

LAB RESULTS REVIEW & REPORTING PROJECT

CUMULATIVE LR³ EVALUATION

Last updated 2017-Mar-22

CONTENTS

1. Project objectives	1
2. Evaluation indicators	2
3. Baseline data	3
3.1 Total number of post-discharge lab results.....	3
3.2 Most common post-discharge labs.....	3
Most common by area.....	3
Most common by lab.....	4
3.3 Evaluation indicator #1: Unique users clearing flags or annotating on post-discharge results.....	5
Emergency Departments (non-micro results)	5
Inpatient units.....	7
3.4 Evaluation indicator #2: Percent of post-discharge results with flags cleared or annotations added	8
4. Results	9
4.1 Calgary Zone Emergency Departments and the Advanced Visit List Team-Based Approach....	9
4.2 Evaluation indicator #1: Unique users clearing flags or annotating on post-discharge results.....	10
4.3 Evaluation indicator #2: Percent of post-discharge results with flags cleared or annotations added	10
4.4 Evaluation indicator #3: LR ³ webpage statistics	10

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1. PROJECT OBJECTIVES

The purpose of the Lab Results Reporting and Review (LR³) project is to devise and promote processes and systems related to ensure abnormal or clinically relevant lab results for patients who have been discharged from urban hospitals are seen. The target is an 80% decrease in the number of post-discharge lab results not viewed. The scope of the project is Emergency and Inpatient units at acute care sites in the Calgary Zone.

The only digital evidence we have that a result was viewed is when a physician clears the results flag, or if an annotation was made on the lab order. Without either of these, we cannot tell if a physician looked at a result on the screen. Note: The absence of both a flag and an annotation does *not* mean the result was not seen or that no action was taken.

2. EVALUATION INDICATORS

Parameters:

- Calgary Zone acute care hospitals (ACH, FMC, PLC, RGH, SHC)
- Inpatient units and Emergency Departments only
- Labs ordered on a hospital encounter while patient still admitted
- All labs – excludes Diagnostic Imaging, although the process would work just as well for these
- Discharge date precedes lab result date
- Patient discharge date precedes patient deceased date (if applicable)
- First annotation *after* the date of the result (null if none)
- First flag cleared *after* the date of the result (null if none)

EVALUATION QUESTION	INDICATOR(S)	FILTERS	DATA SOURCE/METHOD	NOTES
1. How many physicians are following up on post-discharge lab results?	Number of unique SCM users that have flagged or added an annotation to a post-discharge result.	By site ED vs. Inpatient	SCM query	More physicians adding annotations on post-discharge results does not prove an uptake of the LR ³ process, or even successful follow-up, but it shows that more physicians are aware of the Annotation Manager tool, and that they are viewing results after discharge.
2. What proportion of post-discharge results have either a flag cleared or an annotation? I.e., for what proportion of post-discharge results do we have digital	Total number of post-discharge lab results with an annotation and/or cleared flag as a percentage of all post-discharge lab results during a given time period.	By site By lab ED vs. Inpatient	SCM query	This assumes that a cleared flag or an annotation indicates the result was dealt with properly. This does <i>not</i> assume that the <i>absence</i> of a cleared flag or annotation indicates the result was not dealt with properly.

evidence of being viewed?

3. How many physician teams have set up a process	<p>Number of visits to LR³ webpage.</p> <p>Number of LR³ guides downloaded from website.</p>	Web stats	The LR ³ team will not be fielding requests for help, so the number of physician teams setting up new processes cannot be counted directly. Looking at web stats is only descriptive, there are no targets.
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3. BASELINE DATA

3.1 TOTAL NUMBER of POST-DISCHARGE LAB RESULTS

Date range: 2015-10-01 to 2016-09-30

The following table shows the number of lab results that are still pending at time of discharge during a one-year period in the Calgary Zone (separated by Emergency Departments and inpatient units).

