medicaid Innovation funded Community-based Transitional Care Program. Over five years, the program is funding 72 community-based sites to evaluate whether transitional care can reduce the $26 billion Medicare spends on 30-day readmissions each year. Transitional care strategies have also been extended to other settings to highlight the role of home health care nurses in medication management, for example, Setter, Corbett and Neumiller (2012), but the net value of this intervention remains unknown.

Magnet Hospital status. The Magnet Recognition program is designed to recognize hospitals that have achieved the highest levels of nursing practice standards and quality indicators. A multitude of studies (e.g., Kutney Lee et al. (2015) indicate that Magnet recognition is associated with significant improvement over time in quality of hospital work environments and in patient outcomes (mortality and failure to rescue), quality of care measures, and nurse outcomes. Friese et al. (2015) examined 1998-2010 data and found that better patient outcomes at Magnet hospitals persisted over time. They concluded that Magnet recognition was based on existing excellence but does not necessarily lead to additional improvement in surgical outcomes.

Evidence shows that Magnet recognition contributes to improved financial stability for the health care organization, net of the costs of obtaining it. In a longitudinal analysis, Jayawardhana, Welton, and Lindrooth (2014) found that achieving Magnet status increased inpatient costs by 2.46 percent and inpatient revenues by 3.89 percent, on average, resulting in a net increase in inpatient income of $1.23–1.26 million per year per hospital. The revenue growth can come from increased private reimbursement, which in turn reflects the value a Magnet hospital brings to a health insurance network. It can also come from quicker patient turnover that enables hospitals to increase volume and reduce costs per case.

Nurse work environment. A growing body of evidence suggests other aspects of the hospital environment are associated with a higher quality of nursing care and improved outcomes. McHugh & Ma (2013) found that a more stable environment (less nurse turnover) was associated with better outcomes for heart failure patients, as did Newhouse et al. (2013) in rural hospitals; Flynn et al. (2012) linked a supportive nurse practice environment (collaboration between physicians and nurses, opportunities to participate in hospital- and unit-level decisions; continuity of patient care assignments; continuing education opportunities; and the quality of nurse administrators) to lower rates of medication errors; and Hamilton et al. (2010) explored the link between nurses' off-hours shifts and patient mortality. The net value of interventions that target these factors, however, remains unproven, and further economic analyses are warranted.

Management and leadership. Evidence indicates leadership skills of frontline nurse managers are key to creating work environments that promote positive outcomes. McConnell et al. (2013) scored cardiac ICUs on four dimensions of management that

have been successful in other industries: standardizing care, tracking key performance indicators, setting targets, and incentivizing employees. They found that higher performance on these measures was associated with reduced 30-day mortality. Wholey et al. (2014) examined the complementarity of nurse and physician leadership and found that nurse leadership was associated with greater team interdependence, involvement in learning activities, and shared goals that, in combination, were positively associated with encounter preparedness in chronic disease management groups.

An evaluation of a 16-month leadership and innovation training program found that nurses at 42 hospitals nationwide who participated in the program went on to direct quality initiatives that improved patient outcomes. The program trained 163 nurses to address clinical challenges such as health care-associated infections, pressure ulcers, delirium, early mobility, falls, and patient handoffs. By its own account, the program saved more than $28 million annually. Determining its net value, however, will entail research to control for other factors and a full accounting of program costs.

NURSE INTERVENTIONS TARGETING ACA & MEDICARE VALUE-BASED PAYMENTS

Not surprisingly, and by design, value-based payment policies have prompted interventions designed to improve the bottom line of health care organizations that stand to lose or gain from achieving the targeted outcomes. Here we review a number of the nurse-led interventions.

Fall prevention. Since 2008, the Centers for Medicare & Medicaid Services have refused to pay hospitals for care related to an inpatient fall. In a randomized trial, Dykes et al. (2010) showed that a fall prevention tool kit was effective in reducing the incidence of in-hospital falls. The kit integrated existing communication and workflow patterns into an HIT application. A nurse completed a fall risk assessment scale, on which a tailored fall prevention intervention was based. Further research should analyze the cost of this intervention. Given the alignment of payment policies about inpatient falls, hospitals have a strong business case to pursue this inquiry.

Hospital-acquired infections (HAIs). The ACA authorized Medicare to reduce payments to hospitals with the highest HAI rates, giving hospitals a clear incentive to implement and test interventions to reduce HAIs. In a randomized trial, Marsteller et al. (2012) tested a nurse-led, interdisciplinary program to reduce central line-associated infections in ICUs, one of the most prevalent hospital-acquired conditions. The intervention was a "bundle" of evidence-based infection prevention practices and a structured program to improve safety, teamwork, and communication. The intervention group achieved significant and large reductions in infections, although costs were not tallied. A recent review estimated the annual hospital costs of HAIs to be $28 billion to $45 billion.

Pressure sores in long-term care (LTC) facilities. From 2009–2013, CMS ran a nursing home value-based purchasing program in which payment was based on selected quality measures. One of the measures was the percentage of high-risk patients with pressure sores. In a randomized trial, Yap et al. (2013) tested the

effectiveness of a nurse-led pressure ulcer prevention intervention that used musical cues to remind all LTC staff to help every resident move or reposition every two hours. The low-cost intervention significantly reduced the incidence of new pressure sores; however, its net value is not proven.

Conclusion

The value of nursing in health care is a function of both cost and quality. We have focused on the robust body of evidence of the crucial role of nurses have in the quality of health care, and indicate where cost data allow us to judge value. However, evidence on the cost of new processes and staffing models is relatively sparse. An understanding of costs is necessary to target value, and health care organizations need appropriate incentives to align their interests with the societal goal of value. As reimbursement is increasingly tied to value, hospital decision makers should consider new interventions and processes in tandem with outcomes so that a business case for their adoption can be made. Reimbursement can be used to make a business case for adopting high-value processes or avoiding low-value interventions.

Nurses are central to creating value. There is clear evidence that nurse staffing, training, and organizational environment all play crucial roles. Although there are some studies that measure the net value of interventions, most are focused on outcomes and cost is not considered. We hope that by defining value, and stressing the role that costs play, future studies will inform policymakers and insurers about how to reward value and how to create incentives to encourage health care organizations to focus on providing high-value care.

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