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Value-Based Care in Orthopedic Trauma

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Bulletin of the NYU Hospital for Joint

Diseases; **New York** Vol. 80, Iss. 1,

(2022): 102-106.



Abstract

The advent of value-based care (VBC) in orthopedic surgery represents part of a broader effort in the United States to shift paradigms in health care payment structure away from volume and toward quality.²⁻⁴ Whereas in orthopedic surgery examples of VBC, such as the comprehensive joint replacement (CJR) bundle, have been adopted with relative success, orthopedic trauma presents unique challenges in VBC for surgeons, patients, and health care systems.⁵⁻⁹ Strategies of VBC are best applied to predictable

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Abstract

The advent of value-based care as a component of the United States health care system is part of a broader paradigm shifting away from fee-for-service payment models in favor of alternative reimbursement incentives tied to quality and outcome metrics.

Bundled care models, gainsharing agreements, and other cost containment measures, although promising, may induce unintended systemwide consequences for orthopedic trauma surgeons who often specialize in tending to costly multiply injured patients and marginalized populations. This article reviews facets of value-based care applicable to orthopedic trauma surgery with an emphasis on public health and ethical considerations for policymakers and orthopedic surgeons.

In the United States, health care costs in 2019 increased for the fourth consecutive year to \$3.8 trillion and comprised approximately 17.7% of the nation's gross domestic product (GDP).¹ Health expenditures as a

proportion of GDP in the United States significantly outpace comparable costs in other Western high-income countries. The continued rise of health care expenditures has spurred significant public interest in policies that contain cost while maintaining the quality of patient care. The advent of value-based care (VBC) in orthopedic surgery represents part of a broader effort in the United States to shift paradigms in health care payment structure away from volume and toward quality.²⁻⁴

Whereas in orthopedic surgery examples of VBC, such as the comprehensive joint replacement (CJR) bundle, have been adopted with relative success, orthopedic trauma presents unique challenges in VBC for surgeons, patients, and health care systems.⁵⁻⁹ Strategies of VBC are best applied to predictable episodes of care with established clinical pathways. The variability and urgent nature of intervention in orthopedic trauma pose direct challenges to these aspects of VBC. For orthopedic trauma surgeons, trends in Medicare reimbursements as well as proposed VBC penalties may

disproportionately impact surgeons caring for vulnerable and underserved patient populations.^{10,11} The inevitable continued changes to the American health care system coupled with an increasing integration of alternative payment methods (APMs) mandate that orthopedic trauma surgeons consider innovations in treatment and care coordination that will improve quality of care for their patients.

This article reviews features of VBC as they apply to orthopedic trauma with an emphasis on evidence-based models of VBC, strategies of implementation, and barriers to success.

A Brief History of Value-Based Care in the United States

The employer-based component of the modern American health care system originated primarily from benefits that employers offered in the wake of World War II. In 1965, legislation enacted Medicare and Medicaid for the elderly and certain low-income populations, though the payment system was modeled after the fee-for-service (FFS) structure most prevalent at the time. Health maintenance

organizations (HMOs) emerged in the 1970s.^{7,12-14} Health maintenance organizations initiated cost containment strategies through capitated payments, quality of care and utilization reviews as well as patient incentives for using in-network providers. In this system, the primary care providers (PCPs) served as the gatekeeper for referrals to specialists. This model was the first in the United States to shift financial risk to providers. Capitation emerged in 1980s to 2000s and aimed to contain costs via predicted payments to providers for care within a specified period. With a fixed-sum, capitation introduced a hazardous incentive to underutilize care to make a profit. Drawbacks to managed care included infringements on patient autonomy to select their provider and a negative impact on hospital and specialist reimbursements. This was coupled with increased expenses for administrative management to review claims, preauthorization processes, and onerous accounting.⁶

The origins of VBC in the United States can be traced to the introduction of bundled payment initiatives in 1984 as part of an effort to create a packaged care system for cardiovascular surgery at the Texas Heart Institute in Houston. Physicians in this model were incentivized to optimize patient outcomes. The Geisinger Health System Proven Care pay for performance (PFP) program had similar aims and relied on evidence-based medicine. The success of these programs prompted the introduction of the Medicare Acute Care Episode Demonstration Project (ACE-DP) in the 2008 Patient Protection and Affordable Care Act (PPACA).⁷ This pilot program introduced gainsharing and each of three participating orthopedic sites in the program reported \$7.23 million in internal cost savings thus ushering in the era of VBC and bundled payment initiatives.

A Primer on Bundled Payments in Orthopedic Surgery

Bundled care payments are a form of APMs either retrospective or prospective in nature. This form of care is forecast to account for 17%

of payments by 2021. In a retrospective payment system, payers retain a fee-for-service arrangement and continue to compensate providers directly. But they also track total costs against the predetermined target price. If costs exceed the target price, then the payer reduces payments accordingly. If costs are lower than the target price, then providers share in the consequent savings.

