




Using LIS and CRM Integration and Process Improvement to Standardize and Centralize Caregiver Notification of Critical and Urgent Values

10/19/2016

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Manager, Laboratory Client Service and Test Utilization



MORE THAN **150** NORTHERN OHIO OUTPATIENT LOCATIONS,
 INCLUDING **18** FULL-SERVICE FAMILY HEALTH CENTERS
AND **3** HEALTH AND WELLNESS CENTERS

9 REGIONAL HOSPITALS

Akron General Hospital
Euclid Hospital
Fairview Hospital
Hillcrest Hospital

Lodi Hospital
Lutheran Hospital
Marymount Hospital
Medina Hospital

South Pointe Hospital
AFFILIATE HOSPITAL –
Ashtabula County
Medical Center

PEOPLE:



3,432 PHYSICIANS AND SCIENTISTS

14,107 NURSES

49,166 EMPLOYEES

PATIENT CARE:

6.62 million OUTPATIENT VISITS

164,704 ACUTE ADMISSIONS

208,807 SURGICAL CASES

1,437 BEDS ON MAIN CAMPUS

4,362 BEDS SYSTEM-WIDE





Cleveland Clinic Laboratories

For 25+ years, a full-service reference lab providing quality testing and second opinion surgical subspecialty pathology case review.

- 11 million+ tests annually
- Comprehensive test menu with > 2,400 routine & esoteric tests
- 100+ board-certified anatomic & clinical pathologists
- 700+ medical technologists & laboratory technicians

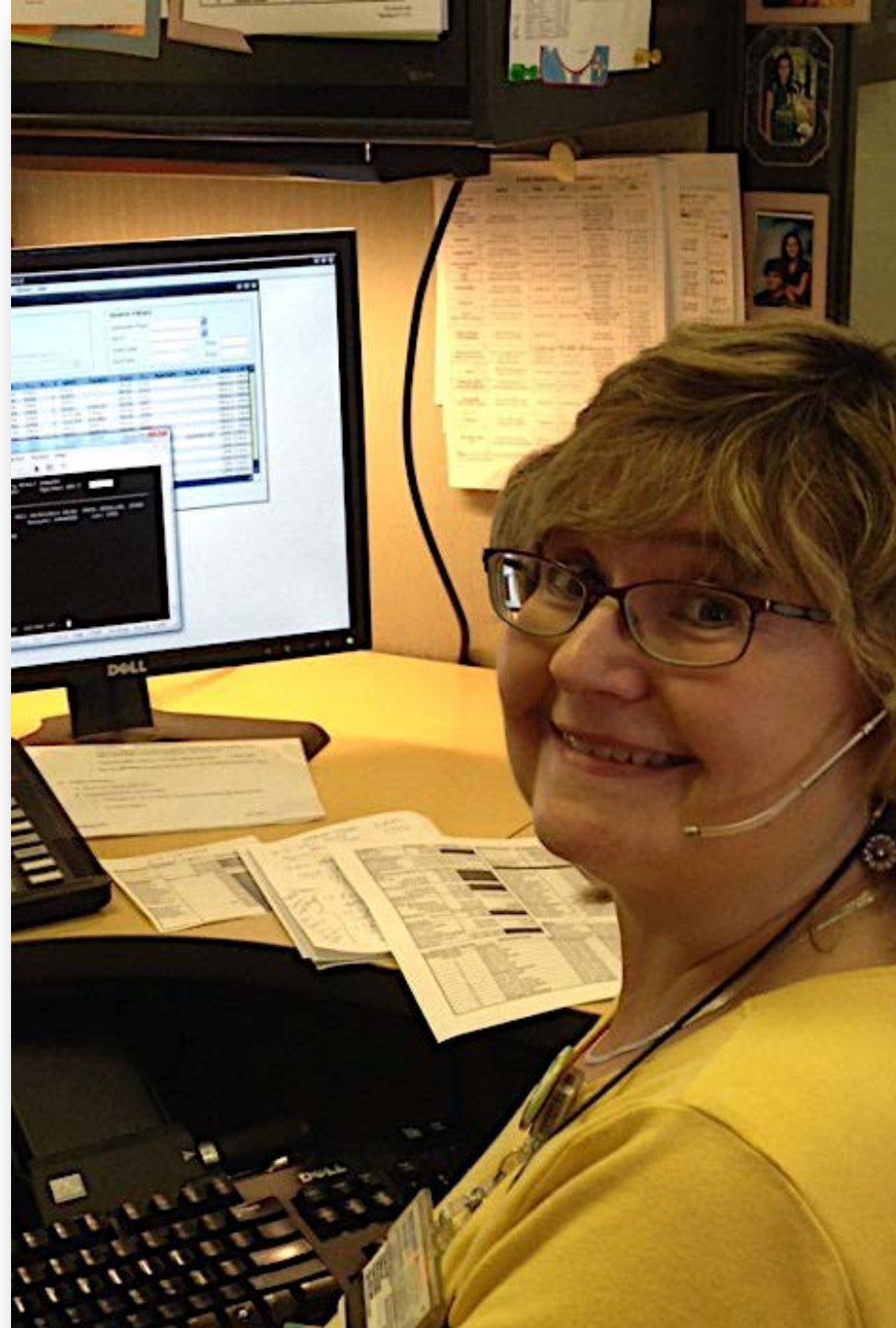


Mission:

To efficiently and accurately assist all caregivers with lab-related inquiries ensuring all interactions are fully documented.

Client Services Goals:

- Provide excellent service to all caregivers
- Answer 80% of incoming call within 20 seconds
- Achieve a call abandonment rate of less than 6%
- Allow technically skilled employees to focus on their specialty
- Resolve majority of calls on the first contact



