



## Time-Driven Activity-Based Cost Analysis for Outpatient Anticoagulation Therapy: Direct Costs of Anticoagulation in a Primary Care Setting with Optimal Performance

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### Abstract:

**Objectives:** To determine how overall cost of anticoagulation therapy for warfarin compares with that of Novel Oral Anticoagulants (NOACs). Also, to demonstrate a scientific, comprehensive and an analytical approach to estimate direct costs involved in monitoring and management of anticoagulation therapy for outpatients in an academic primary care clinic setting, post- initiation of therapy.

**Methods:** A population-based cross-sectional study was conducted in conjunction with observations of patient care processes between August 2014 and January 2015. The study was conducted in an academic primary care outpatient setting at Mayo Clinic's warfarin anticoagulation clinic, Rochester, MN. The anticoagulation clinic serves patients 18 years of age or older in Warfarin therapy management, for any indication, after referral from the patient's primary care provider. The study included anticoagulation clinic enrolment data on a population of 5,526 patients. Time-Driven Activity-Based Costing (TDABC) technique was applied. Detailed process flow maps which showed process steps for all the anticoagulation program components and care continuum phases were created. Staff roles associated with each of the process steps were identified and displayed on the maps. Process times and costs were captured and analysed. The main outcome was direct cost of monitoring and management of anticoagulation therapy, post-initiation of therapy.

**Results:** The cost of warfarin management for patients who display unstable International Normalized Ratio (INR) is more than three times those who display stable INR over time. (Comparator to distinguish stability: Frequency of point-of-care visits needed by patients.) For complex anticoagulation patients, total cost of medication and monitoring for warfarin anticoagulation therapy is similar to that for NOACs.

**Conclusion:** Despite warfarin being significantly less expensive to purchase than NOACs, overall warfarin management incurs higher costs due to laboratory monitoring and provider time than NOACs. NOAC treatment, therefore, may not be more expensive than warfarin therapy management for complex anticoagulation patients.

### Biography:

Mr. Rohit Bobade has expertise in application of industrial and systems engineering principles and methodologies to science of



healthcare delivery. He has experience in operational, flow-time, work-flow analysis, work-load metrics, work-measurement, capacity modelling and process engineering. He earned Master of Science in Industrial Engineering from University of Wisconsin-Madison, USA and Bachelor of Engineering from India. He is a certified Six Sigma Black Belt professional from American Society for Quality (ASQ). He has published in international healthcare journals and presented at international conferences on topics such as practice convergence, queuing theory and optimization of adult diabetes care. He currently works as senior business analyst in Office of Information Security at Mayo Clinic, USA.

Mayo Clinic applied Time-Driven Activity-Based Costing (TDABC) approach to community patient care programs and patient care cycles. TDABC is an objective method to determine value for patients based on total resource costs. This presentation explains its application to outpatient anticoagulation program for community patients at Mayo Clinic in Rochester, Minnesota, USA. TDABC is a bottom-up approach to costing patient care based on the actual clinical and administrative processes and resources, used to treat patients. It combines process mapping with modern approach for accurate and transparent patient-level costing.

### Recent Publications:

- Optimizing adult diabetes care in community health
- u-RANIA: a neutron detector based on  $\mu$ -RWELL technology
- Time-driven activity-based cost analysis for outpatient anticoagulation therapy: direct costs in a primary care setting with optimal performance

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