

A Holistic View of LIS Management Resources, Vendors, and Project

Kathy M. Davis, B.S.,MT(ASCP)

Monday, May 23, 2016

Notice of Faculty Disclosure

In accordance with ACCME guidelines, any individual in a position to influence and/or control the content of this ASCP CME activity has disclosed all relevant financial relationships within the past 12 months with commercial interests that provide products and/or services related to the content of this CME activity.

The individual below has responded that he/she has no relevant financial relationship(s) with commercial interest(s) to disclose:

Kathy M. Davis, BS, MT(ASCP)

Overview

- Perspective – University of Michigan Health System
- Leadership roles for an Informatics Division
- Staffing and Resources
- Operational aspects of lab IT management
 - Interfaces, troubleshooting, maintenance, testing and validation, monitoring, quality and compliance
- Project management – managing competing priorities
- Consultants and contractors
- Vendor relationships

University of Michigan Health System Ann Arbor, Michigan



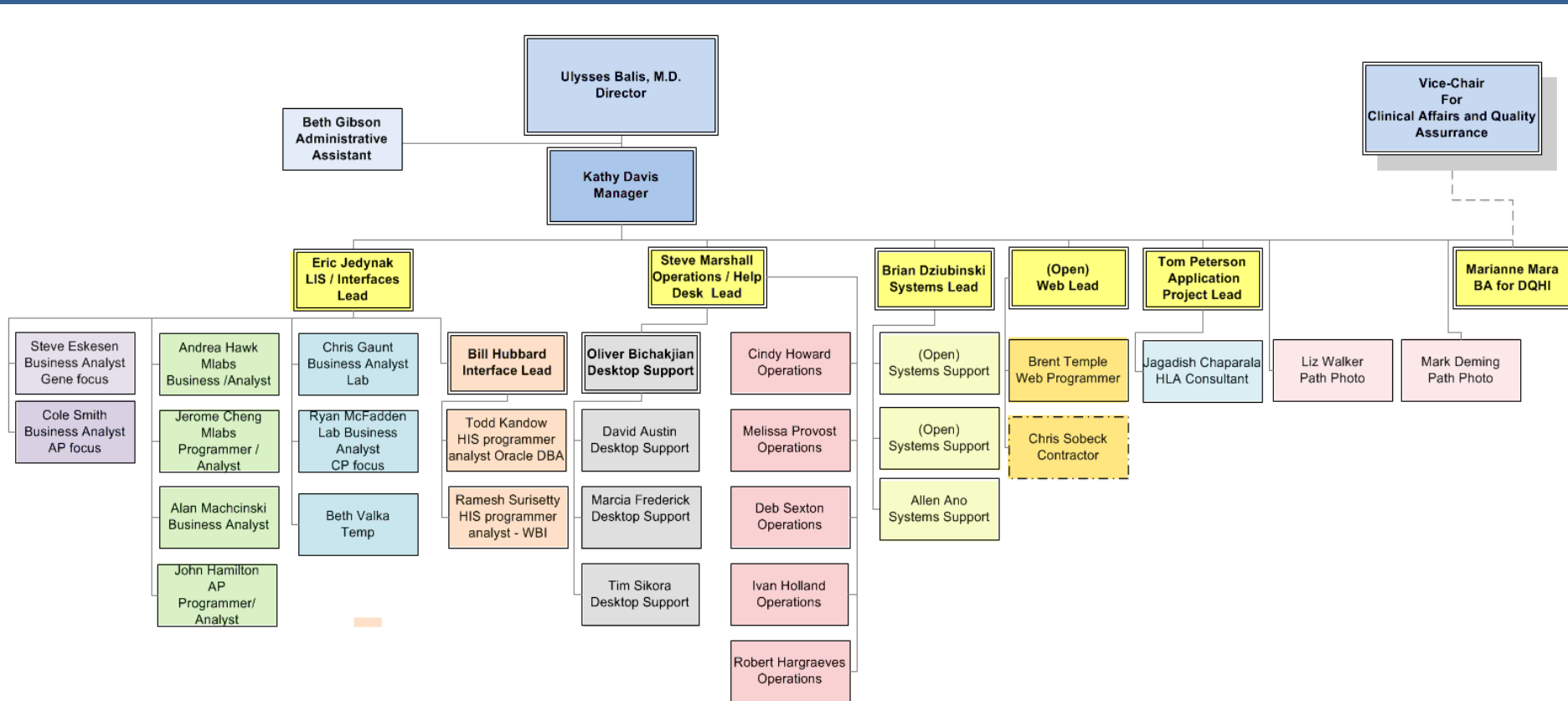
Fun Facts

- 26,000 faculty, staff, students, trainees & volunteers
- 3 hospitals, 40 outpatient locations with more than 150 clinics, and extensive home care operations handle 2.1 million outpatient visits, more than 47,000 hospital stays in 1,000 beds, and much more each year
- MLabs Outreach Program
- CP Tests billed: 5,105,720
- AP Tests billed: 277,895
- Blood Bank Tests Billed: 357,299
- Total = 5,740,914

Pathology Informatics Team



Pathology Informatics Organizational Chart



April 2016

Division of Pathology Informatics

- 26.5 FTEs divided into 6 teams
- 2.75 consultants / contractors
- Management responsibility for:
 - >200 servers, covering many mission-critical clinical and business applications
 - a portfolio of >150 major long-term projects (with 30+ active at any given time)

Division of Pathology Informatics

- Operational support for:
 - >20 laboratories and off-site locations
 - All instrument interfaces and/or interface engines
 - 80+ system-system interfaces (MiChart, CDR, OTIS, IHA, etc.)
 - MLabs Atlas Labworks and all associated interfaces
- Subject matter expert based customer service / help desk support with 24/7/365 coverage for
 - Clinical operations
 - Research
 - Education

The Big Challenge

- Hospitals are on tight budgets and constantly need additional IT solutions to remain competitive
- Every hospital department and division have their own agendas and priorities
- Laboratory systems are very integrated
- Interface hubs reduce the impact of change on other systems, but they do not eliminate it
- Priorities are constantly shifting, especially during long projects such as LIS implementations

