

Implementation of a Clinical Decision Laboratory Ordering Tool for Preeclampsia: A Quality Improvement Initiative to Reduce Excessive Utilization

Presenters:

- Alexander Wong (awong2@ualberta.ca)
- Winnie Sia (Winnie.Sia@albertahealthservices.ca)

Goal: Pregnant women suspected of having preeclampsia receive laboratory tests for diagnosis and surveillance. However, existing guidelines primarily list all possible tests without suggesting which are most important. This poses a considerable unnecessary healthcare cost and carries the potential for iatrogenic harm. Our quality improvement (QI) project aimed to reduce unnecessary patient blood draws and associated healthcare costs.

Activities: QI tools were used to analyze the workup process on the labour and delivery, triage, and antepartum wards of a tertiary care center. Healthcare providers were surveyed regarding laboratory test ordering practices, which was corroborated with 20 inpatient chart reviews. An algorithm for ordering preeclampsia investigations was developed by a multidisciplinary team and disseminated to practitioners. Post-intervention surveys and chart reviews were conducted to refine the interventions.

Impact: Our project led to a 39% reduction in laboratory tests ordered for preeclampsia, resulting in an annual savings of \$89 060. There was a particularly significant reduction in investigation costs for tests with low clinical utility, including D-dimer (69%) and urea (71%). Weekly data show the post-intervention reduction in excessive laboratory investigations were sustained.

How has your ordering practice changed for the following tests due to this project?



Challenges: Culture change was a significant undertaking during the implementation of our project, as survey data indicated that most providers acknowledged that some investigations did not affect patient management and were ordered based on institutional convention.

Lessons Learned: The successful outcomes from our project reveal the value of working within a multidisciplinary team in creating sustained change, as well as the need to address cultural factors underlying provider decision-making.

Major Reductions in Unnecessary Aspartate Aminotransferase and Blood Urea Nitrogen Tests with a Quality Improvement Initiative

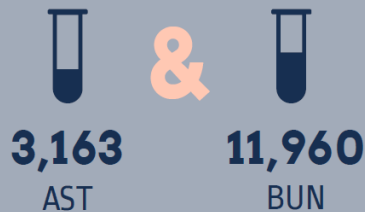
Our goal

To significantly reduce ordering of these two tests across the entire hospital

Why these two tests, specifically?

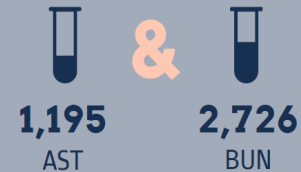
- ✗ Aspartate aminotransferase (AST) and blood urea nitrogen (BUN) are two of the most commonly ordered tests, but they are often unnecessary
- ✗ AST is not reliable as a specific marker of liver injury
- ✗ BUN is not an accurate marker of renal function. Other factors, such as protein intake, heart failure and use of diuretics, may influence BUN levels

In January 2016,



tests were performed each month at Sunnybrook

By August 2018, only



tests were performed at Sunnybrook, a reduction of

74%

How we did it



NOV 17

Release of updated outpatient laboratory requisition

FEB 18

Removal of emergency department and intensive care order groups

MAR 18

Removal of AST/BUN from all hospital electronic order groups

APR 18

Removal from personalized order groups in cancer centre approved

MAY 18

Unit specific meetings to investigate high ordering practices Grand Rounds educational event

JUN 18

Top 20 ordering physicians received feedback on their ordering

JUL 18

Removal of all personalized order groups & initiation of revision of paper and electronic ordersets

Challenges: Outdated ordersets/ordering processes

Lessons: A significant decrease in the AST/ALT and BUN/Cr ratios can be achieved with a multimodal approach and will result in substantial healthcare savings.

Rachel Strauss, Sunnybrook Health Sciences Centre, Toronto, ON
rachel.strauss@sunnybrook.ca

INTRODUCING A HARD-STOP TO PREVENT UNNECESSARY HbA1C TESTING

Daniel Beriault, St. Michael's Hospital

Drake Yip, St. Michael's Hospital

Shafqat Tahir, St. Michael's Hospital

Julie Gilmour, St. Michael's Hospital

Maverick Chan, St. Michael's Hospital

Lisa K. Hicks, St. Michael's Hospital

Background:

Automated change strategies are reportedly more effective than strategies targeting human behavior. However, hard-stops can cause unintended consequences and alienate stake-holders. Hemoglobin A1C (HbA1C) is a lab test routinely ordered to evaluate blood sugar control. Due to the life-span of red blood cells, HbA1C values repeated within 2-3 months are rarely meaningful.

Goal:

Assess the feasibility and acceptability of an electronic hard-stop of redundant HbA1C tests. Methods: Key stake-holders at St. Michael's Hospital were engaged to define redundant HbA1C testing and develop an electronic algorithm to cancel redundant tests using the lab-informatics-system. Educational materials were developed to support the practice change. "Add-on" HbA1Cs and feedback on the new process were tracked as balancing measures.

Impact:

Stake-holders agreed that HbA1C tests ordered within 61 days of a previous result were redundant. Automatic cancellation of redundant HbA1C began May 1, 2018. Between May 1, and December 31, 2018, 96% of all redundant HbA1C tests were cancelled. On average, 145 tests were cancelled each month (4.25% of all HbA1c tests) and 7 cancelled tests were added back by a clinician. The hard-stop process was well received by laboratory staff: 72% reported that it was not confusing and 71% reported that it did not increase their workload.