Laboratory Client Service Requests

Stakeholders

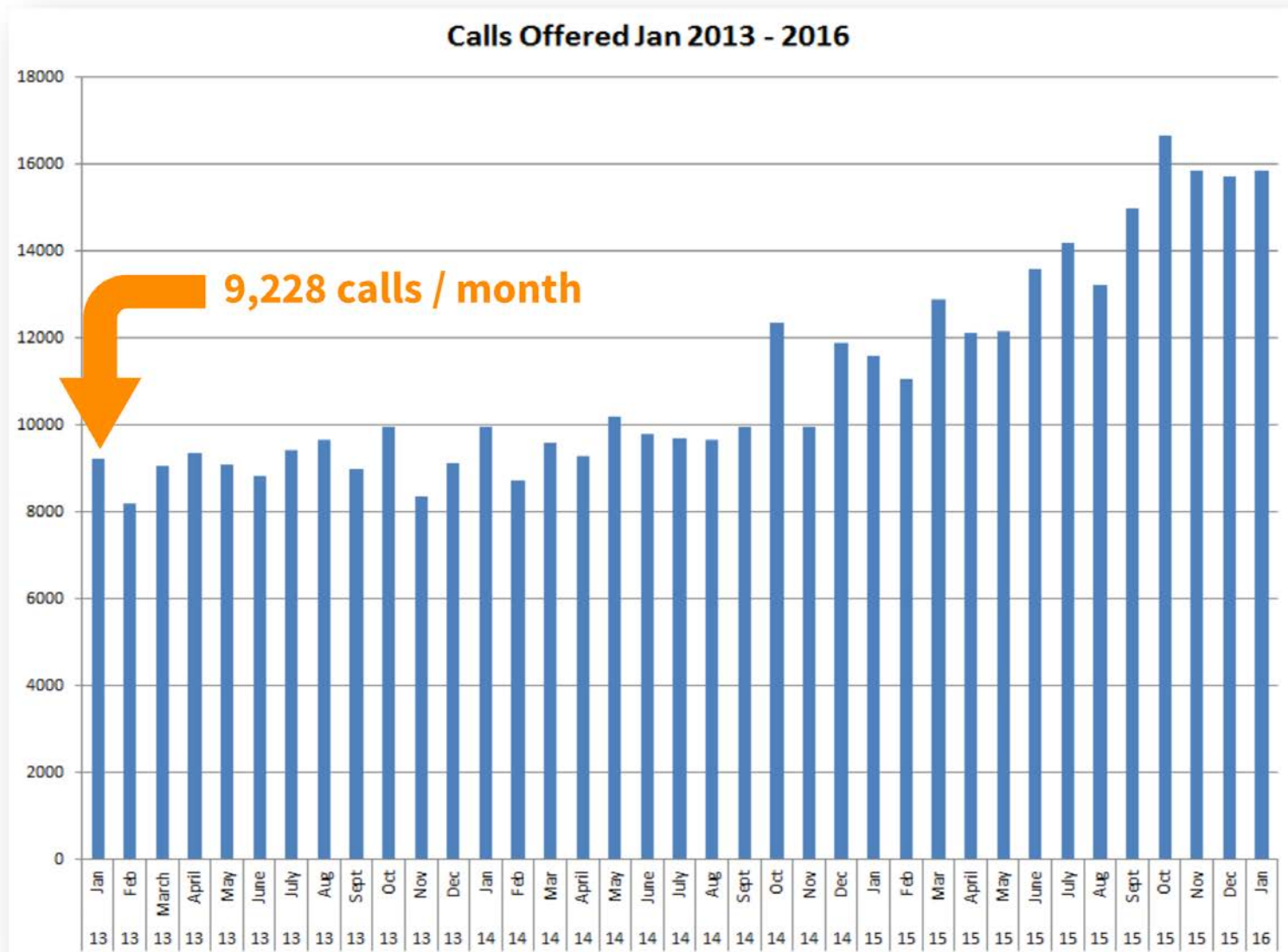


- Add-on Testing
- Accessioning
- Specimen Tracking
- Test Results
- TAT
- Directory Info
- Test Status
- Pricing or Billing
- Supplies Couriers

Inflection Point 2013:

- Increasing Reference Lab Business**
- Laboratory Consolidation**
- Critical and Urgent Values**

LCS in January 2013



Disparate IT Systems

- Data in silos
- Data collection & analysis was manual
- Action was delayed
- Difficult to spot trends



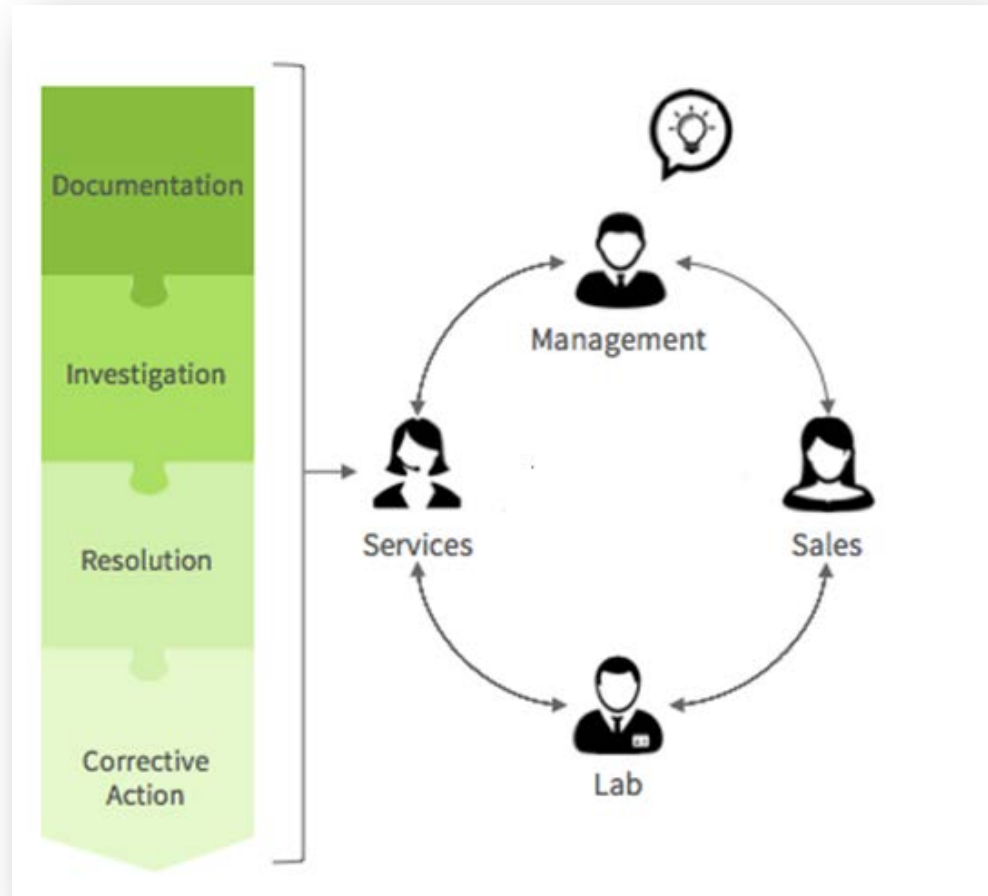


Customer Relationship Management (CRM)

- Application that can compile information from multiple sources:
 - Client interactions
 - Lab Information System
 - Financial system
- Manage interactions with customers, such as services, sales projections, and marketing
- Analyze data about customer history to improve business relationships and retain customers

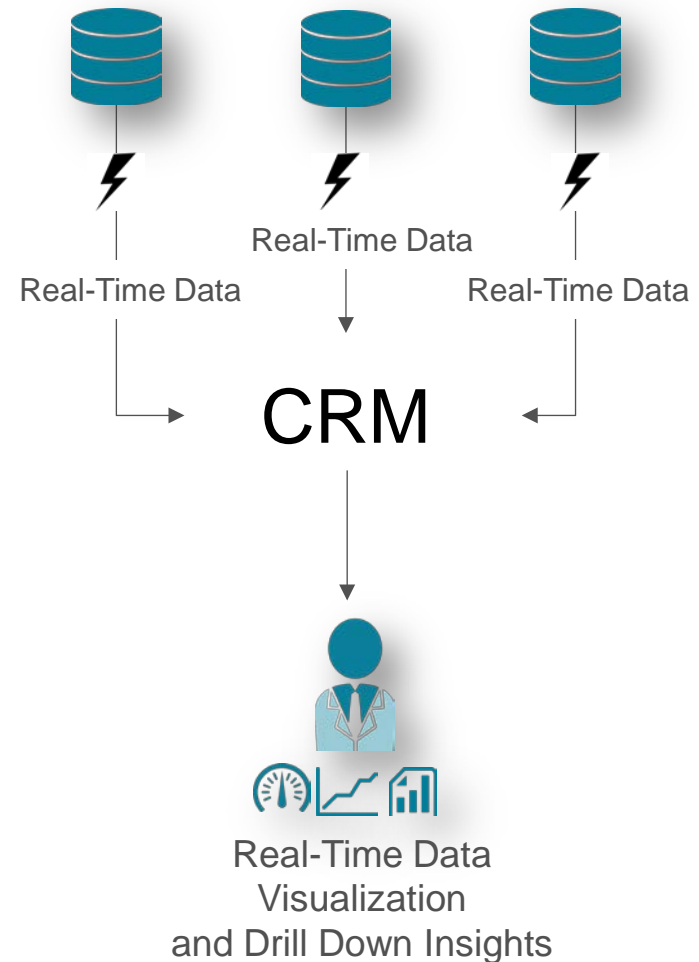
Organizational CRM Needs

- Ability to document calls to allow:
 - Searching on multiple fields
 - Sorting on multiple characteristics
- Reporting for various audiences
 - Executive (overview)
 - Leadership (productivity & quality)
 - Sales (client issues)
- Interfaced to LIS



