Minimizing Unnecessary Coagulation Testing in the ED

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Conflict of Interest

- I have no conflicts of interest
- Academic support through AHS funded non-clinical role

Scope of the problem

- 177,586 PTT or INR studies done in Calgary Zone ED's in 2014
  - Nearly 30,000 of these coags were ordered for ? Cardiac Chest Pain by RN Order Set

- Very compelling evidence that the yield of ordering routine INR/PTT in CP patients is VERY LOW
- 99.8% of ED PTT and INR are bundled
- In our setting, total cost =7.5$* per INR or PTT,
  - direct cost 2.51$ (reagent, labour, tubes)

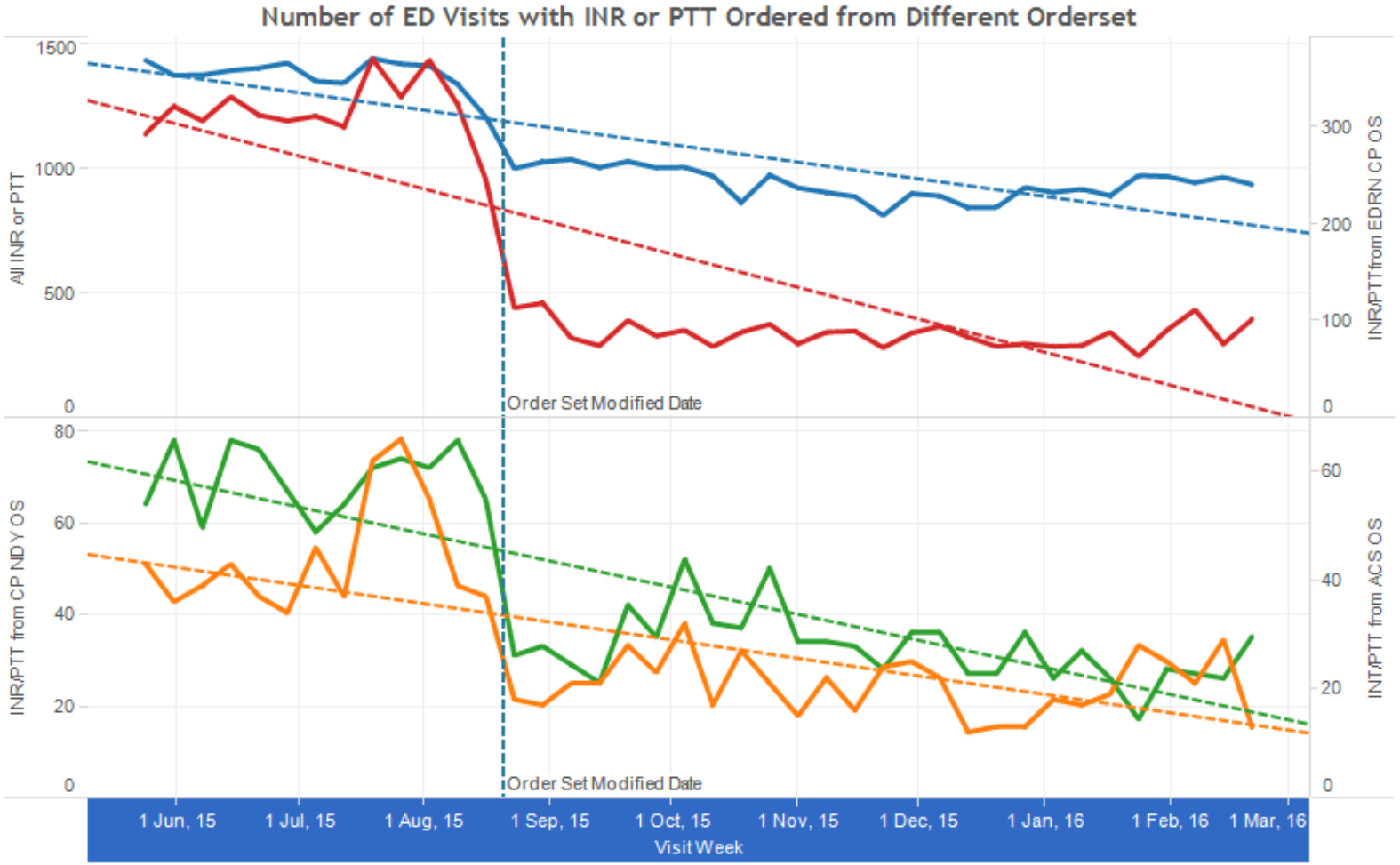
Intervention

- **PHASE 1: Remove Preselected PTT/INR from EDRN Cardiac Chest Pain Protocol* only (May-Aug 2015)**
  - Provide clinical guidance to RN's
    - Send coagulation studies if patient is on coumadin/warfarin, has liver disease or a bleeding disorder
  - RN/Physician Engagement
  - Educational Rollout targeting nurses and physician