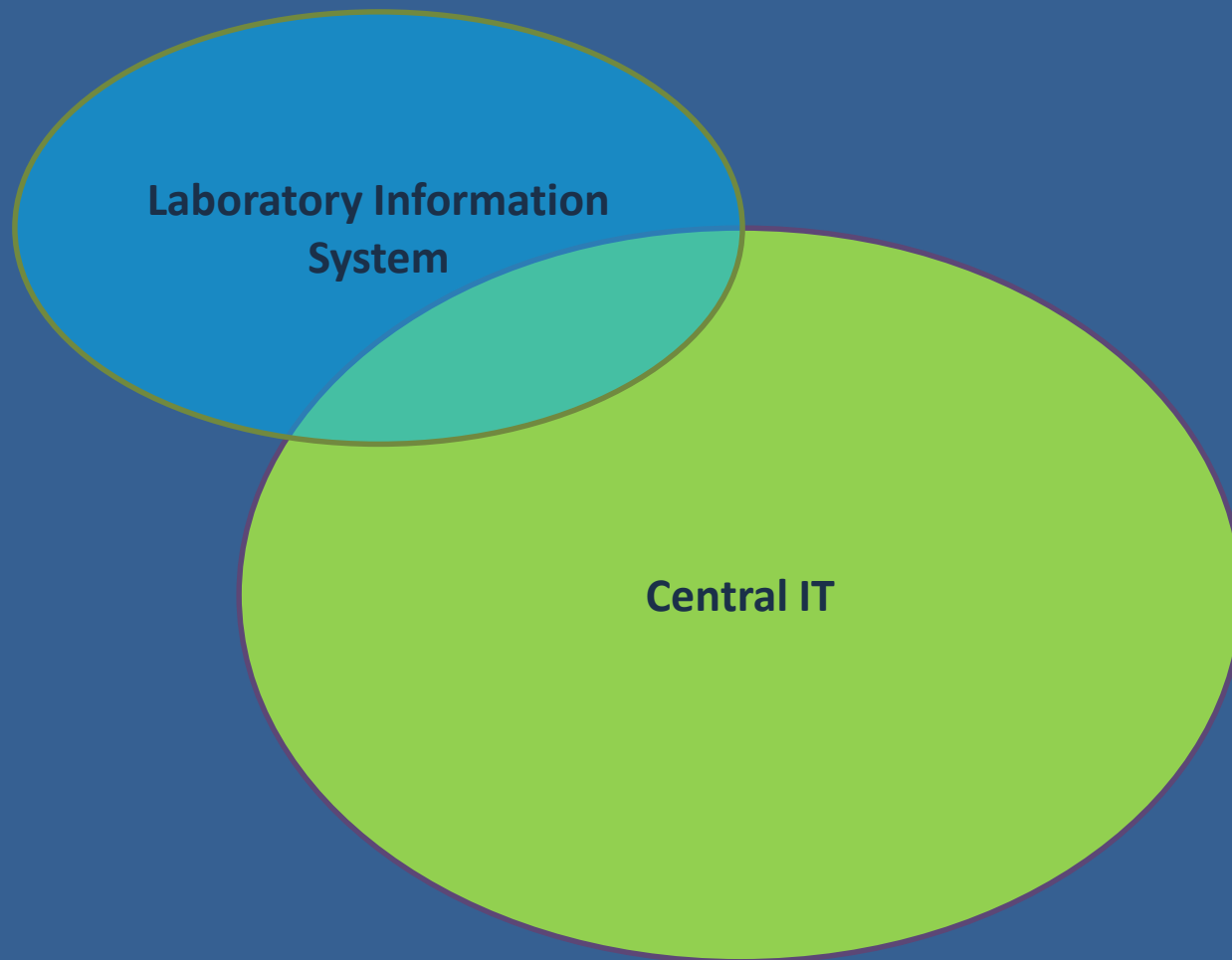
Big Challenge continued ...

- Resources for projects may become diluted with operational responsibilities and other priorities
- LIS functionality you purchased may not be exactly what you expected or may not perform satisfactorily
- Solutions provided don't always meet the expectations of the customer
- Development efforts may take a bit longer than expected
- Vendors always want to sell additional solutions
- HR issues – sabotage, nitpickers, slackers, managing turnover

Organizational Politics

- Educate institutional leadership of the merits of having an Informatics Division or an LIS support team within the Department of Pathology that is separate from Central IT
- LIS support teams are unique from traditional IT support teams
- There are inherent risks when LIS support teams have off-site configurations of servers and support staff
- Periodic struggles with Central IT who believe consolidation of the data centers and IT staff represent the best technical and economic strategy and we manage these struggles to protect and preserve our dedicated LIS support team

LIS Relationship to Central IT



Relationship of Lab IT to Central IT (MCIT)

Pathology Informatics

- Dedicated IT support team for the collective Pathology labs and business units
- Subject matter expertise for the many distinct and unique classes of data that is generated
- Director, Manager and LIS support team have formal laboratory science backgrounds and can converse effectively with laboratory faculty and staff
- Utilize, whenever possible enterprise / MCIT infrastructure for non-Pathology business support

MCIT

- Hardware platforms – redundant servers
- Network security audit for Pathology
- Core image management
- Level 1 and 2 security and authentication
- Institutional change management
- File services
- Outlook email systems
- Help Desk Software
- Other institutional IT systems
 - MiChart suite of applications



LEADERSHIP

Securing the Resources



People



Work space



Hardware/software



Commitment from top
management

The Laboratory IT Team



MD Director



- Pathologist
- Division Director: Board-certified Clinical Informaticist / Pathologist
- Manages the politics and pressures and provides the clout at the institutional level to resolve major issues
- Provides MD representation at high level executive IT committees in the hospital
- Communicates progress or concerns at departmental AP and CP faculty meetings
- Engages the LIS vendor leadership to resolve complex implementation issues and to kindle development relationships when appropriate

Manager



- Primary liaison for the Laboratory Information System Vendor
- Speaks the language of the laboratory managers
- Ensures policies and procedures are in place for the LIS to meet CAP and other regulatory requirements
- Communication skills
- Issue escalation and resolution
- Major Incident Management
- Represents the interests of the Lab IT at institutional meetings
- Leads, motivates, and develops skills of others on the team

Composition of the Team

- Division Director: Board-certified Clinical Informaticist / Pathologist
- Additional subspecialized subject matter expertise:
 - Clinical informaticist in support of reference lab reports design, reporting workflow models, and interconnectivity
 - Bioinformaticians
 - Medical Technologists / Laboratory Scientists
 - Application-specific programmers
 - Database Administration with expertise in LIS schema stewardship
 - Network Administration with expertise in unique aspects of LIS connectivity such as instrumentation and automation lines
 - HL7 /lab information management specialists

Major Roles and Responsibilities



- Provide technical and process support for the clinical laboratory information system and other business processes internal to the department
- Develop, and then support, end-to-end solutions for the department's tripartite mission
- Partner with clinical lab units to develop and implement targeted IT solutions to solve complex laboratory workflow challenges
- Ongoing support for departmental and enterprise LEAN initiatives in support of process improvement
- Facilitate horizontal integration of clinical laboratory IT workflow, simplifying the logistics of running a multi-lab/multi site operation