Organizational CRM Needs

- Unify daily workflows, business processes, and information exchanges
- Allow for internal and external growth
- Monitor multiple performance metrics
- Provide executive and end-user dashboards



CRM Selections

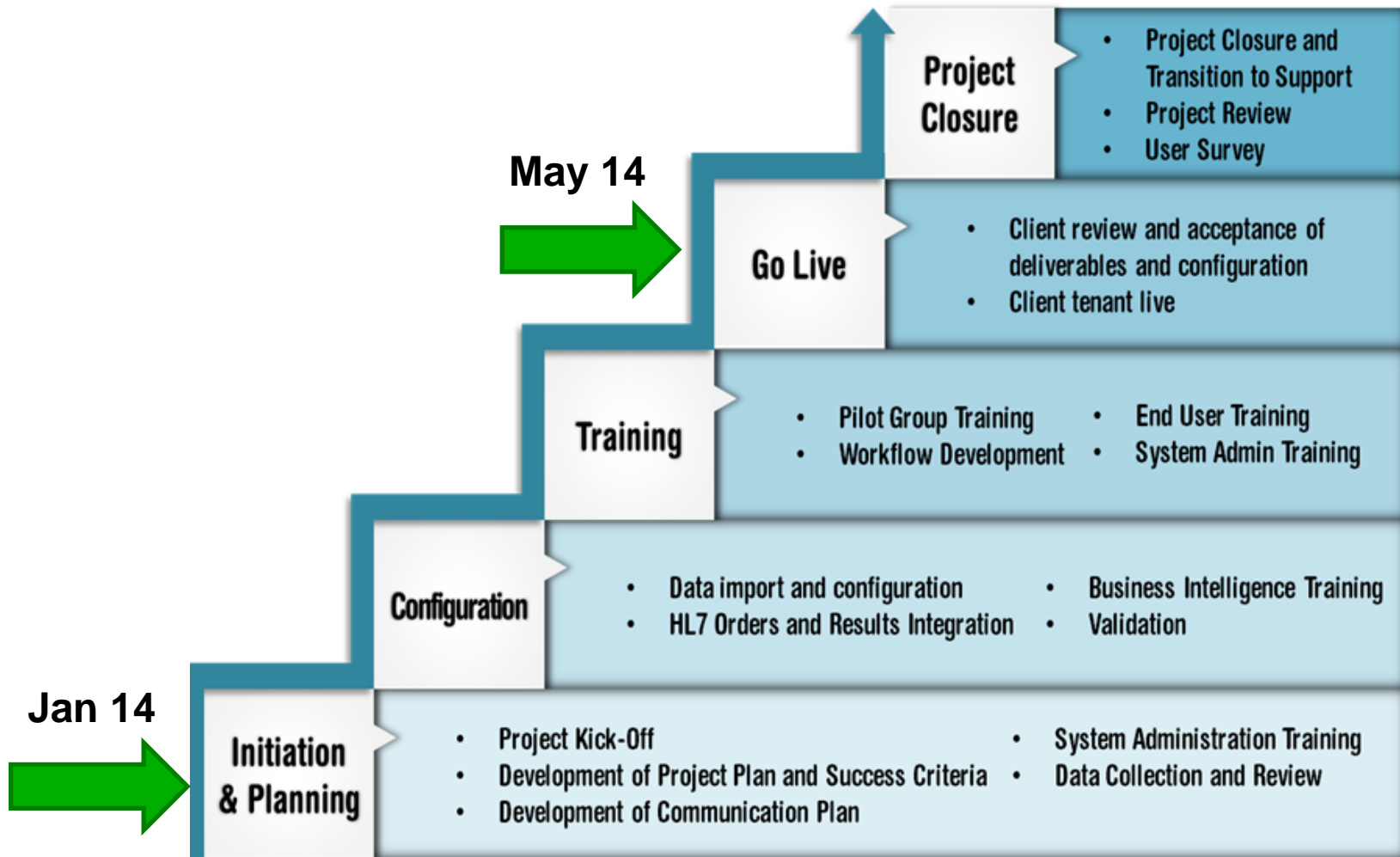


- Cross functional team:
 - IT
 - LCS
 - Sales
 - Pre-analytics
- Evaluated three vendors
 - Microsoft Dynamics
 - hc1.com
 - Salesforce
- Selected hc1.com

Why hc1.com?

- Dedication to healthcare
- Understanding of the the laboratory's role
- Familiarity with lab workflows
- Recognition of the value of designing new workflows and reports
- Extraordinary level of customer service

2014: CRM Implementation



Example of a Case



C510895

Organization Cleveland Clinic Laboratories
Host Codes



Edit

Streamline and standardize data entry by configuring hc1 to align with each of your workflows

General Information

Subject	Suzanne Reese 555-124-9999 TEST
Category	CS - Test Adds
Subcategory	Add-on Genetic
Root Cause or CS Outcome	Test Add Request Error
Assigned To	Barnwell, Jennifer
Status	Completed
Priority	Medium
Date *	10/26/2015 04:49PM
Description	Test Name: FT4 New Accession #: 123456 Test/Slots: ACVH 2345 Patient Name: Donald Duck Date of Birth: 03/10/1955 Medical Record #: M999245 Accession #: 1456789
CC Users	

This Case is resolved

Reopen Case

Resolved By	Barnwell, Jennifer
Resolved On	10/26/2015 04:56PM
Corrective Action or First Call Resolution	Client Contacted
Resolution	Client forgot to add this test for the patient. Test was successfully added and client was notified.

Categorize cases for reporting and analytics

Related Items

Ability to customize description field to capture all required notes

Custom Section

Activities Attachments Messages

Create a new: Memo Task

All - Descending Order



Quick Filter

	Organization	Type	Subject	Order Date	Due Date	Status	Priority
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Understand Relationship Status

Case Count: Top 15 Accounts (Local)

