Leveraging Clinical Data to Develop a Clinician Scorecard for Pathology Investigations

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Objectives

- Understand our need for clinical scorecards

- Understand the data structure of our pathology lab data

- Demo the preliminary version of the scorecard and the physician first impressions

Introduction

- Need to leverage existing data resources to better understand and improve patient care

- Size and breadth of data makes it difficult to parse, hiding valuable information from the decision makers, hindering patient care

- Presenting this information is key to improving our understanding of existing healthcare practices

Clinical Scorecards

- Physicians operate on a micro-level, get very little macro-level feedback
  - aLOS and eLOS for in-hospital usage
- As part of their continuing education, physicians need to know
  - What they are doing
  - What their peers are doing (the standard)
- **Is not an evaluation**. It's a summary

Pathology Lab Use

- GPs use the pathology lab for thousands of tests a year
  - The pathology lab at the QEII in Halifax performs an estimated 5 million tests a year from GPs

- The lab wants a mechanism to provide GPs with feedback about their use:
  - How many/what tests did they order?
  - How many came back normal/abnormal?
  - How did these numbers compare to their peers?

Primary Objective

- Develop a *clinical scorecard* to provide feedback to GPs on their lab use

- Help them understand their role in lab workload and what they can do to make it more efficient

Pathology Data

- ## A *test* has a result, and most have normal ranges
  - Is abnormal if it outside the normal range
- ## An *order* is 1 or more tests
  - Creatinine is a single test
  - CBC Auto Diff is a set of 14 tests
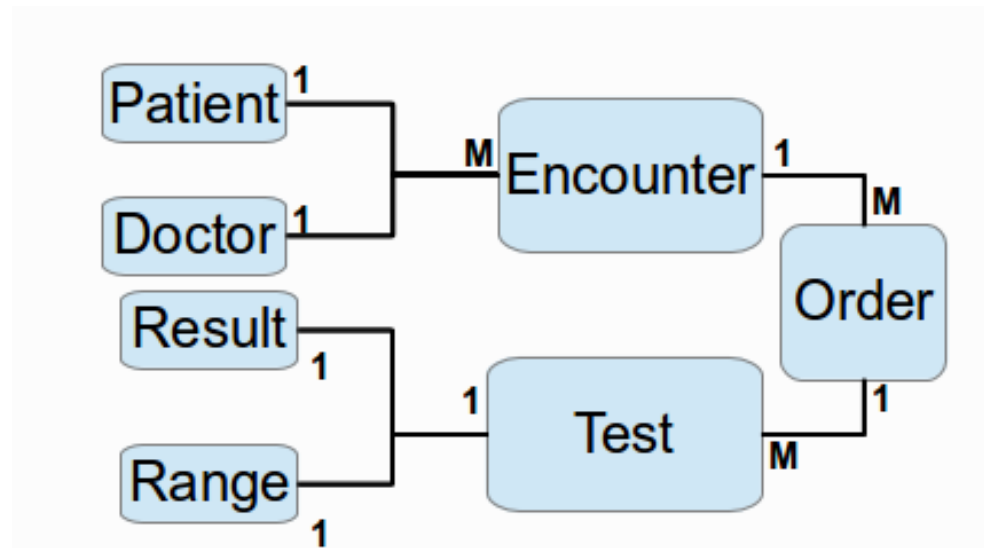
Abnormal Results

- Tests have a "normal" range that is returned with the test result

- Tests that fall outside the "normal" range are labelled abnormal

- Orders are abnormal if 1 or more tests are abnormal

- *Not all results should be abnormal*
  - A normal result is often used to rule-out a diagnosis

Scorecard Design

- Need to summarize test ordering
  - Number of tests ordered
  - Number of tests ordered per patient
  - Number of tests returned abnormal
- Need to compare to peers
- Need to include simple explanations of results

Methods

- Interviews were conducted with key stakeholders to determine scorecard content

- Perl, MySQL, R and LaTeX are used to produce individualized scorecards

- Scorecards are produced as PDFs and faxed to GPs (design factor)

- Results have been field-tested with a small sample of GPs

Data Summary

Date Range: **2011-August-01 to 2014-June-20**

Test	n	%	Test	n	%
CBC Auto Diff	532801	12.40%	*Triglycerides*	290505	6.80%
Creatinine	446511	10.40%	*HDL*	288642	6.70%
Electrolytes	402525	9.40%	*AST*	252190	5.90%
ALT	353162	8.20%	*Alkaline Phos.*	195550	4.50%
TSH	322226	7.50%	*PT*	142308	3.30%
Glucose AC	304959	7.10%	*GGT*	120304	2.80%
Cholesterol	291114	6.80%	*Glucose*	66192	1.50%
Urea	290559	6.80%			