Major Roles and Responsibilities

- Provide direct IT support for Pathology's research and educational missions
- Provide direct educational Informatics opportunities to trainees, in the form of a Pathology Informatics Fellowship (one of six such programs in the country)
- Conduct original research in pathology and bioinformatics
- Participate at the national and international levels in the advancement of the Pathology Informatics field



STAFFING AND RESOURCES

Business Analysts



- Medical Technologists or other laboratory scientists
- Knowledge of laboratory science and workflow
- Speaks the language of the lab managers and bench technologists
- Excellent detective skills
- Excellent troubleshooting skills
- Recognizes the need for documentation requirements for CAP, FDA, and other regulatory agencies for which laboratories and lab information systems are evaluated

Interface Architects



- HUGELY important role in managing the complexities of integration with EMRs, outreach lab portal products, MU2 (meaningful use) compliance requirements, and other interface business partners at an organization
- Expertise necessary to manage interface engines (hubs) enabling systems to exchange information in a more seamless way
- Expert understanding of HL7 or XML is necessary
- Database expertise is a big plus
- Laboratory science background ideal
- Key to the success of many projects

Laboratory Liaisons

- Important to identify workflow experts in each of the clinical laboratory areas that partner with the lab IT team
- Recommended that lab IT managers limit the number of users in the department who are authorized to make changes to the LIS setup files, such as test builds and test maintenance activities, such as reference range updates, etc.
- Members who have access should be required to complete LIS training conducted by the vendor
- Too many cooks in the kitchen can be dangerous



Office Workspace

Current State



Desired Features

- Natural light
- Adjustable desks
- Collaborative workspace
 - Daily huddles
 - Troubleshooting / crisis management
- Swing space
- Near customers

Project / Training Space



Server Room





OPERATIONAL ASPECTS OF AN LIS TEAM

A Big TO DO ...

- Change control
- Troubleshooting
- Test maintenance
- Table maintenance and configurations
- Interface maintenance
- Access control / account management
- Quality reporting and compliance
- Testing and validation
- Software upgrades
- CAP readiness and other regulatory requirements

A Day in the Life ...

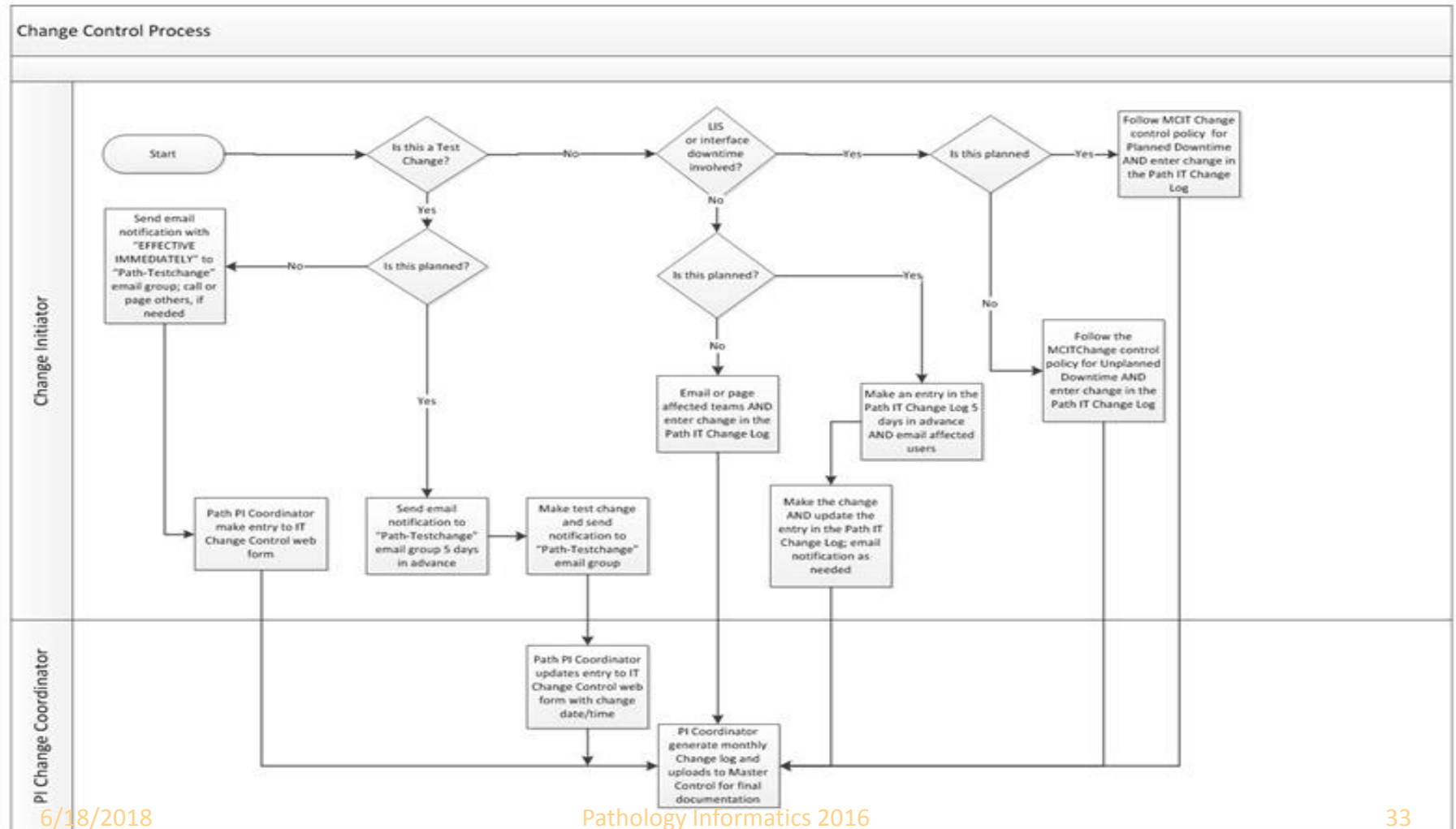
% Effort



- Build Maintenance
- Application Troubleshooting
- Interface Maintenance
- Access Control
- Quality Reporting
- Testing and Validation
- Software upgrades
- CAP / Compliance
- Project time / Development