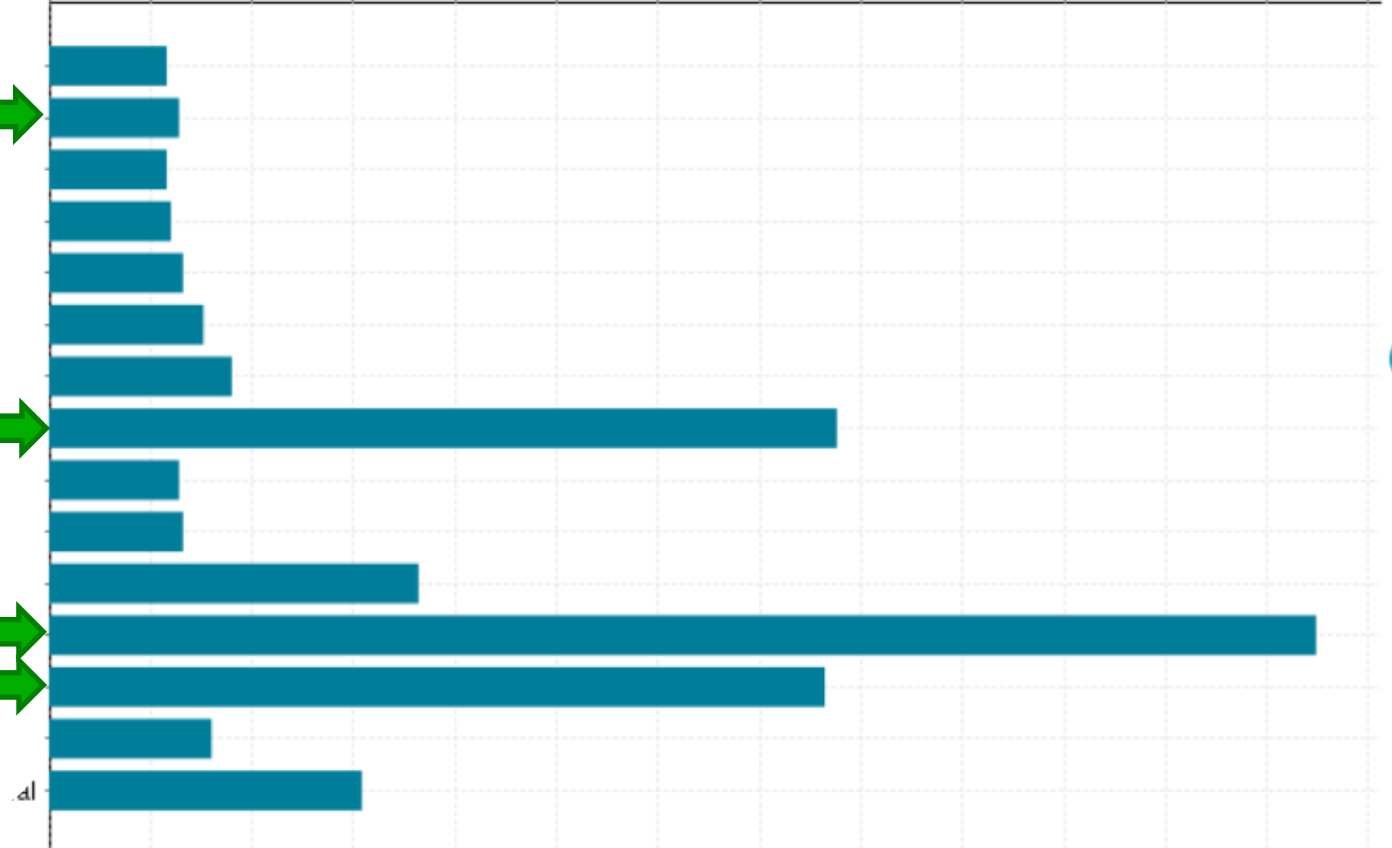


0 25 50 75 100 125 150 175 200 225 250 275 300 325

Reference Client 

Patients 

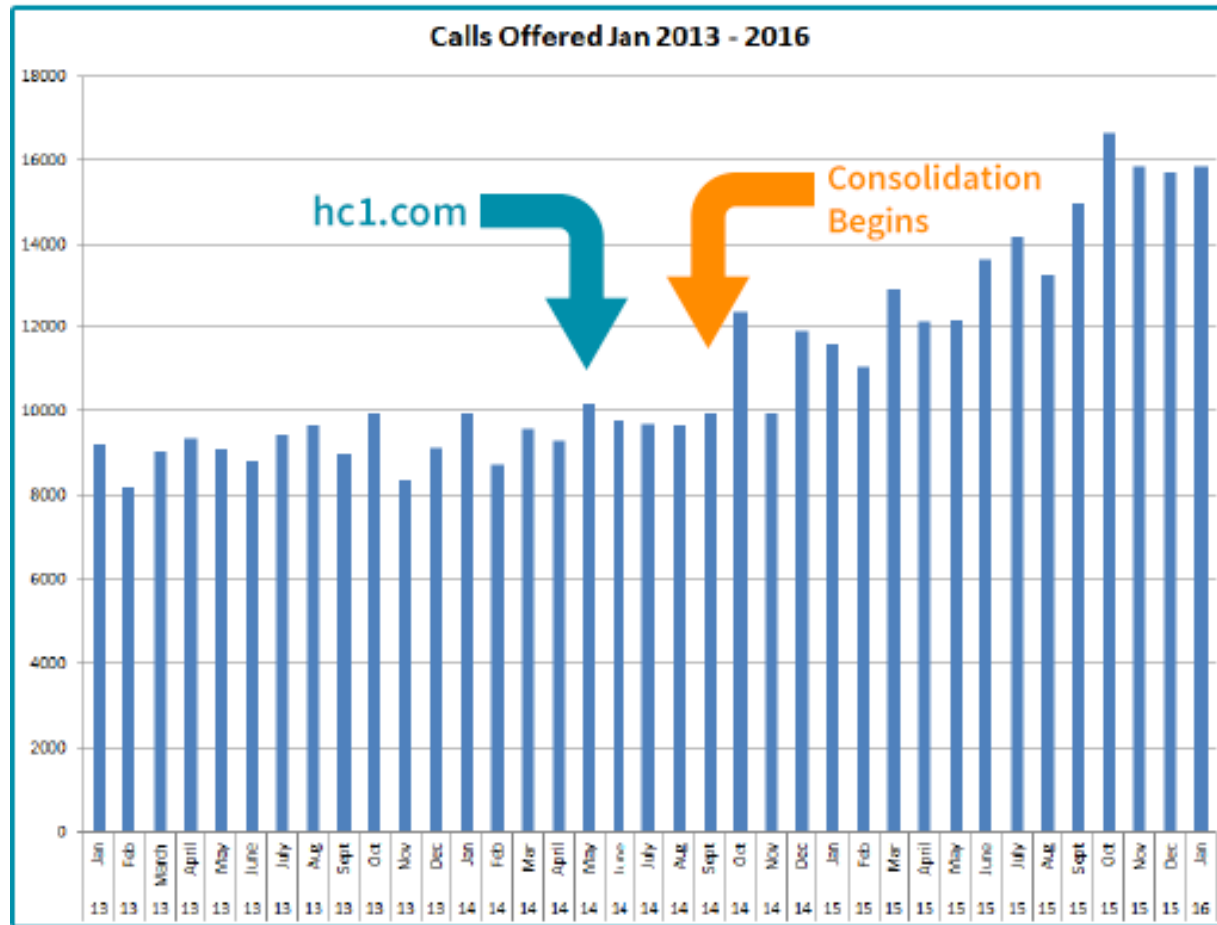
Main Campus 
Regional Hospitals 



Instantly View Types of Issues

Case Totals by Category 8/1/2014 -9/30/2015													
Category Name	11/14	12/14	01/15	02/15	03/15	04/15	05/15	06/15	07/15	08/15	09/15	10/15	Total
CS - Accessioning / Specimen Issues	37	29	27	45	24	43	35	60	44	43	50	30	467
CS - Anatomic Pathology	39	43	45	67	60	68	65	59	47	45	53	39	630
CS - Billing Issues	39	40	40	42	56	43	42	26	52	37	23	24	464
CS - General	4,252	5,042	4,908	4,374	5,092	5,163	5,327	5,920	6,285	5,810	6,136	5,164	63,473
CS - HW and SW Issues	0	0	0	0	0	0	0	0	0	0	0	0	0
CS - Logistics	403	486	489	491	594	580	543	610	645	558	588	457	6,444
CS - Microbiology Lab Results	0	0	0	0	0	0	5	0	0	0	1	0	6
CS - Results	1,668	2,217	2,188	2,083	2,460	2,243	2,445	2,743	2,954	2,821	3,397	2,882	30,101
CS - Test Adds	2,692	2,782	2,880	2,803	3,142	3,185	2,937	3,157	3,284	3,304	3,589	3,301	37,056
	9,130	10,639	10,577	9,905	11,428	11,325	11,399	12,575	13,311	12,618	13,837	11,897	138,641