HOSPITAL	LABS	ABNORMAL	% ABN	ED	I/P
ACH	27,834	6,352	22.8%	20,242	7,592
FMC	49,566	9,483	19.1%	18,894	30,672
PLC	34,416	6,385	18.6%	18,890	15,526
RGH	38,877	6,840	17.6%	19,663	19,214
SHC	29,538	5,358	18.1%	19,208	10,330
TOTAL	180,231	34,418	19.1%	96,897	83,334

Note: The percentage of results that are flagged abnormal does *not* include any text-based results that cannot be flagged (e.g., pathology). The actual proportion of abnormal results is likely to be higher than reported here.

3.2 MOST COMMON POST-DISCHARGE LABS

Date range: 2015-10-01 to 2016-09-30

MOST COMMON BY AREA

The top 5 most common labs for results returning post-discharge are the same across all **Emergency Departments**, differing only slightly in order of frequency.

Inpatient units also share many common top 5 labs, but again differ in relative frequency.

The major difference between the two groups is that Urine is more common for Emergency and Pathology is more common for Inpatient units.

	ED		I/P	
ACH	1. Microbiology	11,289	1. Chemistry	2,116
	2. Chemistry	3,428	2. Prov Lab	1,958
	3. Prov Lab	3,272	3. Microbiology	1,373
	4. Hematology	1,141	4. Pathology†	808
	5. Urine	930	5. Hematology	655
FMC	1. Microbiology	9,136	1. Chemistry	8,549
	2. Chemistry	6,051	2. Pathology†	6,981
	3. Hematology	1,135	3. Microbiology	5,119
	4. Prov Lab	845	4. Miscellaneous*†	2,977
	5. Urine	715	5. Prov Lab	2,802
PLC	1. Microbiology	9,376	1. Pathology†	3,362
	2. Chemistry	5,874	2. Miscellaneous*†	3,184
	3. Hematology	1,126	3. Microbiology	2,672
	4. Prov Lab	863	4. Chemistry	2,419
	5. Urine	725	5. Prov Lab	2,115
RGH	1. Microbiology	10,623	1. Pathology†	6,155
	2. Chemistry	5,533	2. Miscellaneous*†	4,055
	3. Hematology	954	3. Microbiology	2,645
	4. Urine	821	4. Chemistry	2,603
	5. Prov Lab	803	5. Prov Lab	2,107
SHC	1. Microbiology	10,247	1. Pathology†	2,167
	2. Chemistry	5,183	2. Microbiology	1,985
	3. Prov Lab	1,317	3. Chemistry	1,950
	4. Hematology	944	4. Prov Lab	1,543
	5. Urine	769	5. Miscellaneous*†	1,541

* “Miscellaneous” refers almost exclusively to Newborn Metabolic Screen, except for at RGH where 37% of Miscellaneous tests were for Stone Analysis from Urology.

† These labs will not flag abnormal results, thus highlighting the importance of being able to see all pending results that come back post-discharge.

MOST COMMON BY LAB

The following chart shows which labs are most commonly viewed (flags cleared or annotations added), as well as the percentage that come back within two weeks of discharge or more than one month after discharge.

LAB	COUNT	VIEWED	% VIEWED	% RETURNED	
				≤ 14 DAYS	> 30 DAYS
Microbiology	64,465	7,581	12%	100%	0%
Flow Cytometry	364	40	11%	98%	1%
Blood Gases	967	93	10%	93%	2%
Provincial Lab	17,625	1,670	9%	99%	0%
Advanced Diag	546	32	6%	29%	29%
Chemistry	43,706	2,400	5%	89%	5%
Coagulation	2,223	114	5%	93%	3%

LAB	COUNT	VIEWED	% VIEWED	% RETURNED ≤ 14 DAYS	% RETURNED > 30 DAYS
Hematology	9,488	470	5%	80%	13%
Urine	5,313	257	5%	97%	2%
ACH Genetics	81	3	4%	91%	6%
Fluids	1,127	31	3%	99%	1%
Pathology	20,121	691	3%	97%	1%
Tissue Typing	319	9	3%	75%	4%
Miscellaneous	11,894	177	1%	95%	0%
Transfusion Med	1,988	28	1%	97%	3%
ACH Endocrine	2	0	0%	100%	0%
Endocrine	2	0	0%	100%	0%
TOTAL	180,231	13,596	8%	95%	2%

Notes and observations:

- Microbiology is showing the positive effects of AVL/AM in the Emergency departments. Otherwise, Flow Cytometry, Blood Gases and Provincial Lab tests are most commonly viewed.
- The tests that most frequently take the longest to return (and are therefore at highest risk of being missed) are by far and away those performed in the Advanced Diagnostics lab. More than 70% take longer than 2 weeks to come back, and nearly 30% take over a month.

