Variability drivers of treatment costs in hospitals a systematic review

Karel Jacobs*, Erin Roman*, Jo Lambert, Lieven Moke, Lennart Scheys, Katrien Kesteloot, Filip Roodhooft, Brecht Cardoen
* Shared first authors
Funding acknowledgements: Vlerick Academic Fund, Novartis (Belgium), Medtronic

Background

Insights generated from cost variability studies could impact the transition towards VBHC. These studies can inspire the (re)design of reimbursement schemes, improve current care pathways and encourage physicians to opt for lower cost treatments.

Objective

Taking hospital costs as the perspective, this review provides an overview of all cost variability studies, their relevant study characteristics, the independent variables explaining hospital cost variability and recommendations regarding methodology for future cost variability studies.

Methods

Databases:
PubMED/MEDLINE, Web of Science, EMBASE, Scopus, CINAHL, Science direct, OvidSP and Cochrane
Keywords:
Cost variability, cost variation, cost differences and cost drivers, in combination with hospital costs.
Number of Articles:
90 articles were identified
Analysis:
Two screening rounds by two investigators independently.
1st round: Screening of titles and abstracts
2nd round: full-text screening and data extraction.

Inclusion Criteria

Articles taking hospital perspective for costs

Exclusion Criteria

Articles using average cost data, patient-level cost-data, no cost perspectives provided, mixed cost perspective (hospital costs & reimbursements), cost-to-charge ratios

Findings

Figure 1: Summary of findings relating to treatment costs in hospitals

Cost Time Scope

- Entire hospitalization costs (n=50)
- One aspect of hospitalization i.e., ICU admissions (n=22)
- Multiple inpatient and outpatient care episodes (n=13)
- Inpatient care episodes only (n=4)
- Outpatient care only (n=0)

Cost Scope

- Full cost of care (n=40)
- Patient care costs (excluding overheads) only (n=27)
- Variable costs only (n=6)
- Unclear cost classification (n=18)

Costing Methods

- Activity-based costing (n=48)
- Time-Driven Activity-Based costing (n=6)
- Other methods i.e., relative value units (n=6)
- Unclear costing method (n=30)

Figure 2: Study characteristics from included articles

Types of Journals

- Health disease/disorder journal (n=75)
- Other healthcare journals (n=15)

Rationale of Papers*

- Cost optimization/understanding (n=83)
- Insights for reimbursement (n=32)
- Other (n=1)

* Not mutually exclusive

Hospital Setting

- Monocentric (n=62)
- Multicentric (n=27)
- Not clearly stated (n=1)

Figure 3: Summary of significant independent variables driving treatment cost variability

Category	Subcategories/examples	
Patient	Demographics, comorbidities, comorbidity indices	93.3 %
Disease	Disease classifications/diagnosis, severity, phase/stage	72.2 %
Treatment	Procedure variation, treatment intensity, pathway variations	86.7 %
Outcome	Complications, readmissions, mortality, PROMs	44.4 %
Institutional	Hospital, environmental or resource characteristics	26.7 %

Discussion

Costing Methods

Enhance cost transparency by using Transparency & Openness promotion (TOP) guidelines or referring to prior, more elaborate costing method publication.

Policy makers could introduce guidelines for standardized costing methods.

Cost Scope

Full costs should be used by policy makers for setting full reimbursement schemes.

Patient care costs (excl. overhead) could be used to determine variability & develop risk adjusted bundled payments.

Variable costs alone are too limiting for both policy makers & researchers.

Variables

Patient, treatment & disease characteristics are mainly used in studies and further facilitate the development/adjustment of reimbursement schemes.

Institutional variables (hospital, environmental, resources) should be considered, they help identify process improvement initiatives.

Models focused on risk-adjustment bundled payments should exclude resource consumption variables (i.e., LOS/OR).

Conclusion

Recommendations regarding methodologies for future cost variability studies were provided.

Policy makers & researchers are advised to include variables across the different categories when seeking to implement process improvement strategies or develop/adjust reimbursement schemes.