Change Control Institutional and Departmental

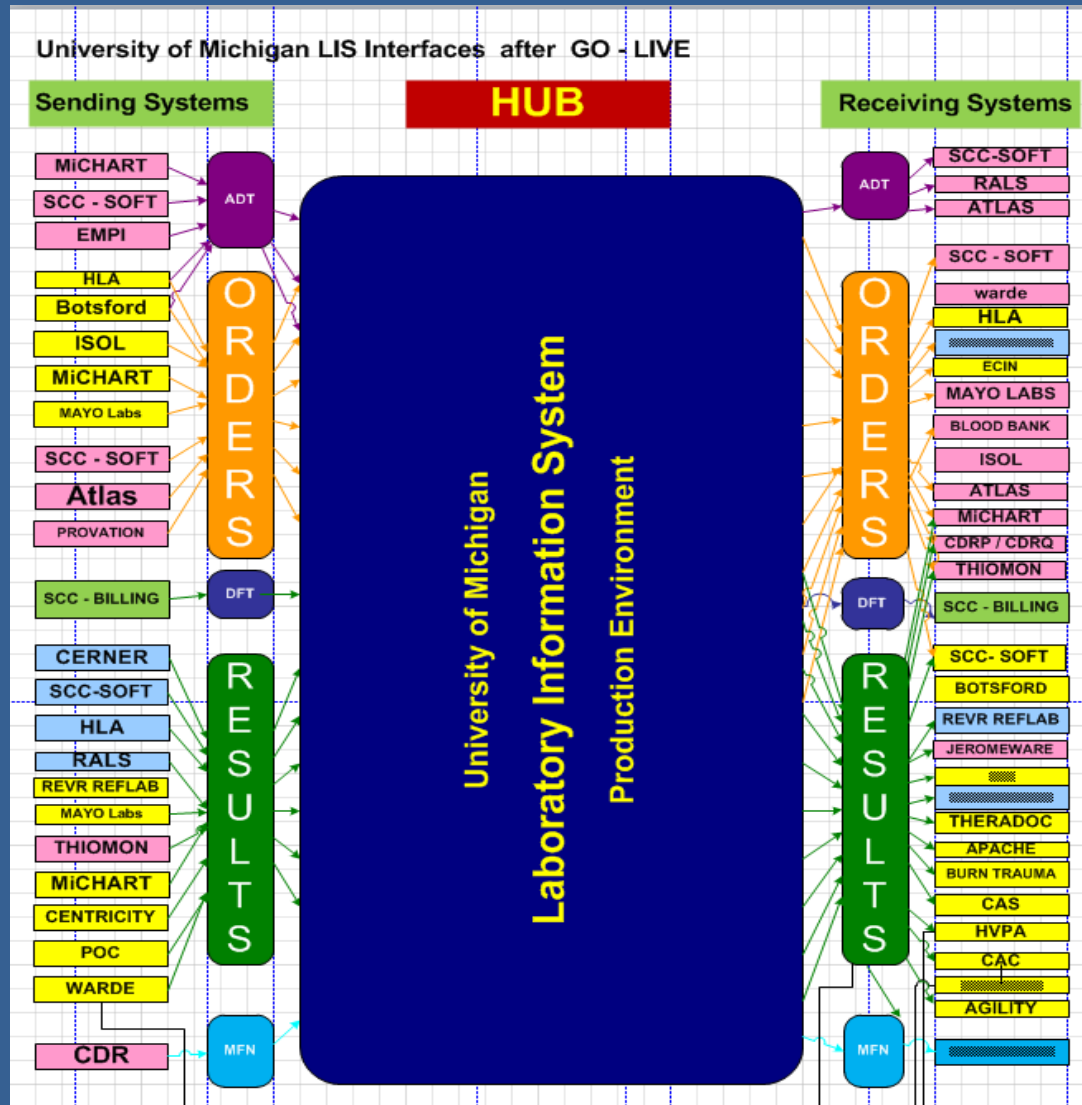
Flowchart



Troubleshooting

- Test ordered on wrong patient
- Microbiology tests canceled as duplicates; tests were sterile body fluids, but had different sites
- User received an error message while working within an application
- The application is too slow or is hour-glassing
- The ordering doctor did not receive the result in his/her results in-basket

Interface Maintenance



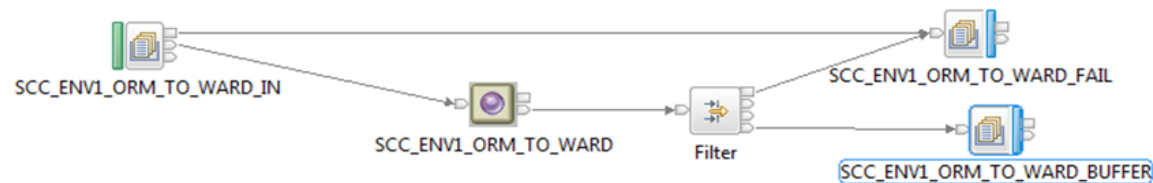
Interface Technical Documentation

Process flow - include interface descriptions

Pathology Orders going to Warde :

UMICH Pathology's Orders are sent to a TCPIP connector at IP& Port: 141.214.90.15 / 5708

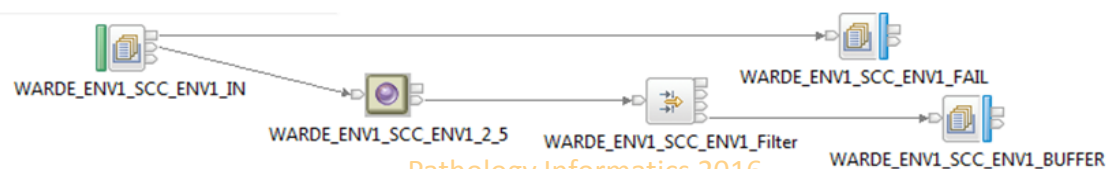
The Orders are then picked up by a IBM's Message Queue and a message broker flow processes the message to the Warde's requirements and sends the transformed message to the Warde to the specified IP Address / Port number. (170.232.112.94 / 46222)



Warde Results going to Soft:

Warde's MCL sends Results to Pathology's WBI hub to TCPIP connector at IP& Port: 141.214.90.15 / 5593

The Results are then picked up by a IBM's Message Queue and a message broker flow processes the message to the Warde's Results requirements and sends the transformed message to the SOFT to the specified IP Address / Port number. (172.20.27.219 / 5593)



Interface Requests

- Blood Product Administration Module in EPIC
- Provation interface for the medical procedures unit
- Custom labels for outpatient chair side specimen collections
- Breast Pathology results to Epic's Radiant Module
- POCT interfaces

Access Control

- On boarding and off boarding processes
- Moving from a paper system to an automated system

Testing and Validation

- [Test Plan Template](#)