Client Services in September 2014



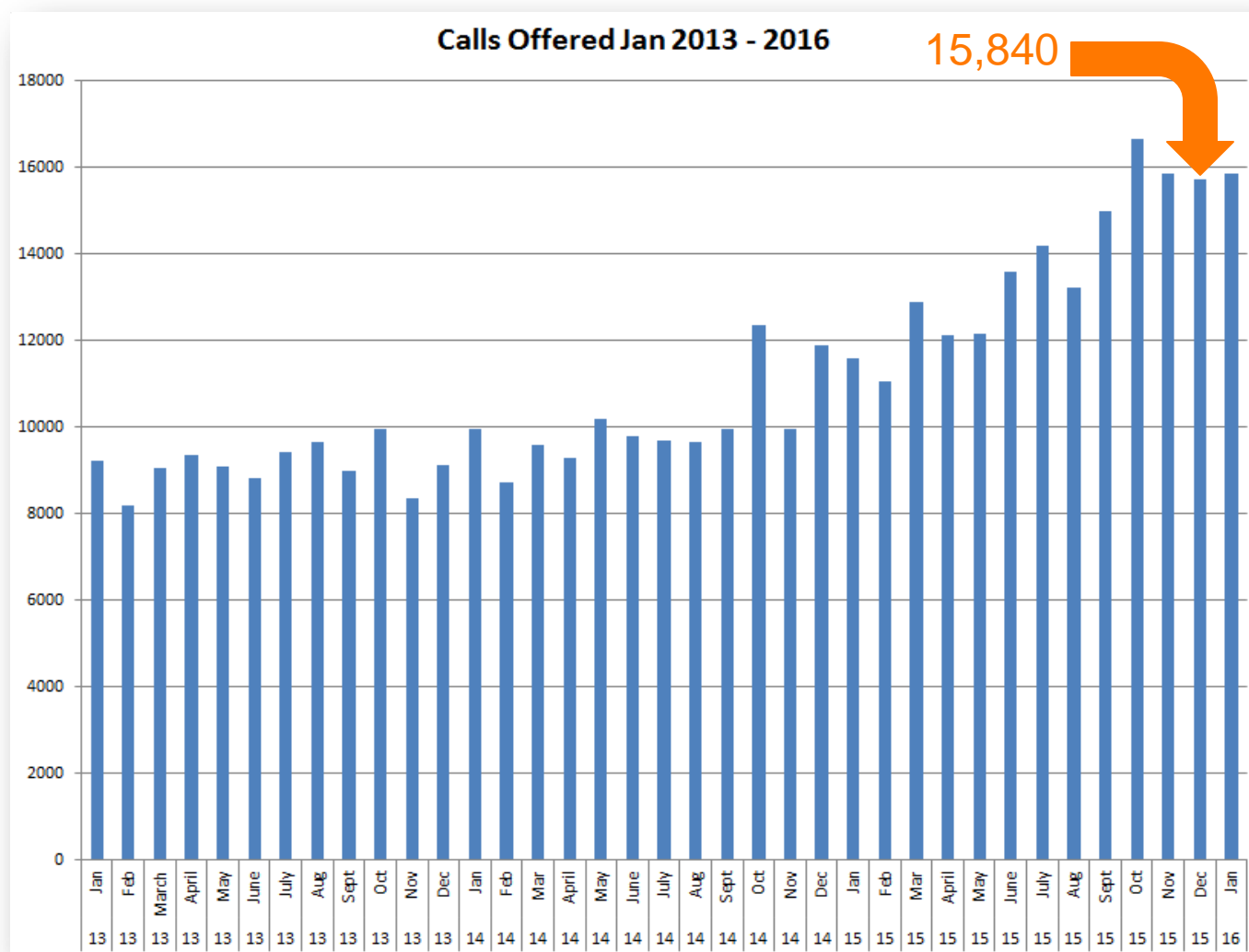
2015 Laboratory Consolidation

- 9 regional hospitals; 18 months
- Specimens transferred to main campus from regional hospitals
- Calls from local labs transferred to LCS
- Call volume was unknown
- Required standardization
- Required a culture change from “my” lab to a centralized lab

		Operational Stages					
	Hospitals	Stage 1	Stage 2	Stage 3	Stage 4	Stage 5	Stage 6
P I L O T	Marymount						
	Lutheran						
N O N P I L O T	Euclid						
	Medina						
	Lakewood						
	South Pointe						
B U S I N E S S	Hillcrest						
	Fairview						

*Marymount includes Marymount South facility for chemistry

Client Services in January 2016





2016: Critical & Urgent Values

- Cleveland Clinic expanded through acquisition
- n locations = n tables of values
 = n policies
 = n practices
- IT systems variations
- Pilot in 2012 showed Sunquest Callback was not an option

Audit Revealed Lack of Standardization

Issue	Resolution
Call critical and urgent values promptly	Dedicated service for calling: Lab Client Services
Limit bench tech interruptions	
Call caregiver directly	Do not transfer from main lab to hospital lab No auto-attendant
Values vary across the system	Standardize values
Policies vary across the system	Standardize policies
Lab and clinical policies vary	Engage nursing and hospital QA to standardize

Three-pronged approach



Enterprise-wide Standardization

2016: Critical and Urgent Values

- Indicate the patient is in danger of death unless treatment is initiated immediately
- Require immediate interruptive notification of the responsible licensed caregiver who can initiate the appropriate clinical action for the patient
- Must be communicated by the laboratory within 30 minutes
- Were standardized when project began

Critical Values			
Test	Patient Type	Low Value	High Value
Glucose		< 40 mg/dL	None
Hemoglobin		≤ 6 g/dL	None
Hematocrit		< 15.0%	None
pO ₂		< 50 mmHg	None
pH, arterial or capillary blood		< 7.20	None
Potassium		< 2.5 mmol/L	> 6.0 mmol/L
Platelets		< 10 K/uL	None