Lessons Learned & Challenges:

It is feasible to introduce a hard-stop on a redundant lab test with high stake-holder acceptance and minimal consequences. The impact of a hard stop on this single test was modest; however, once expanded to other tests the impact may be substantial.

Reducing Waste: A Guidelines-Based Approach to Reducing Inappropriate Vitamin D and TSH Testing in the Inpatient Rehabilitation Setting

E. Ali Bateman MD¹, Alan Gob MD², Ian Chin-Yee MD², Heather MacKenzie MD¹

¹Department of Physical Medicine & Rehabilitation, Schulich School of Medicine & Dentistry, Western University

²Division of Hematology, Department of Medicine, Schulich School of Medicine & Dentistry, Western University

Presented by: Ali Bateman (eabateman@gmail.com)

Background

Laboratory overutilization increases healthcare costs and can contribute to negative health outcomes. For the following reasons, we specifically targeted the overutilization of Vitamin D and TSH testing:

1. Discipline-specific guidelines do not support routine testing for Vitamin D & TSH in inpatient rehabilitation.
2. 94% of patients had these tests ordered on admission to our academic rehabilitation hospital (**Figure 1**).

Baseline Data

Figure 1: TSH and Vitamin D Testing on Admission (N=50)

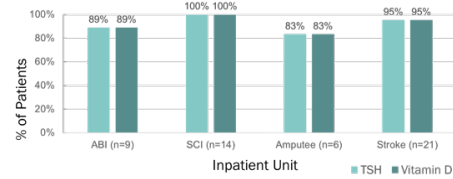


Figure 1: Cross-sectional quantification showed TSH and Vitamin D tests were performed in 94% of patients on admission to inpatient rehabilitation, and identified that 3 key clinicians were responsible for ordering 100% of these tests.

Goal: Reduce Vitamin D and TSH testing by 25% on admission to inpatient Stroke, Spinal Cord Injury, Acquired Brain Injury, and Amputee Rehabilitation.

Methods

Root cause analysis (not shown) informed a series of PDSA cycles:

PDSA #1: Academic Detailing & CCDS

Academic detailing targeted 2 physician factors (knowledge gap for best practices, unaware of potential harms) and 1 institutional factor (unaware of scope and cost of problem); simultaneously, computerized clinical decision support (CCDS) limited Vitamin D testing to Choosing Wisely Canada criteria.

PDSA #2: Audit & Feedback

In-person audit and feedback with key stakeholders to target pre-populated admission caresets that automate the ordering of these tests.

PDSA #3: Result Dissemination & Feedback

Key clinicians were provided by email with a summary of project results including a run chart. We solicited feedback on processes and outcomes.

Selected Other Measures

Cost Savings: This initiative produced a cost savings of \$16.76 per admitted patient, or \$9011.64 annualized.

Balancing Measure:

Figure 3: Rate of Vitamin D Supplementation during Admission

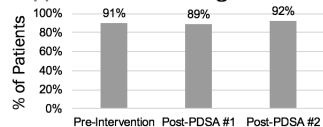


Figure 3: Balancing Measure – Rate of Vitamin D supplementation during admission remained stable at >90% throughout the study.

Process Measure:

Figure 4: Admission Caresets with Automatic Vitamin D & TSH Orders

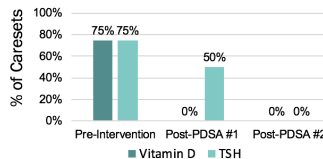


Figure 4: Process Measure – The proportion of favourite caresets with automatic Vitamin D & TSH orders was reduced to 0%.

Additional data not shown is available by request.

Impact

Figure 2: Run Chart for Rate of Vitamin D and TSH Testing on Admission

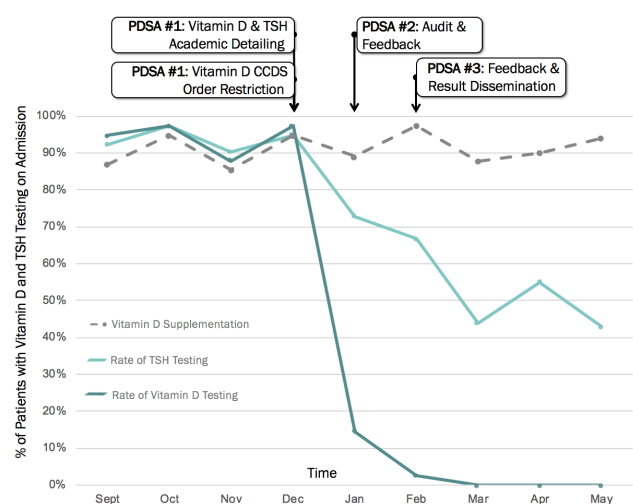


Figure 2: After implementation, 3.4% of patients had admission Vitamin D testing (91% reduction) and 56% of patients had admission TSH testing (37.5% reduction).

Challenges

Manual data collection and one-on-one academic detailing and audit and feedback interventions are labour-intensive and might not be feasible on a broader scale.

Lessons Learned

CCDS was the most effective intervention; however, academic detailing as well as audit and feedback still produced robust results which were felt to be driven by the following:

1. Academic detailing was backed by guidelines specific to the target patient populations
2. Audit and feedback targeted both physician and system factors (automatic order caresets)
3. This project invited in-person open communication between key clinical stakeholders and project leads.