Enhancing appropriate utilization of coagulation tests at St. Michael's Hospital

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BACKGROUND

- The activated partial thromboplastin time (aPTT) and prothrombin time/international normalized ratio (PT/INR) are the most commonly used coagulation tests [1].
- They have become ubiquitous in medical practice despite only having been validated for very specific indications [2, 3].
- Indiscriminate use of these tests increases costs with little anticipated benefit for patients and may mislead care [1].

OBJECTIVE

The aim of this study was to apply strategies to enhance appropriate utilization of coagulation tests at St. Michael's Hospital and to determine if these changes reduced aPTT and PT/INR testing.

METHODS

- A prospective quality improvement study was conducted.
- Four clinical areas were identified (e.g. inpatient and outpatient wards, emergency department (ED) and preoperative clinic).
- The first targeted area was the ED where coagulation test volumes were particularly high.

- Strategies were implemented to:
  - Identify relevant stake holders
  - Uncouple aPTT/PT testing options
  - Present at ED rounds
  - Revise ED order panels
  - Distribute educational materials/prompts

- On January 13, 2016 the ED laboratory order panels were revised.
- The primary outcomes were change in the weekly rate of PT/INR and aPTT testing per 100 ED patients before and after January 13, 2016.
- Weekly rate of creatinine testing pre- and post-intervention were used as a control measure since no order changes were made to this test.
- Rate of patients arriving to the ED via ambulance and rate of patients admitted into the hospital were estimated as surrogates of patient acuity.
- Rate of red blood cell transfusion was used as a balance measure (surrogate for bleeding).
- Laboratory data were obtained from the hospital information system (SoftLab 4.0) and analyzed with SAS 9.4 (SAS Inc. Cary, NC).
- The analysis was conducted using Poisson regression models to estimate weekly rates per 100 patients in the ED before and after the intervention, rate ratios and 95% confidence intervals.
- An offset was included to account for different number of weekly patients admitted in the ED during the study period.

RESULTS

- After changes to order panels, weekly rates of PT/INR testing and aPTT per 100 ED patients decreased (17.2 vs 38.4, rate ratio=0.45 (95% CI 0.43-0.47), p<0.001; 16.6 vs 37.8, rate ratio=0.44 (95% CI 0.42-0.46), p<0.001, respectively) (Figure 1).
- This decrease in coagulation testing was associated with $CAN 6,000 in direct cost savings per month and a one-year projected savings of $55,000.

Figure 1: Laboratory Testing in the ED at St. Michael's Hospital

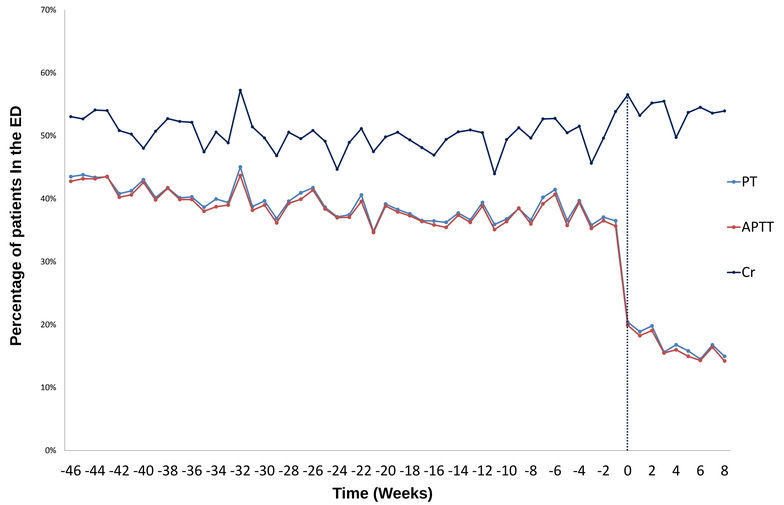
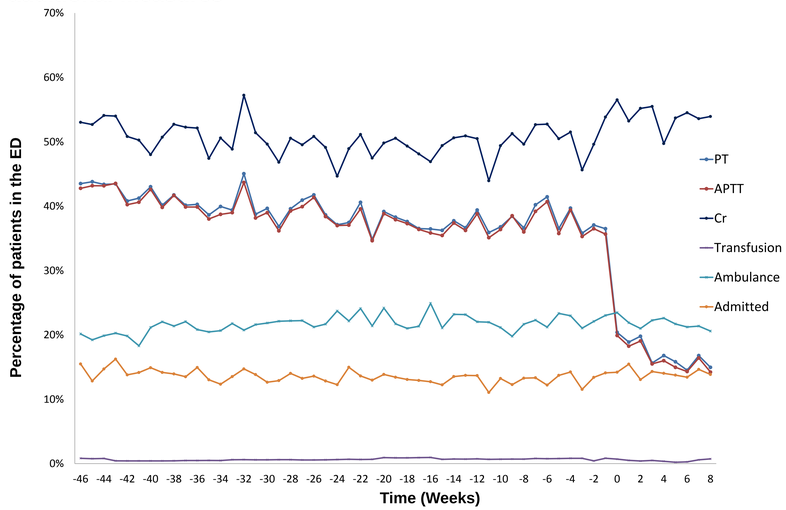


Figure 2: Laboratory Testing in the ED at St. Michael's Hospital with additional measures



RESULTS (continued)

- Rate of creatinine testing per 100 ED patients increased during the same time period (54.0 vs 49.7, rate ratio=1.09 (95% CI 1.06-1.12); p<0.0001) while the weekly rate per 100 ED patients receiving blood transfusions slightly decreased (0.5 vs 0.7, rate ratio=0.66 (95% CI 0.49-0.87), p=0.0034).
- Rate per 100 patients arriving to the hospital via ambulance was unchanged (21.8 vs 22.1, rate ratio=0.99 (95% CI 0.95-1.03), p=0.6414).
- Rate per 100 of patients admitted into hospital increased (14.1 vs 13.2, rate ratio=1.07 (95% CI 1.01 1.13), p=0.0170).

CONCLUSIONS

- A simple process change to order panels is associated with meaningful reductions in coagulation testing and associated costs without obvious adverse effects.
- While physician education and the development of practice guidelines may reduce unnecessary testing, these initiatives are minimally effective and seldom sustainable [4].
- Our intervention, similar to past studies, made it easier for clinicians to order coagulation tests less often and we presume, more appropriately [5].
- While this intervention focused on one area in our institution, its success highlights how a simple process change, when implemented with educational supports, can reduce unnecessary testing.

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