

# Royal Alexandra Hospital / Lois Hole Hospital: Reducing Excessive Laboratory Ordering for Preeclampsia Bloodwork: *Be Hip Gone with PIH*

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Define Opportunity

**Background, Problem Statement and Goal Statement:** In the Royal Alexandra Hospital/Lois Hole Hospital(LHH), pregnant women with suspected or confirmed preeclampsia are ordered "PIH" (pregnancy induced hypertension) labs, which are bundled to conventionally include CBC, ALT, AST, creatinine, uric acid, fibrinogen, PT/INR, PTT, D-dimers, electrolytes, and urea. Most of these blood tests are listed in the SOGC guidelines to investigate for preeclampsia; however, they are not of equal value. For instance, some blood tests are: 1) not cost-effective such as fibrinogen, PT/INR, PTT, and D-dimers, esp. if done once recently and are normal; 2) not necessary to repeat once they are positive, such as uric acid and urine protein to creatinine ratio; 3) not usually helpful, such as electrolytes; or 4) not necessary at all, such as urea. About half of the physicians, residents and nurses surveyed agreed that some labs ordered do not impact on the patient management.

**Problem:** Currently, the Royal Alexandra Hospital (RAH) has a panel for pregnancy-induced hypertension (PIH) that comprises daily laboratory tests that are ordered for both suspected and confirmed cases (~125 suspect patients/month with 63 patients/month confirmed for preeclampsia). The laboratory tests can be ordered as often as 3 times per day. This leads to further diagnostic testing, increases laboratory costs and decreases the quality of the patient experience. Additionally the SOGC (national society of obstetricians) advises against use of the term PIH since it is misleading.

**Baseline data: Jan to April 2017**

Tests	Units	Total Volume (in 4 months)	Total Cost (in 4 months)
"PIH Labs" (see above)	B3W, B3WO, B4E, B4S, B4SI	10, 462	\$69, 350

**Aim:** Dec 31, 2017 – Decrease (10%) of laboratory tests ordered for suspected or confirmed preeclampsia patients in the RAH/LHH.

**Process Assessment:** A cross functional process map, a Gemba walk, force field analysis and a cause and effect analysis assisted in the identification of current process strengths and gaps. Project team along with Clinical Biochemists reviewed literature and current best practices to aide in the development of a standard laboratory approach.

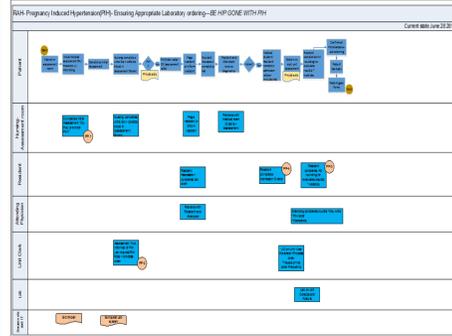
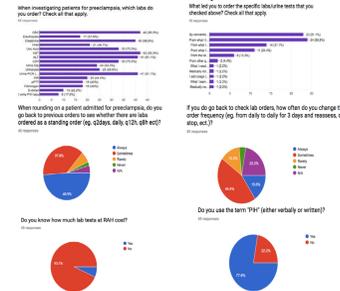


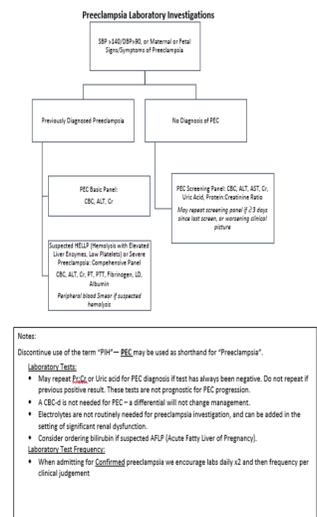
Chart review results: n=12 for women admitted with preeclampsia/"PIH"  
 Most patients have had bloodwork drawn in assessment prior to physician visit.  
 Sicker patients received laboratory investigations every 8-12 hours.  
 This chart review confirmed there were some duplicate tests done when they would not affect prognosis or management, and the extensive panel of laboratory testing completed when a physician writes "PIH labs" or "PEC labs" often includes labs that are consistently normal and have a low likelihood of being abnormal.