- **PHASE 2: Unbundle PTT/INR in appropriate order sets (Feb 2016 – ongoing)**
  - 10 of 197 order sets have been completed

	Reductions in PTT or INR's
Phase 1 – ED RN Chest Pain (May-Aug 2015)	8,412
ED RN Chest Pain (Feb to May 2016)	8,936
Phase 2 – Unbundling PTT/INR (May-Aug 2016)	12,875
Total Reduction in PTT or INR's	30,223

Alberta Health Services



Summary

- This multi-faceted intervention (order set change, decision support and RN/MD education)
  - Dramatic reduction in coagulation testing in the ED
  - Cost–savings* of 124,078$ over a 15mth period
    - Actual savings vs labour savings

- There is more to come!
  - Currently reviewing all ED order sets
  - Current inpatient review to unbundle PTT and INR

Acknowledgments

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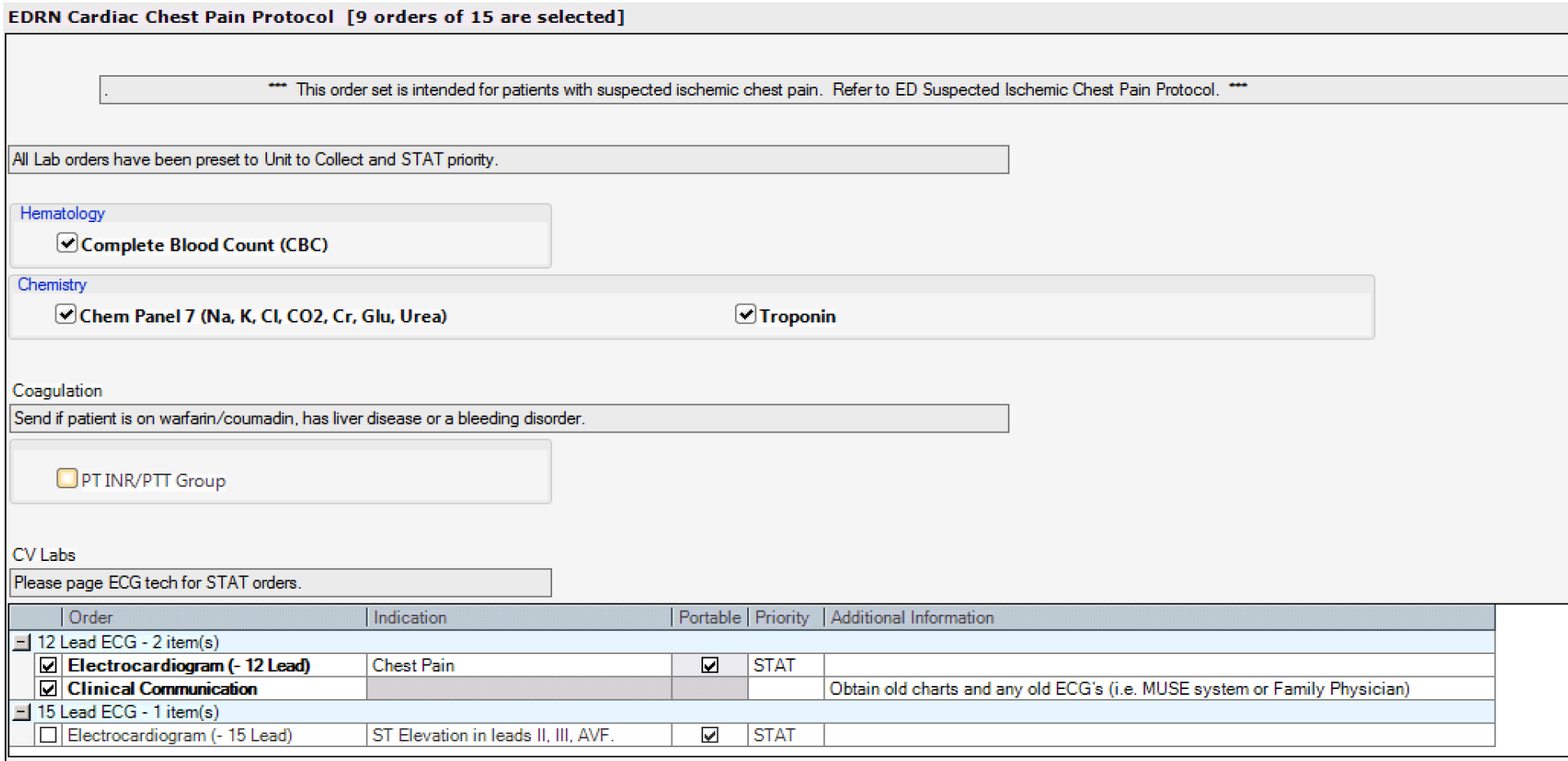
- SCM: Kathy Yiu, Jim Ray Lamsen
- CLS: Dr. Chris Naugler, Heather Sereda (economic analysis)

Additional Slides

Order Set Change



EDRN Cardiac Chest Pain Protocol [9 orders of 15 are selected]

*** This order set is intended for patients with suspected ischemic chest pain. Refer to ED Suspected Ischemic Chest Pain Protocol. ***

All Lab orders have been preset to Unit to Collect and STAT priority.