In a prospective model, payers make a single lump-sum payment to a convener who then distributes payment to the various providers involved in the episode of care. As with the retrospective model, providers share in any losses or gains based on the predetermined target price.²⁻³

The best examples of success in bundled care payment initiatives are predicated on being able to craft predictable risk modifiable care pathways.⁴⁻⁶⁻¹⁵ The unpredictable nature of orthopedic trauma and vulnerable patient populations orthopedic traumatologists cater to create challenges to tracking outcomes. Whereas in joint replacement you might be able to delay care to modify certain risk factors, this is

not the case for many orthopedic trauma patients. Orthopedic trauma tends to be time sensitive, often necessitating urgent or even emergent treatment in the hospital. Many fracture conditions treated on an outpatient basis remain time-sensitive and hinder the logistics of modifying risk factors.

Challenges for Value-based Care in Orthopedic Trauma

Though health care expenditures continue to be major concern in the United States, just 20% of expenditures are attributed to physicians and clinics and some estimates place the percent of health care dollars going to physician pay specifically as only 7% to 9% of health care expenditures.^{16,17} Despite the relatively small proportion of health care costs attributable to physician services, physician reimbursement continues to be a target for legislators and reform efforts. Reimbursements in orthopedic trauma as well as total joint arthroplasty are declining, and increasing complexity burden

of surgical cases seldom result in proportional increases in reimbursement.^{11,12,18}

The difficulties lying ahead for orthopedic trauma surgeons in VBC are reflected by their knowledge and attitudes regarding cost containment measures. In a study by Okike et al.,¹⁹ the vast majority of orthopedic trauma surgeons (88.5%) believed bundled payments would be unsuccessful or only partially successful. With respect to barriers, a third of respondents (34.7%) indicated accurate cost data prevented the implementation of programs that track and maximize value, another third (31.5%) attributed it to a limited ability to collect patient-reported outcomes, and the rest (33.8%) were split between lack of institutional interest and access to funding.

Orthopedic trauma patients do not have predictable hospital stays, are expensive to care for, and trauma outcomes are notoriously difficult to track.^{15,20} All of these features of orthopedic trauma care thwart the basis for bundled care management that relies on pre-determined allocation of resources

toward care based on predictable cost of care episodes. The barriers that non-modifiable risk factors present to orthopedic trauma surgeons implementing VBC were well documented in a study by Mahure et al.²¹ In this study, the authors stratified patients into cohorts of elective total hip and total knee arthroplasty patients and compared them to fracture patients. To further delineate the groups, this study sorted patients according to severity of illness. Notably, fracture patient severity of illness had a disproportionate impact on the cost of care. The discrepancy in the impact of severity of illness on charges was also noted in length of stay. This study concluded that applying the standard bundled payment methods used in total joint replacement would not be appropriate for fracture patients. Despite these discouraging findings, several strategies geared toward VBC in orthopedic trauma demonstrate promise.

Strategies in Value-Based Care for Orthopedic Trauma: Cost-Saving Measures, Clinical Management, and Gainsharing

In 2007, orthopedic implant companies recorded \$14.3 billion in sales. Cost-saving measures in orthopedic trauma to reducing specific expenditures have primarily been directed at implant pricing. In one study, utilization of generic locking plates over vendor implants resulted in over \$400,000 in savings per year.²² A similar strategy was implemented in a study using generic cannulated screws for iliosacral screw fixation in a cohort of 79 patients resulting in a 73% reduction in implants costs and \$15,878 in savings per year. This strategy of generic implant use for femoral neck fracture fixation also showed reductions of costs and no differences in operative complication rates.²³

Matrix pricing and leveraging purchasing power to obtain favorable discounts through dual or single vendor agreement can also result in significant cost-savings. In a study by Althausen et al.,²⁴ 30% savings were realized from a dual vendor agreement leading to \$1.29 million in savings. Matrix pricing in this study significantly reduced implant costs for hemiarthroplasty components as

well as intramedullary nails.²⁴ Targeting medical device costs is a viable means of cost containment as long as the quality of the implants is rigorously examined and physicians are involved in decision making.

Gainsharing is another VBC strategy that can be used by orthopedic trauma surgeons. Gainsharing refers simply to an agreement between physicians and hospital systems in which physician efforts to save the system money result in a sharing of the savings going to the physician. McBride and Althausen²⁵ published a detailed review of gainsharing and co-management strategies in 2016. Of note, they review legal considerations for physicians considering hospital alignment models for VBC agreements. The Federal Anti-kickback statute, the Civil Monetary Penalty, and the Physician SelfReferral Law (commonly referred to as the "Stark Law") are the primary statutes referenced for consideration during physician involvement in incentive alignment agreements. Concerns regarding gainsharing include the incentive

to use less expensive and potentially lower quality services for patient care as well as incentives to potentially limit care. If these conflicts are managed directly, physician participation in gainsharing and co-management agreements present substantial potential to align the incentives of orthopedic trauma surgeons with VBC principles without compromising the quality of patient care.