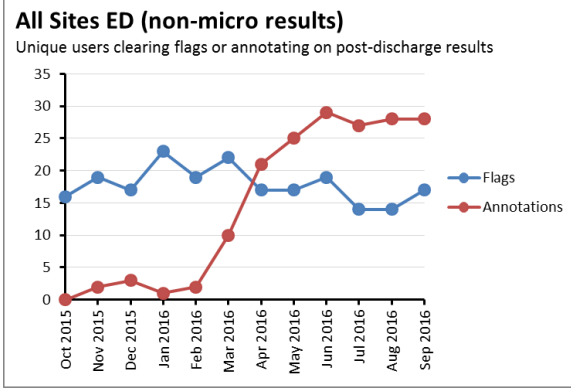
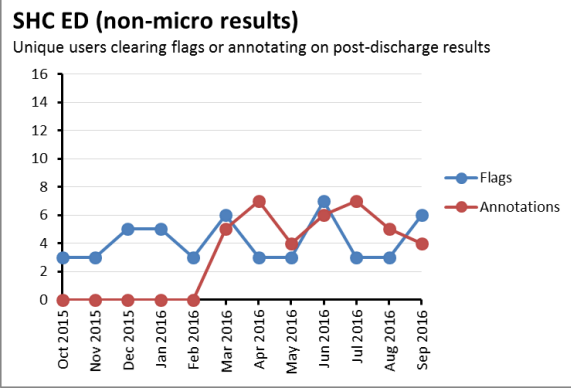
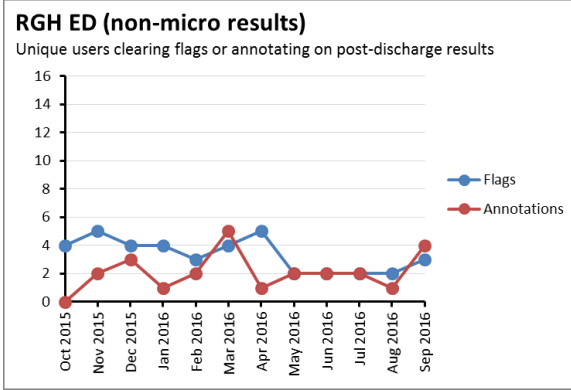
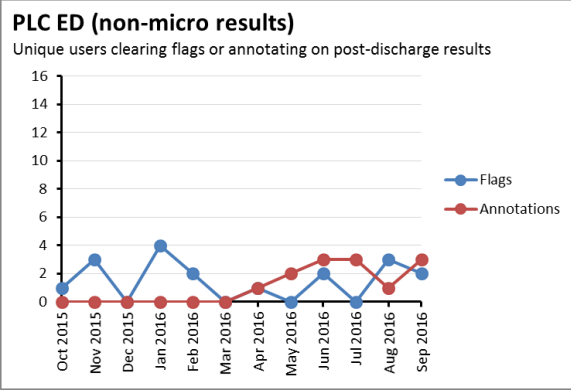
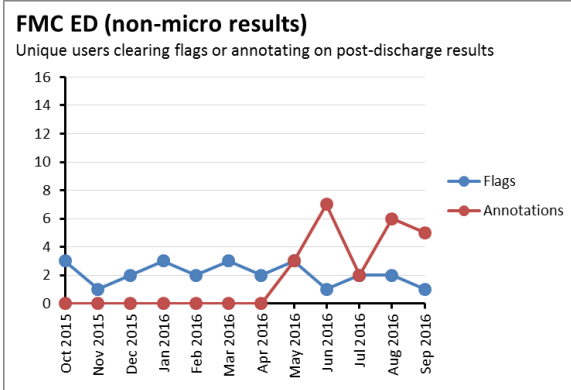
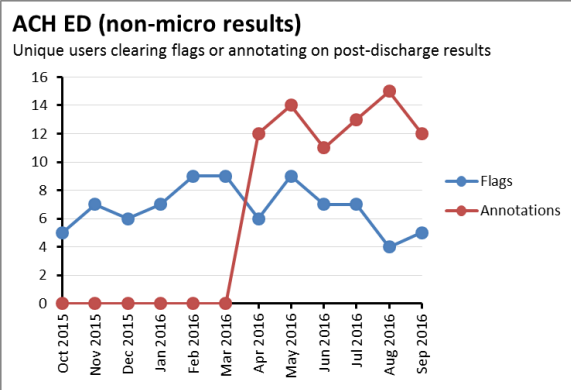
3.3 EVALUATION INDICATOR #1: UNIQUE USERS CLEARING FLAGS *or* ANNOTATING *on* POST-DISCHARGE RESULTS