Abnormal Results
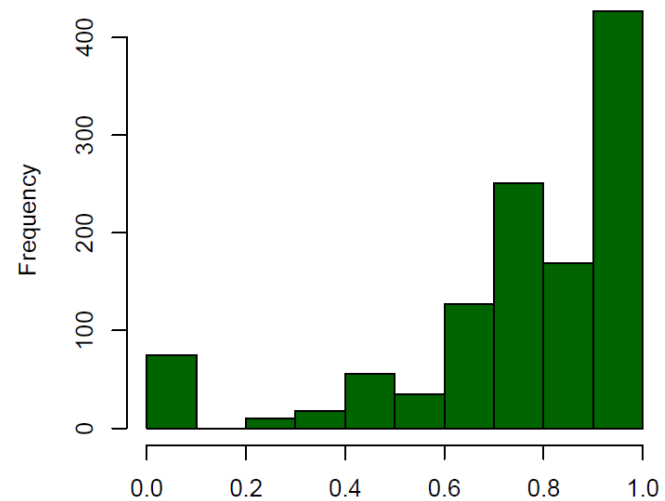
- Lab was interested in preventing spurious or superfluous orders

- GPs were interested in totals and comparisons with their peers
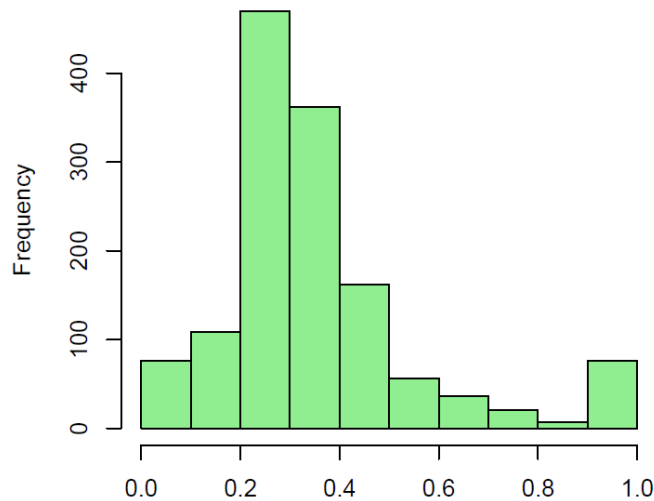
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Sample Physician Usage Data

	Tests Ordered n %		Tests Per Patient n %		Abnormal Rate Rate %	
CBC	207	62%	1.16	35%	68.78	34%
Electrolyte Panel	197	71%	1.22	55%	25.00	37%
Creatinine	189	64%	1.20	49%	16.49	73%
TSH	187	**81%**	1.11	52%	3.23	**20%**
Urea	183	78%	1.20	58%	14.29	55%
ALT	148	64%	1.10	37%	14.19	30%
Glucose AC	143	69%	1.13	57%	48.23	49%
Cholesterol	141	69%	1.12	57%		
Triglycerides	141	69%	1.12	57%		
HDL Cholesterol	140	69%	1.12	58%		
AST	139	**84%**	1.09	39%	5.76	33%
PT	37	62%	3.70	63%	91.89	71%
Glucose Random	32	81%	1.28	75%		
Alkaline Phosphatase	24	49%	1.09	42%	20.83	73%
GGT	12	58%	1.20	64%	33.33	71%

The Department of Laboratory Medicine, working with the District Department of Family Practice (DDFP) and the Division of Health Informatics at Dalhousie University, is pilot testing a method to provide physicians with feedback about their use of laboratory investigations. You are part of a small group of Family Physicians nominated by the DDFP to provide feedback about the draft report. We would like you to review the following report about your personal profile, and then complete the attached survey to give us some feedback about the report.