Quality Reporting

Pathology	Informatics Division													
		Service Continuity	Outpatient Delays > 10 min	Inbound Order Failures	Outbound Result Failures	Mabs Inbound Failures	Mabs Outbound Failures	MiChart Merges	Mlabs Merges	Demographic Updates	Application Defects	Patient Safety Incidents	Major IT Incident	Surg Path
04/12/16		0	0	0	0	1	16	1	3				AP Labs	
04/13/16		1	1	2	3	1	32	2	5				AP Labs	
04/14/16		0	0	2	0	2	29	2	6				AP Labs	
04/15/16		0	1	1	4	1	32	2	3				AP Labs	
04/18/16		0	2	2	2	1	30	1	4				AP Labs	
04/19/16		298	1	0	1	0	38	3	6				AP Labs	
04/20/16		0	3	3	3	1	12	5	9				AP Labs	
04/21/16		0	1	1	2	2	35	4	4				AP Labs	
04/22/16		0	0	0	0	0	16	2	11				AP Labs	
04/25/16		0	3	2	1	2	33	1	8				AP Labs	
04/26/16		0	0	3	0	2	25	6	7				AP Labs	
04/27/16		0	2	0	1	5	33	4	7				AP Labs	
04/28/16		0	2	1	1	2	23	3	5				AP Labs	
04/29/16		0	1	1	1	2	17	2	7				AP Labs	

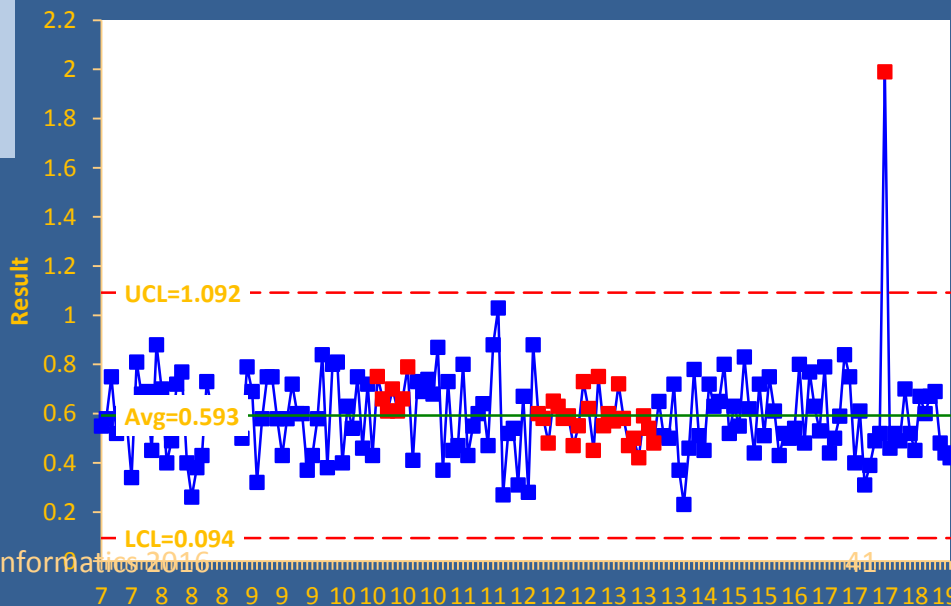
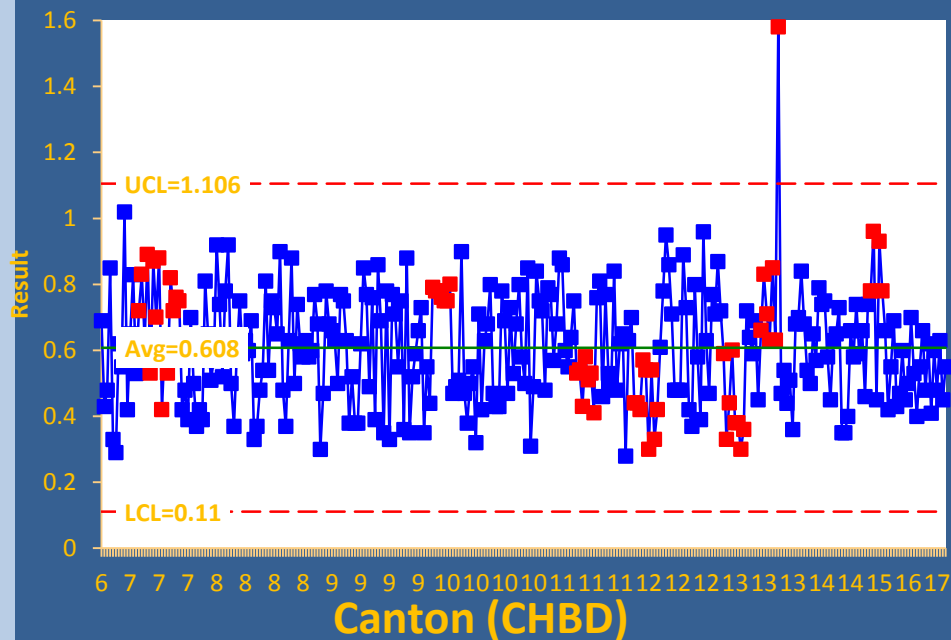
LOCATION	Counts	# >2 minutes	# >5 minutes	# >10 minutes
XCCB	294	0	0	0
XTB3	206	0	0	0
CHBD	170	0	0	0
XMBD	156	1	0	0
XRHB	155	0	0	0
XEAB	141	0	0	0
XTB1	127	0	0	0
XBBD	126	1	0	0
XBB3	94	0	0	0
XCHB	81	0	0	0
XBB0	78	1	0	0
XCVB	67	0	0	0
XDBC	64	0	0	0
XWHB	45	0	0	0
XYBD	44	0	0	0
XTB2	42	1	1	0
XDBH	41	0	0	0
XSHB	39	0	0	0
XBB2	31	0	0	0
XDBA	24	0	0	0
XLHB	19	0	0	0
DFP	2	0	0	0
Total	2046			

Blood Draw Station	Average	Standard Deviation
Canton	0.59	0.18
Brighton	0.65	0.25
Cancer Center	0.61	0.17
East Ann Arbor	0.62	0.17
Childrens and Womens	0.63	0.29
Taubman 3rd Floor	0.62	0.19