### Care Provider Survey



### Improvement Selection and Implementation Plan-Time frame: Sept 25 to Dec 31, 2017

GAPS	Intervention
PIH Lab can be ordered before Resident/physician Assessment	Develop an algorithm for what tests and frequency should be drawn on suspect and confirmed (PIH) Link with Laboratory Biochemists
Assessment room and 3W-PIH cheat sheet posted	Unit: Replacement of Job aides with a new PEC protocol for lab ordering Education with the clinical nurse educators Informational project and lab cost posters Printed algorithm for Residents-'Cheat sheets' for
The panel of test is specific to ordering staff: Residents/Attending/RN's	Physicians- Education-Power Point Presentation Implementation of new algorithm-Physician agreement
On Unit: Attending/Resident may not be aware of original admission order frequency	Unit clerk applies a Pre-Printed Sticker that changes the order from daily to daily x3 alerting physician review and signature
PIH is term used to refer to Preeclampsia	Education-Remove PIH term and panel-PEC is the new term



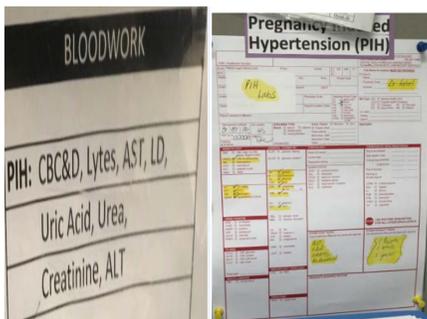
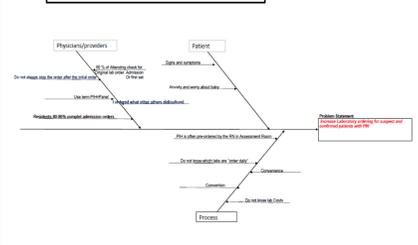
### PDSA measurement plan

Outcome measures: No further use of the term "PIH" and a 10% reduction of labs ordered for preeclampsia.  
 Process measures: Chart review of lab test ordering patterns.  
 Survey of stakeholders of the use of the job aides and suggested lab ordering algorithm for feedback/next steps.

**Reinforce Ownership, Measurement, & Continuous Improvement:** Continue measuring laboratory use data and correlate with our interventions to determine effectiveness. Ongoing education of residents, nurses, and physicians regarding use of the algorithm. Considering broadening use of the preeclampsia investigation algorithm to the Edmonton Zone.

Build Understanding

### Cause-effect analysis



Job aides outlining what tests to order-posted in the assessment room and on the units

Preliminary data	Next steps
Clinicians demonstrate enthusiasm and engagement in using lab tests more effectively. Education has been started with staff physicians and nurses.	Resident education to occur at academic half day, resident pocket cards to be distributed, ongoing "in service" education with nurses and collaboration with clinical nurse educators
By removing AST, urea, electrolytes, and D-dimer from the investigation algorithm, anticipated \$5216 laboratory cost savings per month.	Laboratory use data will be available 6 weeks after the first PDSA cycle to formally evaluate effectiveness of intervention.
If a conservative estimate of 20% of women presenting with suspected preeclampsia are investigated with the basic preeclampsia panel or the screening panel, with the remainder receiving the severe preeclampsia investigation panel, the anticipated cost reduction would be an additional \$741 per month.	Laboratory use data, chart review, and repeat provider survey will determine effectiveness of intervention, change in practice, and clinician recommendations for any changes to improvements to algorithm.

Manage Change

**Collaboration & Communication Strategies:** Physician lead and Biochemist collaboratively developed a standard test ordering approach. Communication Approach: Educational Power Point Presentation (PPT) provided to physicians, residents and nursing explains why this change intervention is needed. Accompanying posters heightening staff awareness and laminated 'Cheat sheets' for the Residents on rotation

### Lessons Learned:

- Laboratory testing data is available 6 weeks after intervention so there is a delay in formally measuring impact.
- Much of laboratory test ordering is cultural as opposed to being based on what is needed to make clinical decisions for a patient.
- Care providers are often unaware of laboratory test costs, and knowledge of the cost can assist in making test ordering more effective and applicable to the patient.
- Care teams are amenable to job aides, especially pocket cards. Job aides posted on the wards significantly impact practice and ordering.

Act to Improve

Sustain Results

Share Learning