The following report presents a summary of your personal ordering patterns for the top 15 "most popular" lab tests for the one year period commencing 2013-06-20 and ending 2014-06-20. During that interval you submitted **285** orders. Within those orders you submitted **1908** different procedures. To put it in context, we show how your numbers compare to your peer group, other family physicians in Capital Health. The data includes:

- the total number of times that you ordered the specific test (high numbers and percentiles could reflect a big practice, "sicker" patients, or relative overuse of the test)

- how many times you ordered the test per patient (where high numbers could reflect "sicker" patients or a tendency to repeat the test more often than your colleagues)

- how often the tests you ordered were abnormal (where low numbers might reflect a tendency to overuse tests in patients with a low pre-test probability of problems, and high numbers might reflect relative underuse of tests)

- The "Percentile" columns present where you rank compared to your peers. The highest percentile (100%) ordered the most of a specific test, and the lowest percentile (0%) ordered the least

	Number	Percentile	Per Patient	Percentile	Positive Result Rate	Percentile
CBC	207	62%	1.16	35%	68.8	34%
Electrolyte Panel	197	71%	1.22	55%	25.0	37%
Creatinine	189	64%	1.20	49%	16.5	73%
TSH	187	71%	1.11	52%	3.2	20%
Urea	183	78%	1.20	58%	14.3	55%
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Glucose Random	32	78%	1.28	75%		
Alkaline Phosphatase	24	49%	1.09	42%	20.8	73%
GGT	12	58%	1.20	64%	33.3	71%

We hope you may find this feedback useful as a general guide to help you review and possibly modify certain areas of your practice. If you have any queries on this please contact Dr Irene Sadek at 902-473-8471 (irene.sadek@cdha.nshealth.ca) or Dr Manal Elnenaei at 902-473-5194 (manal.elnenaei@cdha.nshealth.ca).

Please take a moment to fill out the survey at the links below or by scanning the QR code:
http://goo.gl/bSUwZC
OR
https://survey.nshealth.ca/TakeSurvey.aspx?SurveyID=181I9o85

Survey Results

19 sent, 9 looked at, 6 completed

1. Does the Report Card supply useful information?
   - **5 Yes, 1 No**
2. Is the format clear and easy to interpret?
   - **4 Yes, 2 No**
3. Would you be likely to change your ordering practice based on your Report Card information?
   - **5 Yes, 1 No**

Survey Comments – Presentation

- *The notion of percentile is confusing as is presented … if you are among 'lower percentile' [in the 1st column] it's a good thing, but if you are a 'higher percentile' person [in the 3rd column], it's a good thing*

- *more clarification with regard to the last percentile for positive results - what would the percentage in this column mean to the physician?*

- *I wonder if you had thought of a visual way to do this rather than by numbers/tables?*

Survey Comments – Implication

- *How is overuse defined? Some of this is screening, is this legitimate or not?*

- *The comments make it sound that you are out of line to order tests when you are getting normal values. Well, this may not be true if you are monitoring a medication for side-effects for example or to see if you are dosing appropriately(TSH for example for patients on synthroid)*

Survey Comments - Overall

- *Great initiative ... it'd be interesting to know my 'overall' usage compared to others in some sort of 'per eligible patient in my practice' way*

- *Overall-good initiative. Would like to see some detail around patient population*

- *…it would be necessary to make the report show data from each physician's different areas of practice*

Discussion

- Survey results were promising, though troubling as well
  - Seemed to be interest
  - Poor interpretation of results
- Text needs to be revised, reasoning for scorecard needs to be improved
- New round of test reports this summer

Conclusion

- Leveraging health data is an important step in improving clinician knowledge

- Need to consult all key stakeholders in clinical scorecard development, as their expectations can vary

- Developing optimal methods for presenting this information is not a trivial task

Conclusion

- This project leveraged a variety of programming and analytic tools to produce a report that is useful to clinicians

- Provides valuable feedback from the perspective of administrators,

- Can hopefully work to optimize the test-ordering patterns of the healthcare community as a whole