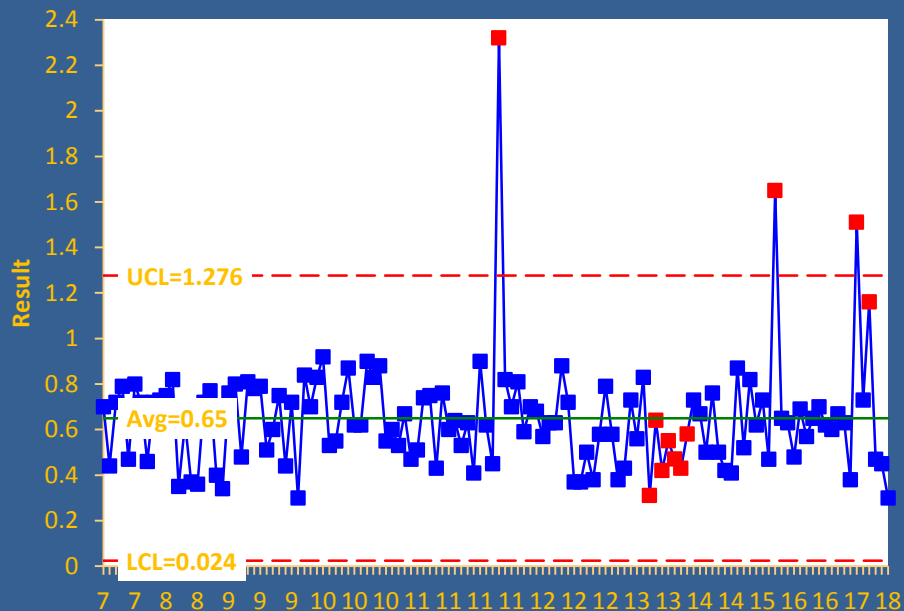
6/18/2018

Pathology Informatics 2016

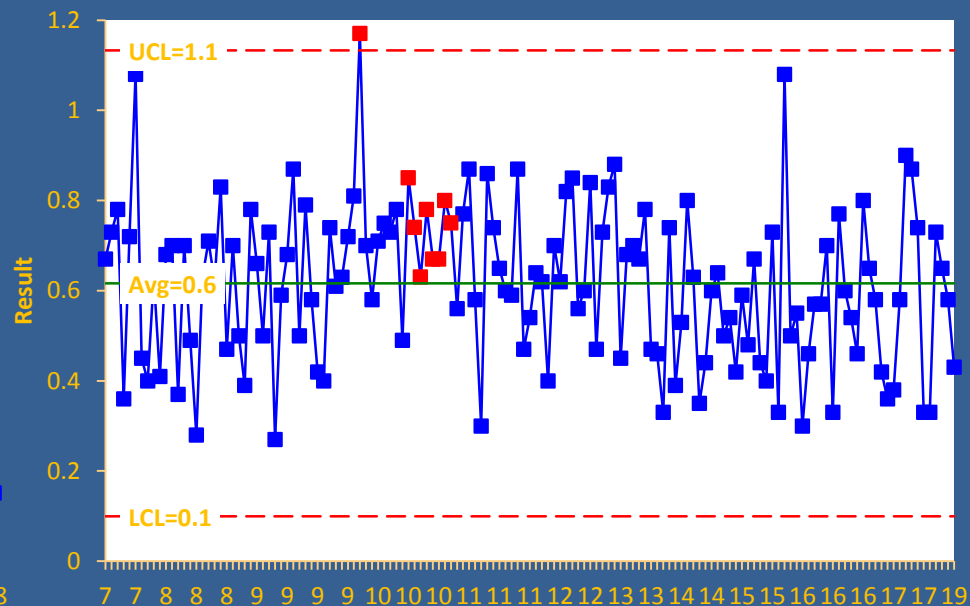
Statistics for 4/26/2016 Cancer Center (XCCB)



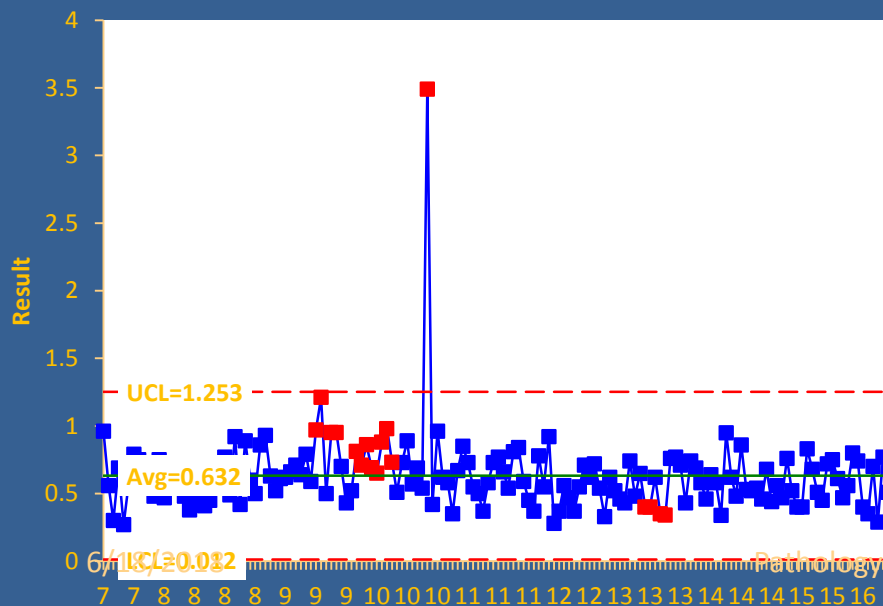
Brighton (XBBD)



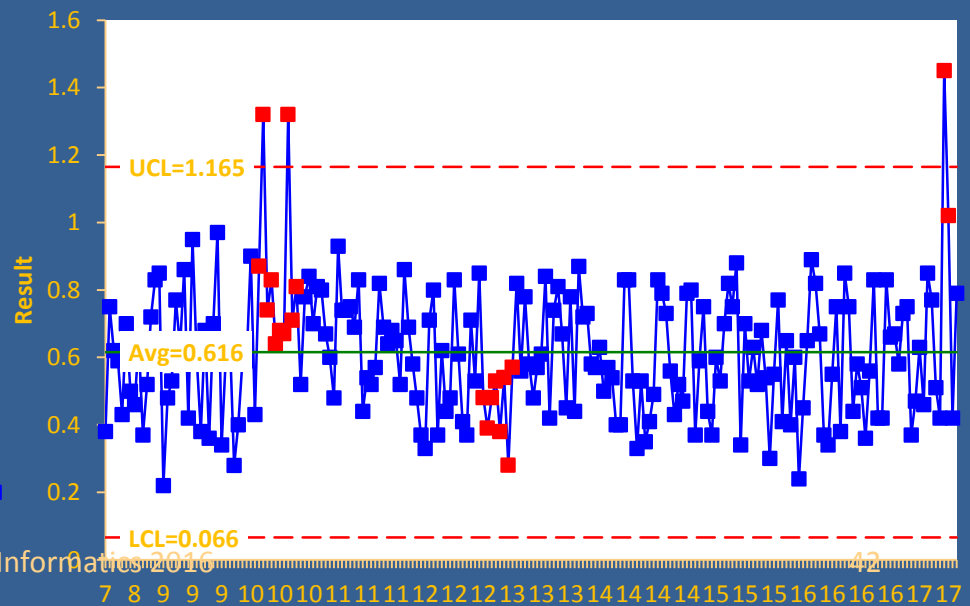
East Ann Arbor (XEAB)