Date range: 2015-10-01 to 2016-09-30

The following series of charts show the number of SCM users that either cleared a flag or added an annotation to a post-discharge lab result.

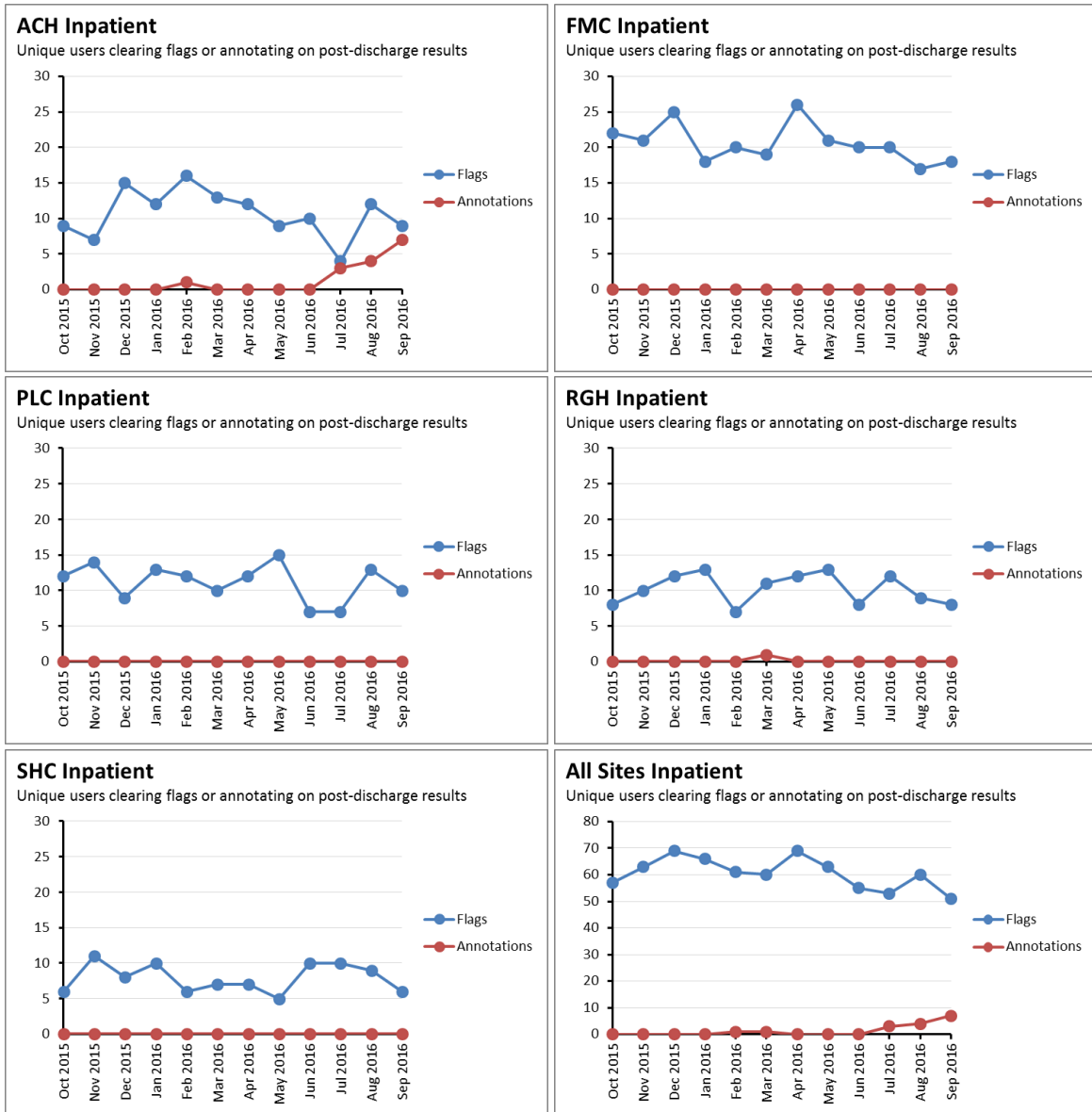
EMERGENCY DEPARTMENTS (NON-MICRO RESULTS)