Thank You

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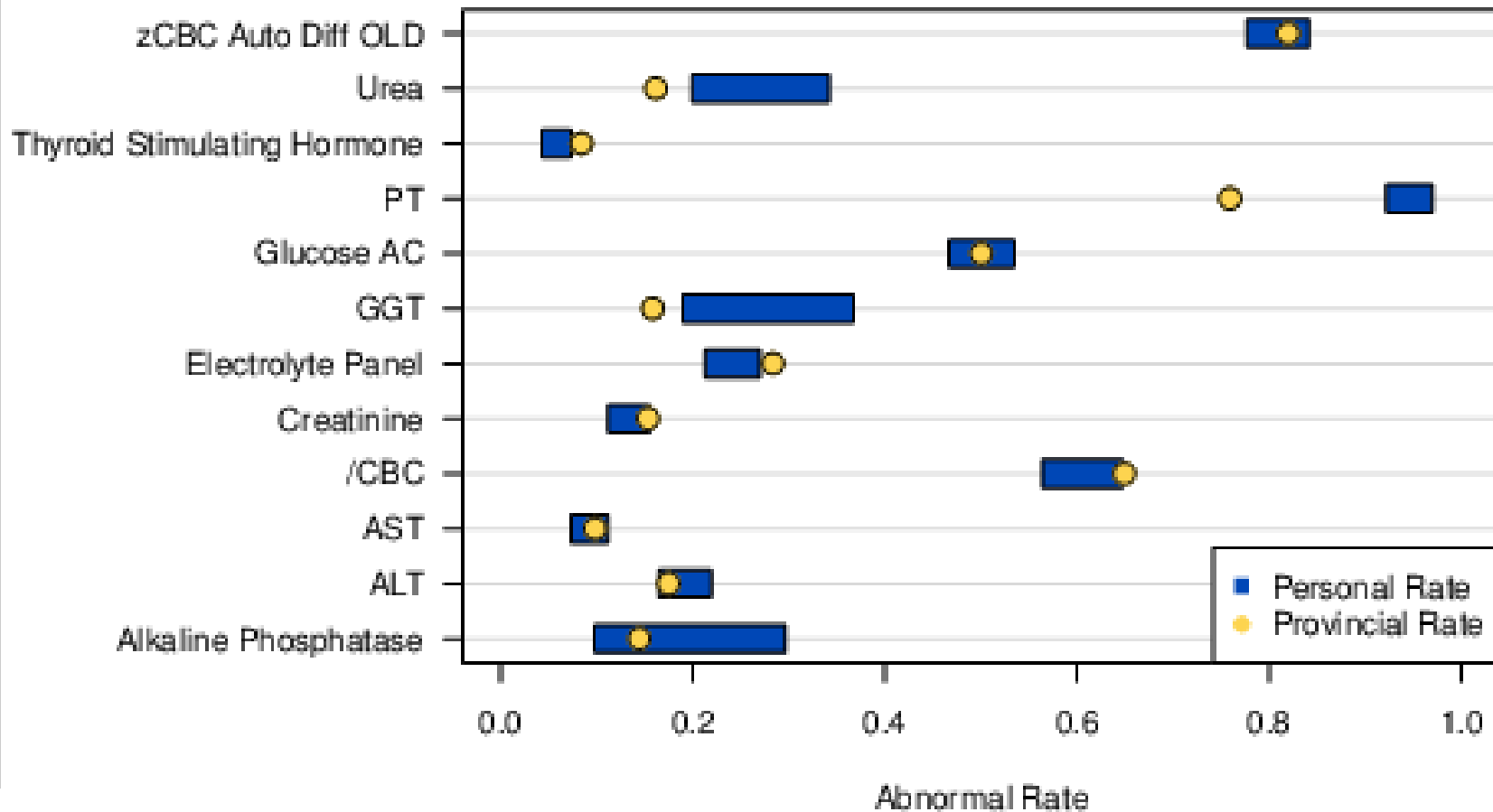
Some Examples

- Mammography reading
  - Number read, number abnormal, number of cancers
  - PPV, abnormal and cancer rate
  - Stratified by first screens and rescreens
- OSA testing
  - Number processed, number tested, number treated, FN rate, treatment success rate
  - Compare results to pre-test probabilities