Childrens and Womens (XMBD)



Taubman 3rd Floor (XTB3)

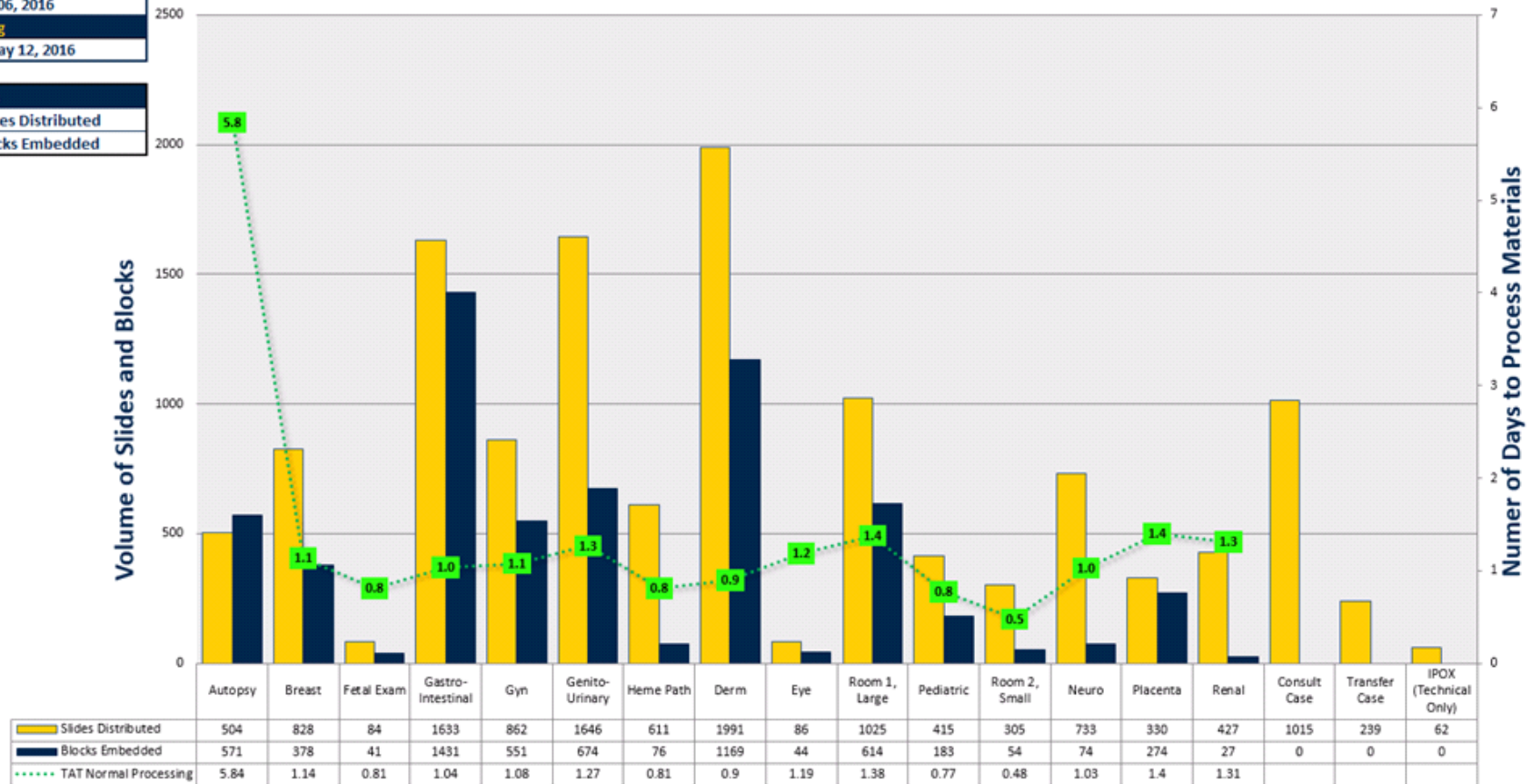


Histology Dashboard

Anatomic Pathology Histology Process Timing Averages

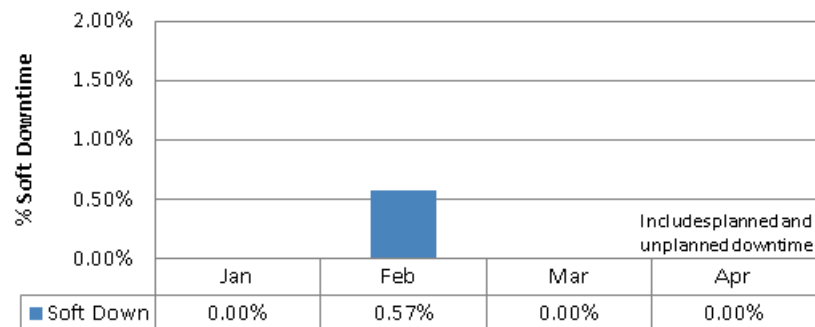
Work Starting
Friday, May 06, 2016
Work Ending
Thursday, May 12, 2016