Annotation Manager came online for Emergency Departments at various points during this time period as part of the Advanced Visit List trial. The following charts only show trends for *non*-microbiology results only because microbiology results are now being routinely annotated as part of the Advanced Visit List process with $\geq 90\%$ success.



INPATIENT UNITS

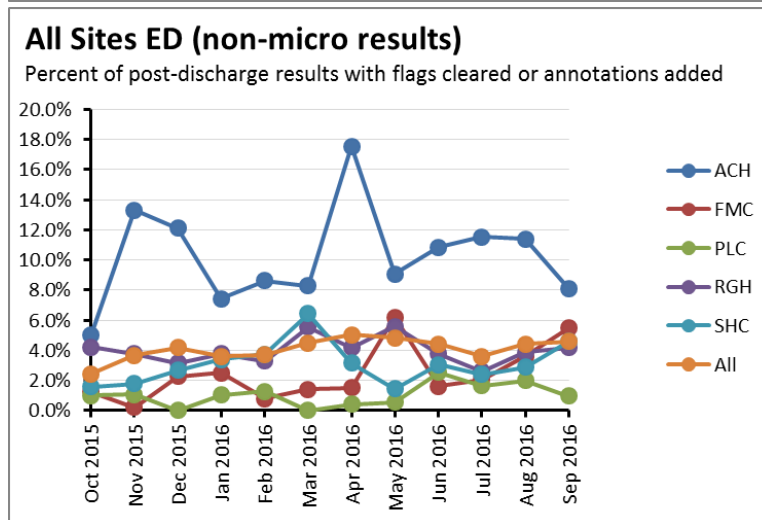
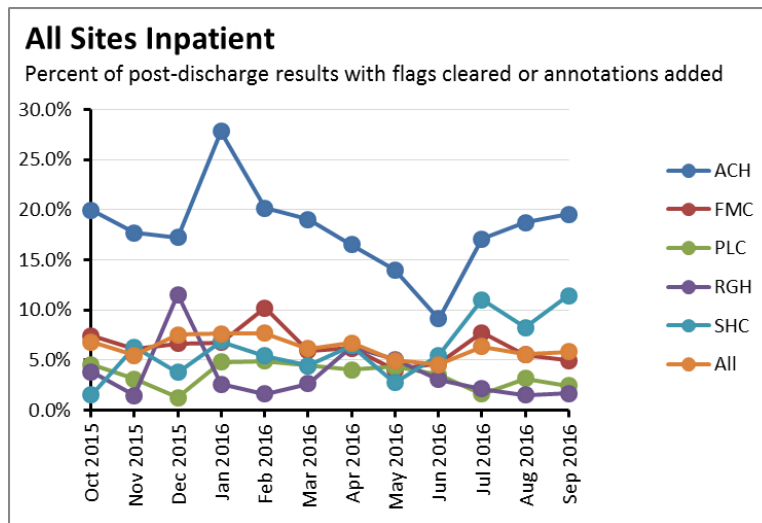
Annotation Manager was part of a trial among the Pediatrician Hospitalists at ACH, which accounts for the small uptick in SCM users adding annotations to lab results. Annotation Manager was not yet available for inpatient physicians at the other sites.