Test Visualization
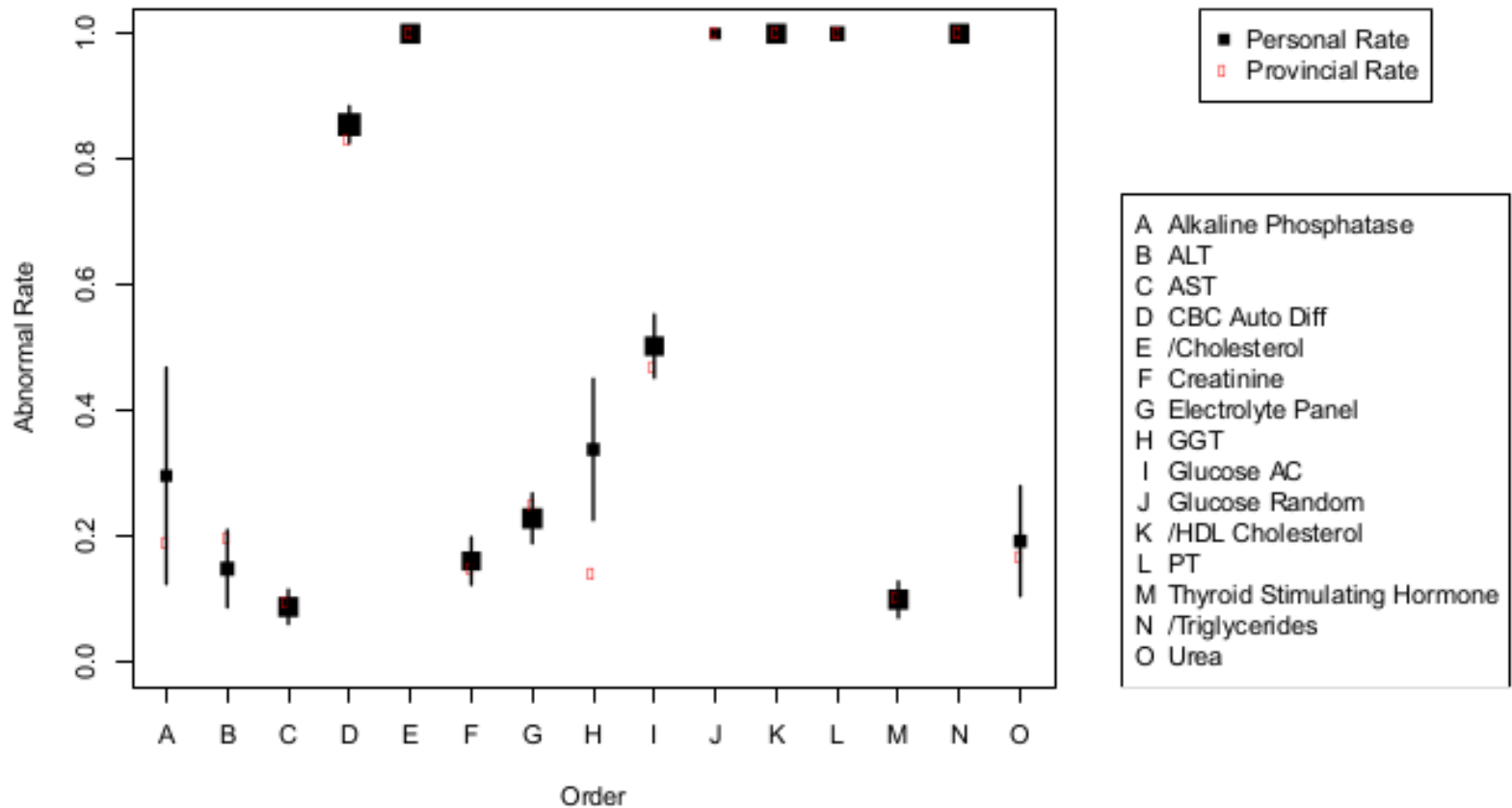
Test Visualization

Test Visualization

	Number	Percentile		Per Patient	Percentile		Pos. Result Rate	Percentile	
/CBC	1092	98.7	▮	1.4	71.9	▮	0.7	43	▮
/Cholesterol	865	99.5	▮	1.3	84	▮			
/HDL Cholesterol	861	99.5	▮	1.3	84.6	▮			
/Triglycerides	862	99.5	▮	1.3	83.6	▮			
Alkaline Phosphatase	61	70.9	▮	1.3	73.3	▮	0.2	69	▮
ALT	800	99.2	▮	1.2	63.5	▮	0.2	63.4	▮
AST	859	99.5	▮	1.2	69.3	▮	0.1	55.5	▮
Creatinine	947	98.9	▮	1.3	64.8	▮	0.1	61.5	▮
Electrolyte Panel	869	99	▮	1.3	61.8	▮	0.2	33	▮
GGT	97	88	▮	1.2	63.1	▮	0.3	64	▮
Glucose AC	825	99.4	▮	1.2	76.3	▮	0.5	58	▮
Glucose Random	14	58.8	▮	1.2	69.1	▮			
PT	353	98.3	▮	5.9	78.9	▮	0.9	75.8	▮
Thyroid Stimulating Hormone	906	99.6	▮	1.2	87.2	▮	0.1	31.2	▮
Urea	149	73.3	▮	1.3	67.8	▮	0.3	82.1	▮