An estimated 150,000 to 300,000 hospitalizations for hip fractures occur in the United States each year with cost burdens estimated between \$17 and \$25 billion.²⁶ The aging population globally has led to some estimates of a projected cost burden up to \$240 billion by 2040 related to hip fracture hospitalizations in the United States.²⁷ A review by Malik et al.²⁸ collated results from several studies examining hip fracture bundled payment methods. The take home message from the studies reviewed was that fracture cases are not comparable to elective arthroplasty cases. A comparison of total hip arthroplasty for femoral neck fractures to total hip arthroplasty

for osteoarthritis revealed that the femoral neck fracture cohort incurred a \$415,950 loss under the target episode price, whereas the osteoarthritis cohort was associated with a \$170,000 saving.²⁸ Increasing high fidelity, large database research and registry for orthopedic trauma patients is one pathway to improving VBC, though adherence to high quality research methods in orthopedic database research is low. The PERSONACARE system at the New York University Langone Orthopedic Hospital highlights a single institution research and database strategy to improve VBC success in orthopedic trauma surgery for hip fracture patients. In an analysis by Konda et al.,²⁹⁻³⁰ a trauma triage score for geriatric and middle-aged patients accurately identified high risk patients who fell outside bundled payment parameters. Similar parameters implemented at hospitals in conjunction with orthopedic trauma surgeons can help anticipate high cost and morbidity patients early during admission.

Public Health "Systemness" and Health Inequity Considerations

"Quality" remains a somewhat nebulous goal in health care. Orthopedic trauma surgeons always strive to reduce complications and efforts to reduce length of stay or readmission rates go hand in hand with that-but what about patient reported outcomes? Or radiographic outcomes? How are we deciding what a "good" outcome is? A study by DeBaun et al.³¹ demonstrated that the outcomes reported in orthopedic trauma are heterogeneous, and quality measures were mostly process based rather than structure or outcome based. The fragmented health care system in the United States also often results in the duplication of studies and redundant care delivery. A separate study estimated that the cost for duplicated imaging in trauma transfers to their institution during one calendar year based on a Medicare fee schedule was \$96,475.31

Orthopedic trauma patients are subject to the same health care disparities seen throughout American health care. Studies have highlighted that rates of surgical fixation are lower among Black and

Hispanic orthopedic trauma patients, and issues of equal access persist across the field of orthopedic surgery.³²⁻³³ In a study by Driesman et al.,³⁴ minority patients had a 2 day longer average length of stay compared with white patients ($p < 0.001$), costing on average \$4,000 more per hospitalization ($p < 0.001$). A study by Dy et al.³⁵ identified higher mortality, greater risk for delayed surgery, and higher readmission rates among Black hip fracture patients compared to white patients, independent of socioeconomic status. Similar findings were highlighted in a paper by Jarman et al.³³ using the Trauma Quality Program Public Use Files. These findings have troubling moral implications for a health care system moving toward incentivizing care based on patient outcomes. As incentives become tied to outcomes, unexpected consequences can occur, thus further disincentivizing care for already vulnerable patient populations, especially in orthopedic trauma.

There are no adequate protections in value-based health policy to account for these disparities and redundancies of care. Care models aimed at improving value have potential, but systemic inadequacies warrant attention to elevate the standard of care for orthopedic trauma patients in a meaningful and equitable manner. Increasing calls for a move toward "systemness" in medicine and in orthopedic surgery may address these issues. Cornerstones of this "systemness" include cost containment as well as increased prevention and targeting at risk communities.³⁶ Safeguards of a values explicit approach to health care can plug the gaps of oversight in policy design for VB C that result in disincentivizing surgeons caring for vulnerable patient populations subject to worse outcomes.³⁷ An ethics value-based system prioritizing solidarity as well as the principles of justice, beneficence, and nonmaleficence can aid policymakers when approaching legislation impacting orthopedic trauma patients.³⁸

Conclusions

It is readily apparent that the landscape of VBC in orthopedic trauma is complex and difficult to navigate. Policymakers must consider the unique characteristics of orthopedic trauma patients as they work to reform American health care. Legislators and payors must also take care not to penalize surgeons who provide care for patient populations from lower socioeconomic groups and individuals with higher comorbidity burdens. As the American health care system evolves, understanding the intricacies of VBC is critical for orthopedic trauma surgeons and their patients.

Disclosure Statement

None of the authors have a financial or proprietary interest in the subject matter or materials discussed herein, including, but not limited to, employment, consultancies, stock ownership, honoraria, and paid expert testimony.

Sidebar

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