Knee Replacement:
VHA’s Data-Driven, Clinically Informed Bundle Design

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Disclosures, Thanks and Disclaimer

Peggy L. Naas MD, MBA - Employed by VHA Inc.

Dave Jackson – Employed by Thomson Reuters

Neither speaker has a conflict of interest to disclose.

Thanks to my colleagues in the VHA Center for Applied Healthcare Studies and also to my colleagues at Thomson Reuters who worked with us in the VHA Bundled Payment Simulation Project

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Agenda

Project background
Approach
Results
Calculator demonstration
Key learnings
Next steps
Discussion
Background
A privately-held alliance of 1,340 non-profit hospitals and health systems and 30,000 non-acute providers nationwide

Our purpose: VHA exists to ensure the success of not-for-profit health care

Our mission: To consistently deliver expert guidance and solutions that drive exceptional performance for members
Background: About Thomson Reuters

• Share new name and logo and key facts about our new independent company recently acquired by Veritas Capital
Background: Project Goals

Help member hospitals better understand the clinical care process redesign opportunities and the complexities of designing a bundled payment strategy

Assess the financial risk and implementation requirements associated with such an undertaking

Allow a team learn together in a simulation…”no one gets hurt, everyone walks away in a simulation!”
Background: Defining Scope

Why bundling?

Why knee replacement?

Why not use an “off the shelf” model?

Preparation required
The bundle definition should include services that can be clearly related to the trigger-event.

The bundle design should encourage the provider and payer to agree on the specific types/causes of readmissions to target for better control, rather than set a price based on a general reduction target for all-cause readmissions.

The bundle design should not create a financial disincentive to direct a patient into the best/appropriate treatment pathway.

The bundle design should create an incentive to improve the quality and efficiency of patient care delivery.
Approach
Simulation model for provider organizations to explore opportunities for changing existing patterns of care in knee replacement.

Utilize empirical data exposing current utilization patterns and consequent costs.

Define a bundle of services that then could be productively managed at relevant clinical decision points.
Approach: Participants and Roles

15 participating hospitals

- Financial leader, operational administrator, physician leader
- Provide feedback/guidance via webinars, website, face to face meetings

VHA employees

- Physician Lead (orthopedic surgeon) – provide clinical input and direction
- Project Sponsor
- Project Manager

Thomson Reuters

- Consulting, data analysis, proprietary data assets
1. Review the current literature on total knee replacement practices
2. Complete an exploratory analysis to profile possible relevant clinical decision points
3. Expose empirical results to clinical experts for interpretation and suggested additional analyses
4. Collect local input regarding common treatment pathways from participant hospitals
5. Collect payer input regarding bundle design
6. Finalize bundle decisions
7. Develop financial modeling tool
Approach: Empirical Data

Thomson Reuters MarketScan® Commercial Claims and Encounters Database (CCAE)

- Enrollment, inpatient, outpatient, and prescription drug experience of tens of millions of commercially insured employees and their dependents
- Individual level data can be linked between care settings

Thomson Reuters Projected Inpatient Database (PIDB)

- Represents approximately 50% of all inpatient discharges in the United States for a given fiscal year, collected from more than 2,800 short-term, general, non-federal hospitals
- Projected and statistically weighted to reflect the universe of U.S. discharges
Approach: Sample Knee Replacement Pathway
Approach: Analysis Process

1. Derive Empirical Results
2. Review with VHA Sponsors
3. Refine Analysis and Results
4. Present to all participants
5. Incorporate feedback
Approach: Considerations

What starts the episode?
What are the treatment decisions?
What are the decision criteria?
Where are the services delivered and by whom?
What is the impact on patient outcomes?
What are the costs of those bundled services?
What are the observed, unexplained variations at each of these steps?
What do we expect in a care process...what really happens?
Approach: Inclusion Decisions

Types of service

Diagnoses

Timeframe after discharge

Specificity vs. Sensitivity
Approach: Financial Calculator

Identify important simulation model parameters and default values based on prior steps

Convert claims-based reimbursement amounts to provider-based cost estimates

Estimate localized utilization and cost as a starting point for individual health system participants

Create a spreadsheet modeling tool that enables participants to modify baseline defaults, then model the impact of various bundled payment performance assumptions
Results
Important Findings

Diagnosis behind knee replacement significantly affects inpatient reimbursement:

- Osteoarthritis, Except Spine (98.16%)
- Rheumatoid Arthritis (0.61%)
- Other Arthropathies, Bone and Joint Disorders (0.59%)
- Complications of Surgical and Medical Care (0.26%)
- Encounter Related to Other Treatment (0.19%)
- Neoplasm, Malignant: Primary Bone (0.05%)
- Psoriasis Vulgaris (0.04%)
- Injury: Knee, Ligamentous (0.02%)
- Fracture: Tibia (0.02%)
- Infectious Arthritis (0.02%)
Facility inpatient care represents the largest percent of reimbursement for a knee replacement:

- Inpatient Facility (74.7%)
- Inpatient Professional (14%)
- Inpatient Rehab (0.3%)
- Related SNF 90 Day (0.4%)
- Related Outpatient 90 Day (9.3%)
- Related Readmits 90 day (1.3%)
Important Findings