Hematology

- [x] **Complete Blood Count (CBC)**

Chemistry

- [x] **Chem Panel 7 (Na, K, Cl, CO2, Cr, Glu, Urea)**
- [x] **Troponin**

Coagulation

Send if patient is on warfarin/coumadin, has liver disease or a bleeding disorder.

- [ ] PT INR/PTT Group

CV Labs

Please page ECG tech for STAT orders.

	Order	Indication	Portable	Priority	Additional Information
−	12 Lead ECG - 2 item(s)				
☑	**Electrocardiogram (- 12 Lead)**	Chest Pain	☑	STAT	
☑	**Clinical Communication**				Obtain old charts and any old ECG's (i.e. MUSE system or Family Physician)
−	15 Lead ECG - 1 item(s)				
☐	Electrocardiogram (- 15 Lead)	ST Elevation in leads II, III, AVF.	☑	STAT	

Secondary Outcomes

- **No change in MD ordering rates**
  - 219 PTT and INR 90 d pre
  - 218 PTT and INR 90 d post
- **Total Number of coags (PTT and INR)**
  - Pre – 18,327
  - Post - 12,769 (1352 fewer PTT/INR* beyond ED RN OS)
- **% INR abnormal**
  - Pre- 24.6%
  - Post – 29.7%

Assumptions

- “xx” service will always want it. I might as well order it…
- “Dr. xyz” will just order it anyways, why even try?
- “You’re taking away our autonomy to order these tests”
- “What if their INR is xxx?”

- **BARRIER TO CULTURE CHANGE: ASSUMING THAT CHANGE CAN’T HAPPEN**

Summary of evidence– PTT/INR in CP

- Campbell S. et al CAEP abstract 2014) – 78.7% of CP (?cardiac) had INR's done (patients on Coumadin were excluded). Only 13 (1.8%) had abnormal INR – 12 of which were on a/c but not recorded in chart
- Martin et al. Emerg Med J 2012, vol 29 pg 184. 640 pts with CP had coag studies – 79 were abnormal. All of these could be predicted on Hx (anticoagulant use or liver disease) OR were trivial (4 patients, INR <1.5)
- Schwartz et al. 23 patients (13%) of patients admitted with ACS had INR >1.25. 20 Of these patients had hx of anticoag usage or liver disease or daily. In the remaining 8 patients (mean INR was 1.44) no change in therapy was initiated based on these abnormalities.

References

1 http://www.acepnow.com/article/emergency-physicians-can-reduce-unnecessary-coagulation-testing-patients-chest-pain/

2 Schuur et al. A Top-Five List for Emergency Medicine *JAMA Intern Med.* 2014;174(4):509-515

3 Kale, M.S., Bishop, T.F., Federman, A.D., Keyhani, S. (2013). Trends in the Overuse of Ambulatory Healthcare Services in the United States. JAMA Intern Med 173(2): 142-148

2 Kochert, E., Goldhahn, L., Hughes, I., Gee, K., and Stahlman, B. (2012). Cost-effectiveness of routine coagulation testing in the evaluation of chest pain in the ED. American Journal of Emergency Medicine 2012;30:2034-2038.

3 Martin, D., and Beardsell, I. (2011). Is routine coagulation testing necessary in patients presenting to the emergency department with chest pain? EMJ 2012;29:184-187.

4 Kitchens, CS. (2005). To bleed or not to bleed? Is that the question for the PTT?. Journal of Thrombosis and Haemostatis, 3:2607-2611

5 Schwartz, D. (2005). Utility of Routine Coagulation Studies in Emergency Department Patients with Suspected Acute Coronary Syndromes. IMAJ 2005;7:502-506.

6 Campbell SG, Magee, K., Cajee, I., Field, S., Butler, M., Campbell CL. (2014). The utility of measuring international normalized ratio (INR) as part of the investigation of patients with cardiac-type chest pain. CAEP/ACMU 2014 Scientific Abstracts. May 31 to June 4, 2014

7 McHugh J, Holt, C., O'Keeffe, D. (2011). An assessment of the utility of unselected coagulation screening in general hospital practice. Blood Coagulation and Fibrinolysis 2011;22:106-109

8 McKinley, L., and Wrenn, K. (1993). Are baseline prothrombin time/partial thromboplastin time values necessary before instituting anticoagulation?. Annals of Emergency Medicine 22(4); 697-702

9 Cooper, JD., Smith, KJ., Ritchey, AK. (2010). A cost-effectiveness analysis of coagulation testing prior to tonsillectomy and adenoidectomy in children. Pediatric Blood and Cancer 55:1153-1159