Urgent Values

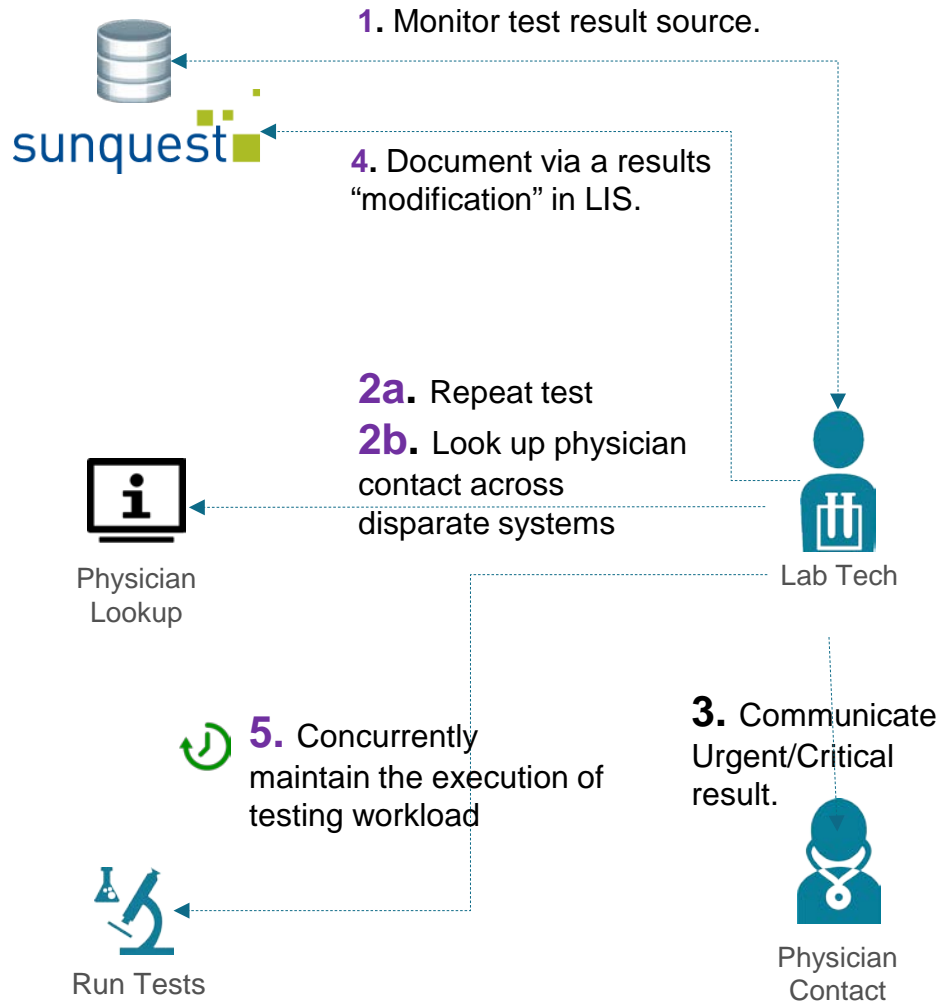
- Test results that fall outside the normal range
- Represent a significant finding for the patient
- Require prompt communication to and attention by the caregiver
- Were not standardized at the beginning of the project

Hematocrit	Main		Yes	No	No	<15.0%	None
Hematocrit	Main	Neonates (<31 days old)	No	Yes	No	<26.0%	>65%
Hematocrit	North General Hospital		Yes	No	No	<19.9 %	None
Hematocrit	North General Hospital	Neonates (<31 days old)				≤25.9%	≥65.1%
Hematocrit	Chicago Hope		Yes	No	No	<15.0%	< 20.0 %
Hematocrit	Chicago Hope	Neonates (<31 days old)	No	Yes	No	≤26.0%	≥65%
Hematocrit	Seattle Grace		Yes	No	No	19.90%	None
Hematocrit	Seattle Grace	Neonates (<31 days old)				≤25.9%	≥65.1%
Hematocrit	Rampart General		Yes	No	No	<15.0%	None
Hematocrit	Rampart General	Neonates (<31 days old)	No	Yes	No	<26.0%	>65%

System Wide Policy

- Critical values were standardized and adopted across the enterprise before the audit
- Performed a gap analysis of urgent values
- Standard urgent values were approved by ePSC and MEC advisory committee
- Standard table go to BOG
- New procedure in Manual of Operations

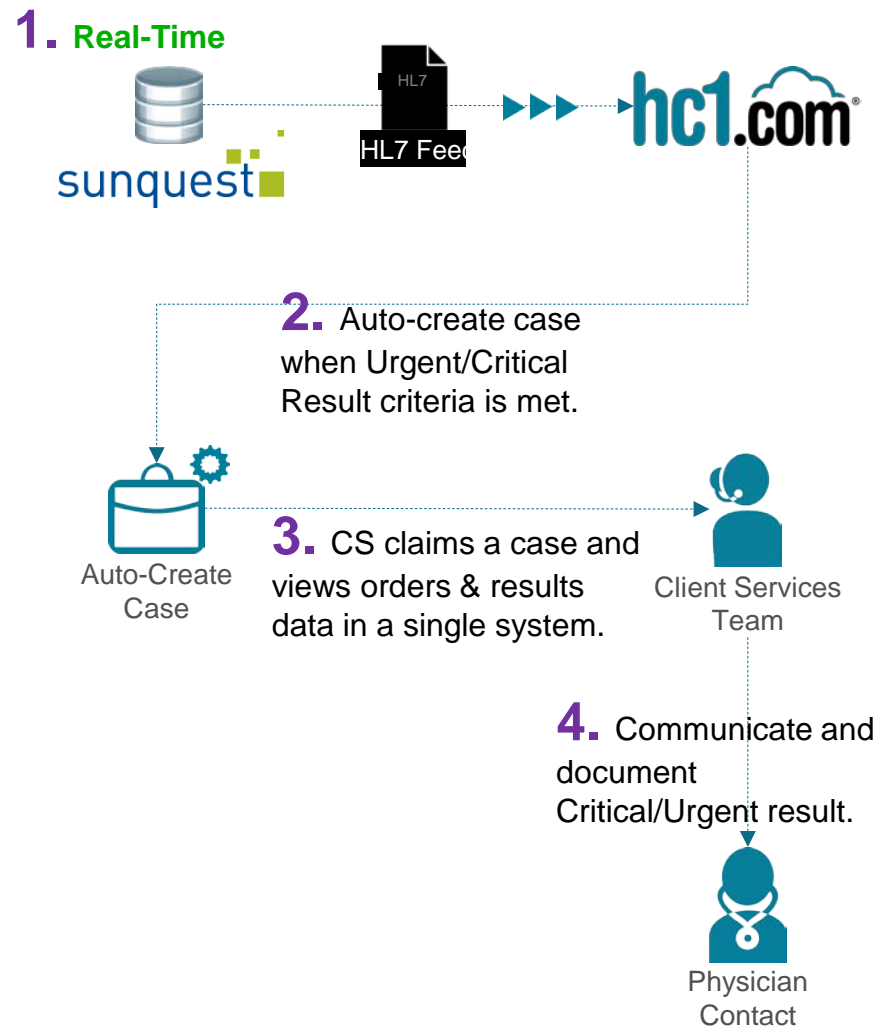
Original Workflow



- Decrease in productivity
- Lack of standardization
- Highly manual process
- Time-intensive communication between laboratory and caregiver

Streamlining the Process: New Workflow

- Removed lab techs from the process
- Centralized & standardized workflow in client services
- Decreased SLA missed
- Decreased turnaround time in delivering information to the caregiver



IT Challenges

- Flag values in Sunquest
 - New flagging was possible
 - Reviewing existing flagging was not

```
MSH|^~\&|SQ_LAB|4|HC1||2012343421042||ORU^R01|20132434039419|P|2.3||||PID|||914893^^  
^4|^|DucK^Donald|^|19400519|F.^MOUSE^MINNIE^^^|^|^|1621300156|274363422|||  
|||||PV1||IP|9TH^9TH922^^|||835271^MOUSE^MINNIE^^835271^I04261|^^^|IP^|1  
621300156|||||201608020000|||||ORC|RE|910251035|||||835271^  
MOUSE^MINNIE^835271^I04261|||^|OBR||910251035||GLU^Glucose^GLU^L^^^LN||20160808201  
500|20160808202900||740907^DAFFY^DUCK (EUC)|||20160808203000|^|835271^MOUSE^MINNIE  
K^^835271^I04261|^|740907||M2031805|||CCOR|F|GLU^GLU|^^^S|9022^RAKHIT^AKBAR^^902  
2^G07388^~~~~~|OBX|1|NM|GLU^Glucose^GLU^L^^^LN|1|564|mg/dL|65-  
100|H^UH|||F||20160808211034|EUC^Performed at Euclid Hospital Laboratory, 18901 Lakeshore  
Blvd, Euclid, OH 44119|35647^ABOAGYE^EDINA|||OBX|2|ST|GLU^Glucose^GLU^L^^^LN|2|Called to  
and read back by:|mg/dL|65-100|H^UH|||F||20160808211034|EUC^Performed at Euclid Hospital  
Laboratory, 18901 Lakeshore Blvd, Euclid, OH 44119|35647^ABOAGYE^EDINA|||
```