Within inpatient facility, the largest financial category is implants:

- Supplies (47.9%)
- OR/Recovery (25.1%)
- R&B (7.9%)
- Pharmacy (6.3%)
- Anesthesia (4.1%)
- Lab (2.8%)
- PT/OT (3.4%)
- Radiology (0.7%)
- Other (1.8%)
Partial knee replacements have a different financial profile than total knee replacements, despite same DRG.
Important Findings

Readmissions after knee replacement are rare but have a large financial impact on bundle:
Important Findings

Most common reasons for short term readmissions are infections and peripheral vascular disorders

Revisions of knee replacements tend to occur 6+ months post discharge
Important Findings

Inpatient rehabilitation: most occurs immediately post-discharge
SNF: most occurs during 30 days post-discharge
Outpatient: significant amounts occur 1-90 days post-discharge
Important Findings

- Physical therapy is the most expensive and common outpatient follow up care:
Regional variation exists, particularly around post-discharge facility care:
Important Findings

The top 5 diagnoses associated with MCC’s were largely acquired during the hospital stay, therefore bundling together creates incentive to prevent complications.

<table>
<thead>
<tr>
<th>MCC Diagnosis</th>
<th>Percent Not Present on Admission</th>
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<tbody>
<tr>
<td>Acute kidney failure NOS</td>
<td>90.8%</td>
</tr>
<tr>
<td>Pneumonia organism NOS</td>
<td>89.7%</td>
</tr>
<tr>
<td>Post-op pulmon insuff</td>
<td>96.0%</td>
</tr>
<tr>
<td>Ac respiratory failure</td>
<td>97.9%</td>
</tr>
<tr>
<td>Iatro pulm embol/infarct</td>
<td>98.3%</td>
</tr>
</tbody>
</table>
Results: Bundles Modeled

Three separate bundles modeled:

- Single (unilateral) total knee replacement
- Single (unilateral) partial knee replacement
- Bilateral total knee replacements
Results: Trigger Definition

- DRG on admission indicates joint replacement, with or without MCC
- Principal Procedure on admission is an ICD9 or CPT code indicating knee replacement
- Principal Diagnosis on admission indicates osteoarthritis
- Admission does not include a knee revision
- Admission does not an indication of another joint type (hip or ankle)
- Discharge status does not indicate death
- Admission does not result in a transfer to another facility (other than rehab or SNF)
Results: Bundle Components

Pre-admission care within 30 days of admission for specific procedures with related diagnoses

Entire inpatient knee replacement admission

Inpatient rehabilitation with related Dx within 30 days of discharge

SNF with related Dx within 30 days of discharge

Outpatient care within 90 days with related Dx for specific categories (PT/OT, radiology, lab, major procedures, home health, DME, and physician visits)

Readmissions within 30 days with related DRG

Readmissions within 90 days for related DRG w/review

Revisions within 180 days
Results: Financial Calculator

Developed a hands-on Excel-based tool, customized to each hospital’s geographic location and case volume, that models the VHA knee replacement bundle design

Allows hospitals to set a baseline price and cost scenario for a knee replacement bundle, then model other cost scenarios to see where potential savings opportunities exist
Results: Financial Calculator

MarketScan data provided national baseline

MarketScan was then adjusted to provide local estimates for each hospital:

- All utilization amounts were calculated at the regional level
- All financial amounts were adjusted to represent the hospital’s core based statistical area (CBSA) as illustrated below
- For certain components, cost was set to be equal to current reimbursement amounts
Calculator Demonstration
Key Learnings
Key Learnings: Self Assessment

How are we aligned with the physicians supplying these services?
  • What about our alignment with post acute providers?

What is our quality and efficiency profile for these episodes?
  • How much do we need to improve?

By how much have we reduced the costs of care?
  • What are our existing capacities and resources to do more?

Have we made progress in working across managed care settings?
  • How much progress do we need to make?
Key Learnings: Managing Bundled Payments

Test the risks and opportunities across the continuum

Understand the benefits and costs of framing the bundle in different ways

Test which variables are due to which patient characteristics and which are due to provider decision and treatments variables

Simulate decision variations and demonstrate patient outcome variations

Identify those key variables that generate significant cost without increasing quality

Inform so providers can manage and reduce variation that does not add value
Key Learnings: Using Data

Simulate the opportunities and risks of transforming FFS to bundled payment

Leverage data and an algorithm to test patterns across the continuum of care

Test the impact on price by simulating changing criteria:

• Components and services included in the bundle
• Time period covered by the bundle
• Including / excluding outliers

Diagnose opportunities to improve care, reduce variability and manage financial risk

Understand how to differentiate care and outcomes to maintain or capture market share
Key Learnings: Challenge and Opportunity

Care redesign across the continuum of services, preadmission testing through acute care to outpatient therapy

- Care is better when coordinated, safe and of high quality
- Care is improved when physicians and hospitals are aligned
- All are engaged to correct underlying causes of complications and readmissions
- All are engaged to manage all costs

“Cultural overhaul”

Value
Next Steps
Questions/discussion

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