3.4 EVALUATION INDICATOR #2: PERCENT of POST-DISCHARGE RESULTS *with* FLAGS CLEARED *or* ANNOTATIONS ADDED

The cumulative percentages of post-discharge lab results that had either a flag cleared or an annotation added are summarized in the table below.

	ED (non-micro)	I/P
All sites	4.1%	6.3%
ACH	10.3%	18.1%
Adult sites (FMC, RGH, PLC, SHC)	2.6%	4.9%



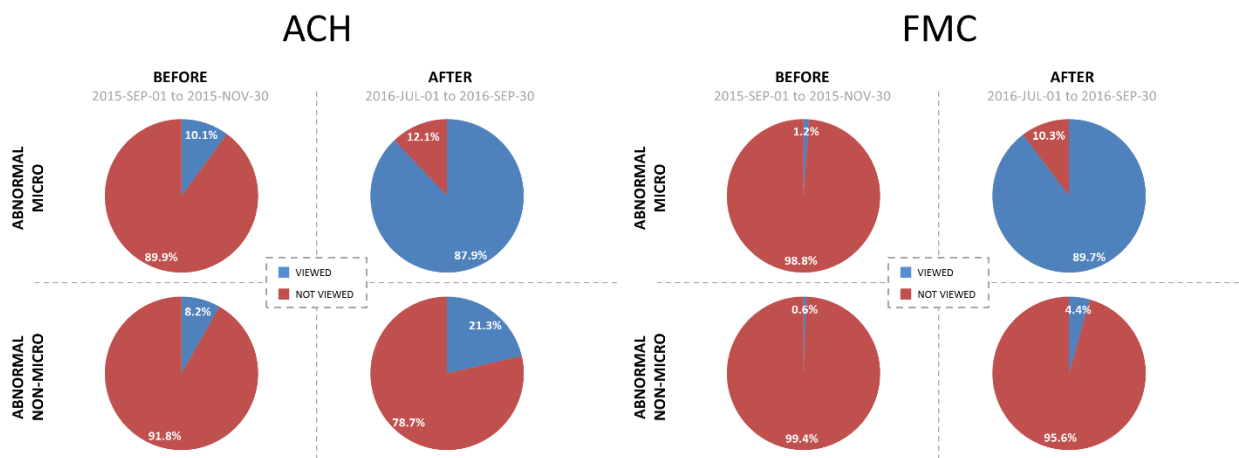
4. RESULTS

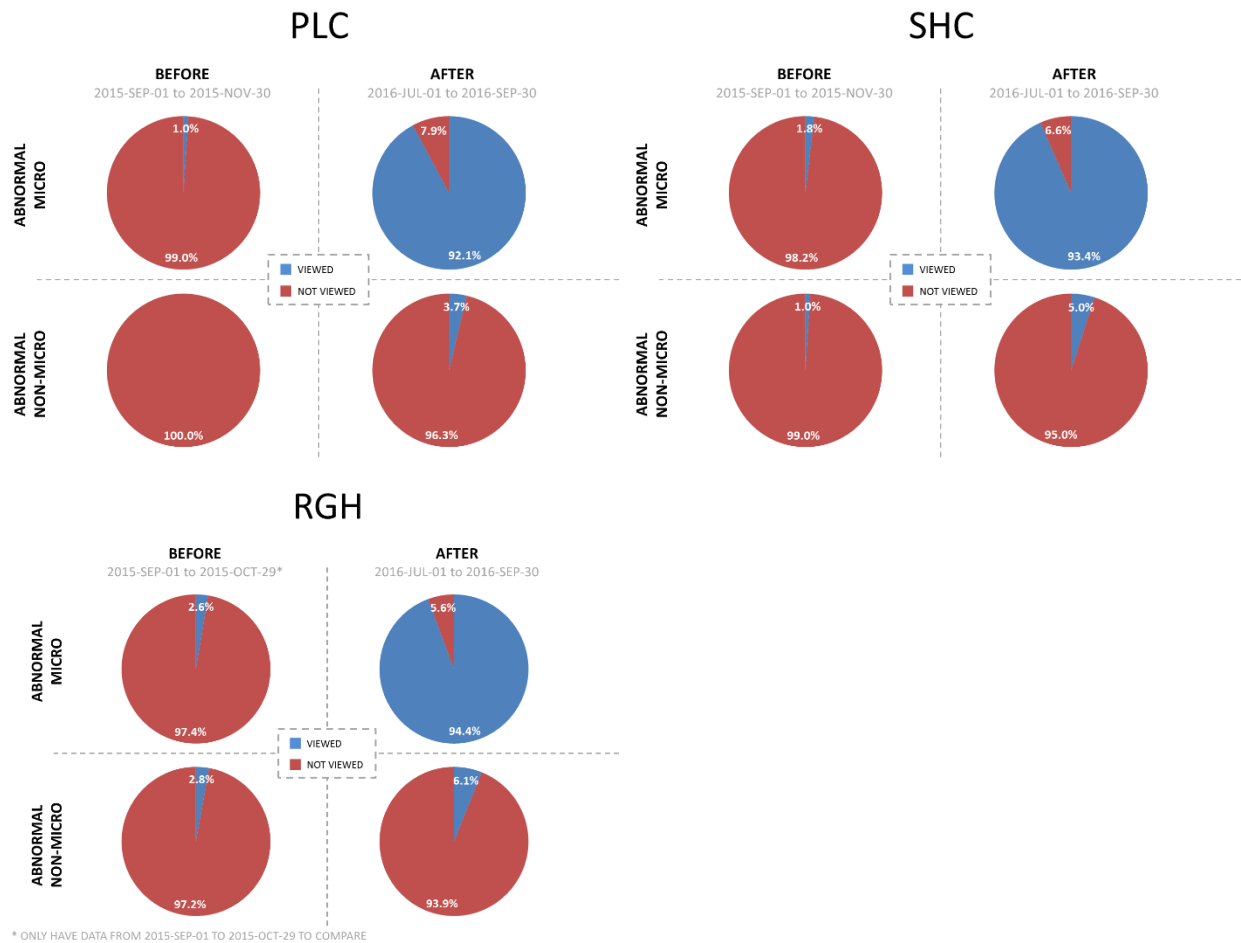
4.1 CALGARY ZONE EMERGENCY DEPARTMENTS *and the* ADVANCED VISIT LIST TEAM-BASED APPROACH

The following charts show the percentage of post-discharge abnormal microbiology and abnormal non-microbiology lab results that had digital evidence of being viewed (either a flag cleared or an annotation added after lab result returned). Overall, there was a dramatic improvement in abnormal microbiology test results, and only a miniscule improvement in abnormal non-microbiology test results.

HOSPITAL	MICRO/NON-MICRO	"BEFORE" (Sep-Nov 2015)			"AFTER" (Jul-Sep 2016)		