Procedural Changes:

- Limit repeat testing
- Change process for resulting values
- Only call urgent values to ERs during Sunquest and Epic downtimes



Implementation Timeline

Start Date	End Date	LCS Responsibilities	Lab Responsibilities
June 27	June 28	revalidation	none
June 29	July 1	1 to 1 count	Report previous 24 Critical and Urgent Total
July 5; 11:00 am		West go-live: 11 am - 5 pm	5 pm to 7 am
July 6	July 8	Days only 7 am - 5 pm	5 pm to 7 am
July 9	July 10	none	Call all criticals and urgents
July 11	July 15	Days only 7 am - 5 pm	5 pm to 7 am
July 16	July 17	none	Call all criticals and urgents
July 18	July 24	Days only 7 am - 5 pm	5 pm to 7 am
July 25	July 29	East go-live: Days only 7 am - 5 pm; West 24 x 7	East 5 pm to 7 am
July 30	Aug 14	East and West 24 x 7	East and West 24 x 7
Aug 15	Aug 24	MC Days only 7 am - 5 pm	5 pm to 7 am
Aug 25	Go-Live Completed		

Staffing

Table 3.

Percent Inpatient vs. Outpatient 8/1 - 10/31/2015

	90 days		1 day
IP*	8115	82.45%	184
OP**	1424	17.55%	39
			223

* In-patients, includes ER patients

**Out patients, includes reference clients

Estimated FTE based on Range of Call Volume

Call Range	Total Calls in Range	OP	IP	Total OP Call Time 18.1 min/call	Total IP Call Time 5.6 min/call	Total Call Time per Day (min)	Total Call Time per Year (min)	Total Call Time per Year (hours)	Estimated FTE (1FTE per 2080 hours)
Low Volume	109	19	90	346	503	849	310,063	5,168	2
Average Volume	223	39	184	708	1,030	1,738	634,349	10,572	5
High Volume	377	66	311	1,197	1,741	2,938	1,072,420	17,874	9

Critical and Urgent Dashboard

Critical and Urgents Queue (v2.0)

Case	Case Status	Case Number	Case Assigned To	Organization Name	Provider	Patient	Test Code	Result Date	Target TaT	Time to SLA
View	In-Progress	-BLCUL	Aboagye, Edina	E12 EMERGENCY DEPT	RISLEY, KIRSTEN		CULT	09/07/2016 10:51 PM	30	18
View	In-Progress	-BLCUL	Aboagye, Edina	E12 EMERGENCY DEPT	GULLETT, TRAVIS		CULT	09/07/2016 10:52 PM	30	19
View	In-Progress	-PTT-	Rogers, Kaleigh	J32 HEART FAIL INTENSIVE CARE	WAKIM-FLEMING, JAMILE		APTT	09/07/2016 10:42 PM	60	39
View		-PTTAC-		H80 GENERAL INTERNAL MEDICINE	BADAR, MUSTANSER		APTT	09/07/2016 10:56 PM	60	53



Case ID: C23

Organization Physicians Group A

Host Codes ORG21003

General Information

Subject	Critical Notification
Category	Notification
Subcategory	Critical Result Notification
Assigned To	Jones, Miriam
Status	Open
Priority	High
Occurrence Date *	04/01/2016 1:47 PM
Description	Critical Glucose Level
CC Users	Smith, Jason

hcl can auto assign a subcategory based on event type

This Case is unresolved

Cancel Case

Resolved By

Resolved On

Corrective Action

Resolution

Related Items



Rebecca Gill

Rgill@drco.com

(303) 707-0906



Maria Staats

mstaats@gmail.com

(555)987-6543



ORD3239-34433



Activities

Attachments

Messages

All



Document out reach attempts as memos

Create a new:



Task



Memo

	Organization	Type	Subject	Category	Created On	Status	Level	
	Physicians Group A	Memo	Attempt 3 - Call: Reached Client	Resolution	04/01/2016	Closed	High	
	Physicians Group A	Memo	Attempt 2 - Call: Voicemail	Update	04/01/2016	Closed	High	
	Physicians Group A	Memo	Attempt 1 - Call: Voicemail	Initial	04/01/2016	Closed	High	

72 Hour Patient History

[Client Services](#)[Help](#) ▾[Recent Items](#) ▾[Collaboration Center](#)[Dashboard](#)[Accounts](#)[Contacts](#)[Campaigns](#)[Activities](#)[Opportunities](#)[Reports](#)[Orders and Patients](#)

01439909-912031546_01439909-TNT-TROPT

Organization: Fairview Emergency Dept

Mailing Address: | Phone:

Fax:



Edit

[General Information](#) [NPI Lookup](#) **[72 Hour Patient History](#)** [Reference Chart](#)

Report

**Filter List**

Case ID Equal to 27,139,218,924,835,487,1



72 Hour Patient History (v1.4)

Criticals/Urgents, 5/23/2016 7:04 PM

1 - 100 / 240

Patient Name	Provider Name	HIS Order Number	Accession Number	Result Code	Result	Result Ref Range	Result Local Date
Smith, Sally	Craig, Melissa	847263084_08734739xx	X3847380_9834783748	SLACTT VBGCOM VCBWHO	CANCELLED; Specimen not collect or received CANCELLED; Specimen not collect or received CANCELLED; Specimen not collect or received	,2.1	
Johnson, Bob	Craig, Melissa	836439278_84578378xx	W83478378_983473893	WSR WSR-2 WSR-3	100 Test performed by: Cleveland Clinic Laboratories OH 44195 CLIA 36D06594780	0-10 0-10 0-10	08/18/2016 11:19 AM 08/18/2016 11:19 AM 08/18/2016 11:19 AM
Hicks, Murray	Doe, Charles	843361684_37734787xx	W878578347_83473897	CRP	4.1	0.0-1.0	08/18/2016 7:10 AM
McDonald, Lorraine	Little, Marty	838431747_93734643xx	W34783759_83478937	B12	>2000	221-700	08/18/2016 8:42 AM
Chase, Kendra	Weaver, Frank	938481748_9378347xx	W8784705_9873487983	SERFOL	16.7	2.8-18	08/18/2016 8:42 AM
Harrison, Susan	Myers, Jeremy	983487574_3874387xx	W2974387_89347837	AIGL A2GL ALBE BEGL GAGL GPEROL LOC RXIFE SPENT SPESTF TPSPE	PENDING PENDING PENDING PENDING PENDING PENDING PENDING PENDING PENDING PENDING PENDING	0.18-0.31 0.52-0.97 3.37-4.23 0.84-1.36 0.70-1.44 0.00	
					6.7	6.0-8.4	08/18/2016 11:20 AM

Reference Chart



Client Service

Help

Recent Items



Collaboration Center



Dashboard



Accounts



Contacts



Campaigns



Activities



Opportunities



Reports



Orders and Patients



01439909-912031546_01439909-TNT-TROPT

Organization: Fairview Emergency Dept

Mailing Address: | Phone:

Fax:



Edit

General Information | NPI Lookup | 72 Hour Patient History | **Reference Chart**

Report



:: Critical Laboratory Tests

Category	Test	Patient Type	Low Value	High Value
Laboratory Tests	pO2		< 50 mmHg	None
Laboratory Tests	Glucose		< 40 mg/dL	None
Laboratory Tests	pH, arterial or capillary blood		< 7.20	> 7.60
Laboratory Tests	Hemoglobin		< 5.99 g/dL	None
Laboratory Tests	Potassium		< 2.5 mmol/L	> 6.0 mm/L
Laboratory Tests	Hematocrit		< 15.0%	None
Laboratory Tests	Platelets		< 10 K/uL	None
Laboratory Tests	Hematocrit	Neonates (<31 days old)	< 26.0%	> 65%

:: Urgent Blood Bank

Category	Test	Patient Type	Low Value	High Value
Blood Bank	Antibody Screen		Positive	None
Blood Bank	Transfusion reaction		Positive	None
Blood Bank	Positive Direct Antiglobulin Test (Direct Coombs)		Positive	None

:: Urgent Chemistry

Category	Test	Patient Type	Low Value	High Value
Chemistry	%CKMB		None	> 4%
Chemistry	Glucose		None	> 500 mg/dL
Chemistry	pH, arterial or capillary blood		None	> 7.60
Chemistry	Calcium, Ionized		<0.9 mmol/L	> 1.5 mmol/L
Chemistry	Troponin T		None	> 0.029 ng/mL
Chemistry	Lactic Acid (Lactate)		None	> 4.0 mmol/L
Chemistry	Phosphorus		<1.1 mg/dL	None

Activities | Attachments | Messages

Create a new: Memo Task

All - Descending Order

► Quick Filter



Organization

Type

Subject

Order Date

Due Date

Status

Priority

No Results



Cleveland Clinic

Dashboards

Critical and Urgent Value Report

Total Critical Count

144

Critical SLAs Not Met

2

Critical SLAs Met

142

Total Urgents Completed

355

Urgent SLAs Not Met

1

Urgent SLAs Met

354

Critical SLA Percentage Meter (v2.0)



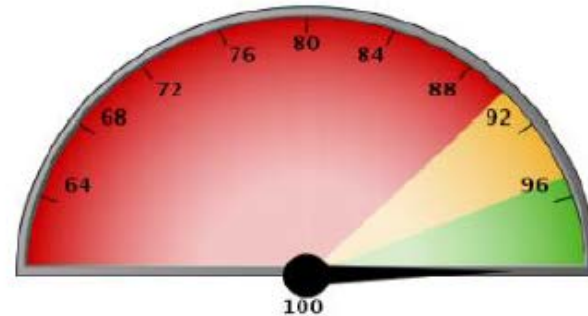
Critical SLA Percentage Meter (v2.0)



Urgent SLA Percentage Meter (v2.0)



Urgent SLA Percentage Meter (v2.0)



Dashboards

hc1.com

827 Collaboration Center

Dashboard

Organizations

Contacts

Campaigns

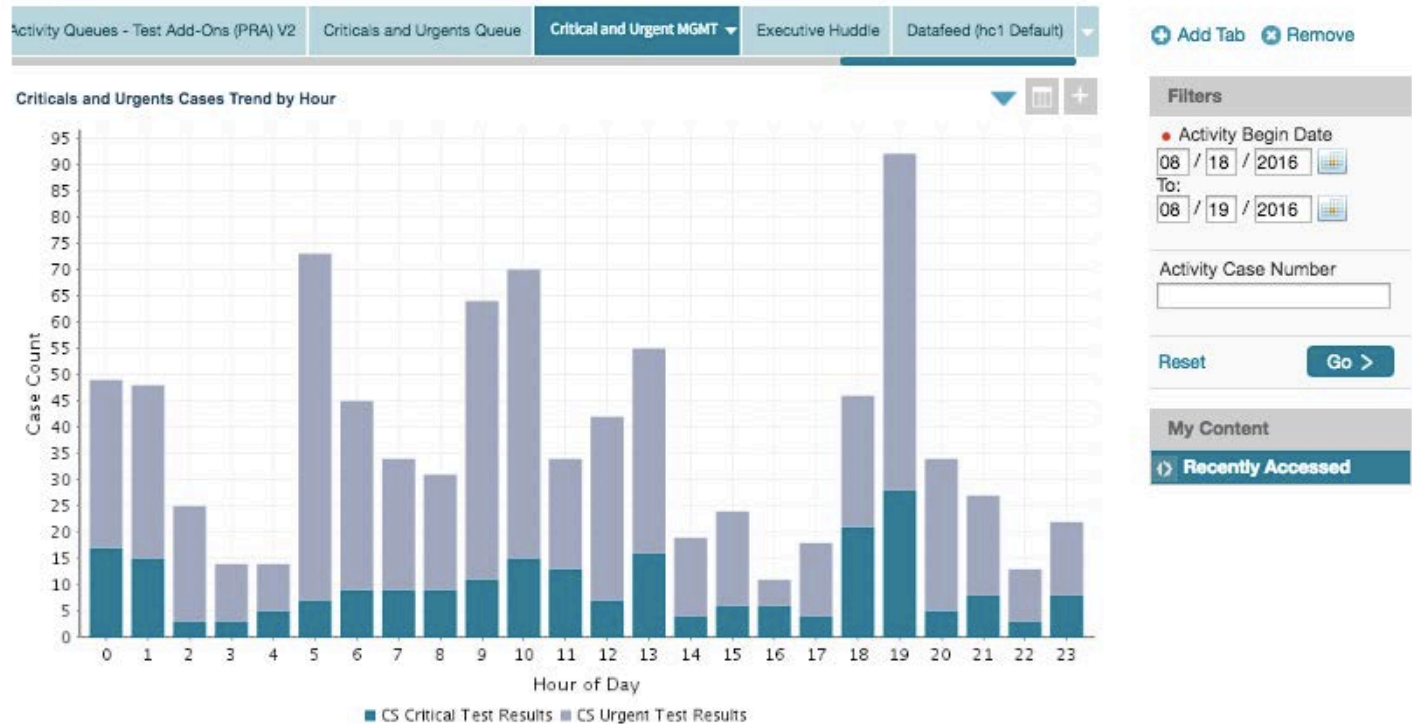
Activities

Opportunities

Reports

Orders and Patients

Dashboard



Critical and Urgents Queue - ALL (v1.1)

Activity Subcategory Name	Case Number	Case	Case Status	Case Assigned To	Organization Name	Provider	Activity Case Resolved On Local
CS Critical Test Results	00108071-913204709_00108071-MABGP-MPO2	View	Documented	Rogers, Kaleigh	General Hospital	Dr. Ashton	08/17/2016 8:05 PM
	00108071-913487978_00108071-CCASP-PO2	View	Documented	Roberts, Angela	Medina	Dr. Roberts	08/18/2016 3:50 PM



Critical & Urgent Values Successes:

- Went live in 3 months
- Kept the labs in the process by having them do QA
- Gave 1 FTE up to manage the validation of the process
- Believed the project was possible in the faces of “NO”

Critical & Urgent Values Opportunities to Improve:

- Find more methods to standardize additional items intra-departmentally, before starting
- Ask a lot more questions about the existence of downstream reporting
- Train more people longer before the go-live
- More communication with medical operations



Thank You!

Questions & Answers

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Every life deserves world class care.