Using Time-Driven Activity-Based Costing (TDABC) to Evaluate the Cost of Common MRI Exams at an Outpatient MRI Center

Azadeh Tabari*, Neil Bhatia, Barbara Wichtmann, Helen Piltner, Sittaya Buathong, Azadeh Hajati, Hope Taft, Susie Huang, Min Lang

1. MGH/HMS Athinoula A. Martinos Center for Biomedical Imaging, Charlestown MA
2. Department of Radiology, Mass General Hospital, Harvard Medical School, Boston MA

Conatct: atabari@mgh.harvard.edu

Athinoula A. Martinos Center For Biomedical Imaging

MASSACHUSETTS GENERAL HOSPITAL

HARVARD MEDICAL SCHOOL

Objective

- Time-Driven Activity-Based Costing (TDABC) is a bottom-up method that estimates the cost of healthcare services (e.g., conducting an MRI exam) based on practical capacity units [1-4].
- MRI offers crucial diagnostic information for accurate diagnosis and guiding treatment decisions; however, it is relatively costly compared to other imaging methods [4].
- This study aimed to apply TDABC to evaluate the total cost of commonly performed MRI exams at an outpatient imaging center.

Methods

Cost Analysis Using TDABC:

TDABC was applied to calculate the base direct cost of 9 outpatient MRI protocols, including brain, spine, cardiac, and abdominal scans, with or without contrast.

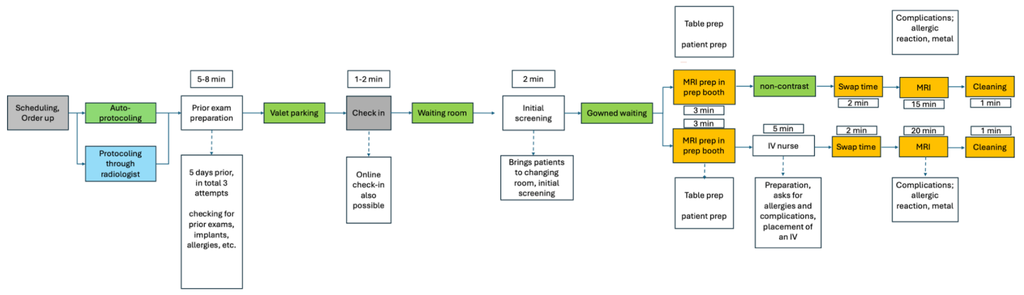
Workflow Mapping & Resource Allocation:

A detailed process map for brain MRIs was created using direct observation and interviews, highlighting step-by-step time, staff involvement, and consumables like IV contrast and linens.

Cost Components Quantified:

Labor, equipment, and space costs were calculated using capacity cost rates and multiplied by time spent at each step to derive total examination costs.

The process map included time duration analysis of each step in the imaging workflow



Results

Highest Costs (Contrast-Enhanced MRI):

- Abdomen: **$313**
- Thoracic spine: **$292**
- Brain: **$218**
- Cardiac: **$199**

Cost Drivers (Contrast-Enhanced):

- Space (40–63%) and labor (19–35%) were the largest contributors for abdomen, thoracic spine, and brain exams.
- For cardiac MRI, space (63%) and consumables (20%) were the main cost contributors.

Results

Highest Costs (Non-Contrast MRI):

- Hand: **$296**
- Brain: **$272**
- Foot: **$248**
- Knee: **$235**
- Lumbar spine: **$232**
- Cervical spine: **$219**

Cost Drivers (Non-Contrast):

- Space (42–57%) and labor (20–30%) were primary contributors across most exams.
- For cervical spine MRI, space (57%) and consumables (18%) dominated the cost.

Conclusion

- Utilizing the TDABC methodology can help identify high-cost items and steps within the MR imaging workflow. Understanding the cost breakdown of MRI exams will be helpful for developing cost-reduction strategies, managing site efficiency, consideration for alternative payment models, and increasing patient satisfaction.

References

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