		VIEWED	NOT VIEWED	% VIEWED	VIEWED	NOT VIEWED	% VIEWED
ACH	Abnormal Micro	44	392	10.1%	393	54	87.9%
	Abnormal non-micro	48	535	8.2%	109	402	21.3%
FMC	Abnormal Micro	5	428	1.2%	384	44	89.7%
	Abnormal non-micro	5	776	0.6%	31	675	4.4%
PLC	Abnormal Micro	4	394	1.0%	446	38	92.1%
	Abnormal non-micro	0	487	0.0%	24	622	3.7%
RGH*	Abnormal Micro	11	407	2.6%	502	30	94.4%
	Abnormal non-micro	14	479	2.8%	38	583	6.1%
SHC	Abnormal Micro	6	321	1.8%	398	28	93.4%
	Abnormal non-micro	4	391	1.0%	30	573	5.0%

* Data only from 2015-Sep-01 to 2015-Oct-29 for comparison.





4.2 EVALUATION INDICATOR #1: UNIQUE USERS CLEARING FLAGS *or* ANNOTATING *on* POST-DISCHARGE RESULTS

Results for this indicator will be reported in December 2017.

4.3 EVALUATION INDICATOR #2: PERCENT *of* POST-DISCHARGE RESULTS *with* FLAGS CLEARED *or* ANNOTATIONS ADDED

Results for this indicator will be reported in December 2017.

4.4 EVALUATION INDICATOR #3: LR³ WEBPAGE STATISTICS

Results for this indicator will be reported in December 2017.