Week Totals
12,797 Slides Distributed
6,161 Blocks Embedded

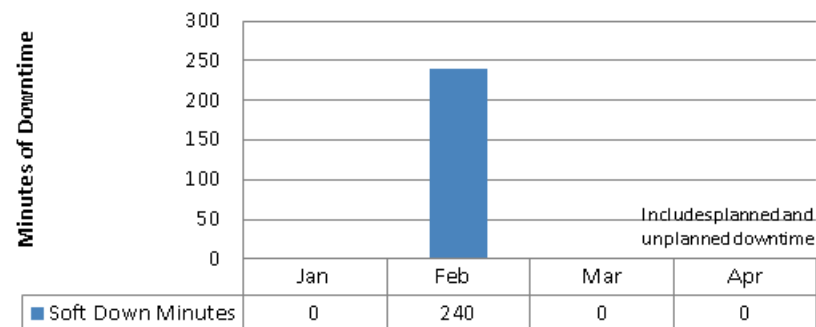


LIS Downtime Statistics

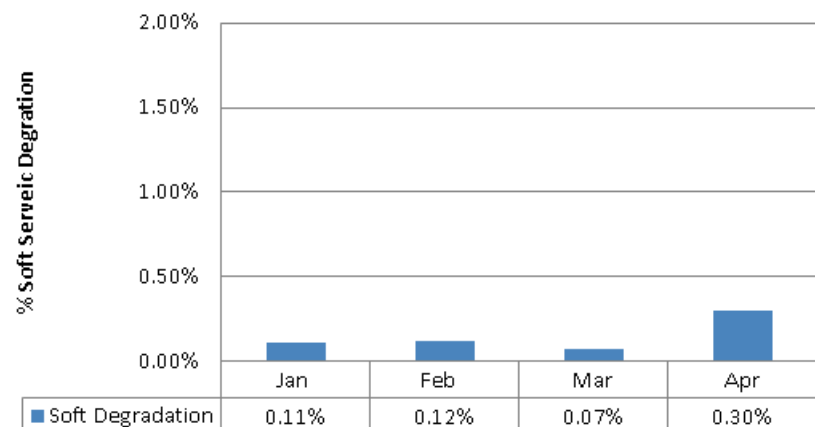
2016 LIS Downtime



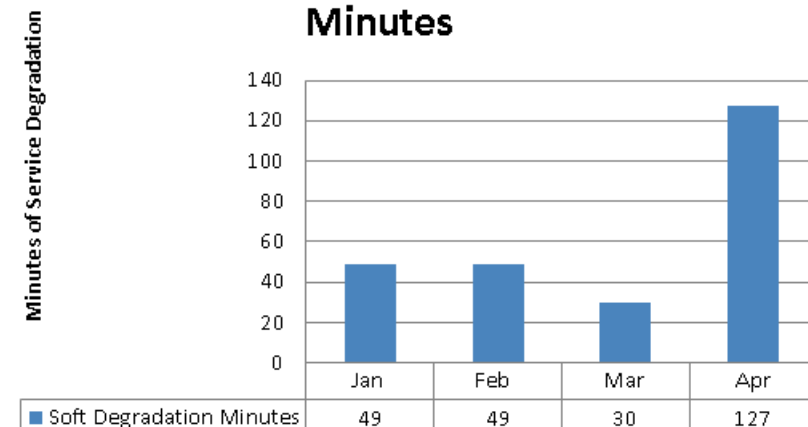
2016 LIS Downtime Minutes



2016 LIS Service Degredation



2016 LIS Service Degradation Minutes



Software Upgrades

- [TO DO List](#)
- Institutional change control
- Departmental communication
- Testing team readiness
- Vendor contacts
- Downtime procedures
- Fan out notifications
- Conference lines
- All clear communication



PROJECT MANAGEMENT FOR LIS IMPLEMENTATION

The People

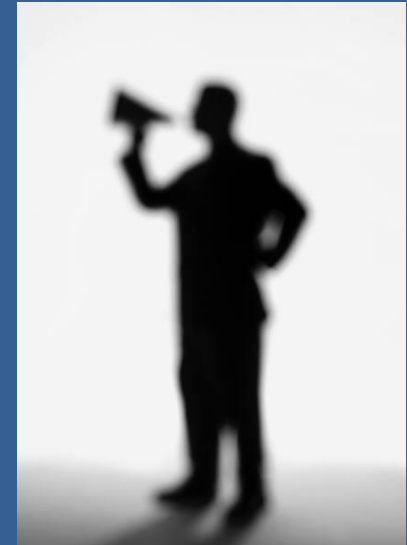


The Project Director

- MD - Pathologist and/or Pathology Resident
- Manages the politics and pressures and provides the clout at the institutional level to resolve major issues
- Provides MD representation at high level executive IT committees in the hospital
- Communicates progress or concerns at departmental AP and CP faculty meetings
- Engages the LIS vendor leadership to resolve complex implementation issues and to kindle development relationships when appropriate

The Project Manager

- Works to ensure top management commitment for the project
- Forms the project teams
- Coordinates all project activities
 - Overall project planning
 - Internal operational meetings
 - Manages the project plan and project documents
 - Training schedules
 - Database build activities
 - Problem and issue tracking
 - Testing and validation activities
 - Implementation schedules
- Ensures the project is delivered with the functionality and workflow required, on time, and within the budget.
- Communicates and provides status reports



The Teams

- Laboratory Core team
 - Lab IT support staff
 - Medical Technologists
 - Desktop support
 - Systems support
- Interface team
 - HIS, CPOE, Outreach portals, etc.
- Laboratory Leadership team
 - Laboratory directors
 - Laboratory managers



Forming the Teams

- Medical technologists with an aptitude for information management
 - Horizontal integration into the laboratories
- Central IT staff with desire to change job roles
- Internal vs. external candidates
- Consultants
- Experienced vs. inexperienced
- Full time project staff vs. staff with existing operational responsibilities

Team Leads

- Coordinate the subprojects of the implementation
 - CP – general lab, blood bank, microbiology
 - AP – Anatomical pathology, cytology, genetics, flow
 - Data cross load
 - Desktop and peripherals
 - Patient and management reports
 - Outreach
 - Specimen management
 - System management
 - Testing and validation

Consultants

- Consultants
 - Extra lead time
 - On boarding and off boarding
 - Risk that the operational support staff will lack the depth of knowledge necessary to maintain the systems post implementation
 - Dedicated staff that can focus on the project
 - May become eligible candidates for permanent employment

Directors, Managers, and Top Leadership

- Must ensure that the project is visible at the highest level of the hospital
- Must ensure that upper management supports, embraces, and is made aware of the degree of effort required to implement an LIS
- Must include MD leadership because many of the business decisions and priorities are established by MDs in the healthcare environment



VENDOR RELATIONSHIPS

Importance of a DETAILED Contract



- Very important to ensure the LIS contract is very detailed
 - Don't assume basic functionality exists
 - What instruments will be interfaced initially?
 - What HIS interfaces will be included?
- Development partnerships between clients and vendors must have clarity
- Maintenance costs

Vendor Relationships

- Important to establish a good working relationship with vendor leadership; especially important with LIS software vendors
- Must ensure you have an advocate who will work well with you to prioritize and escalate issues that are important at your institution
- Outline expectations with extreme clarity
- Fully understand the vendor's cost structure
- Terminology and content of contracts is very important
- Consider development partnerships

THANK YOU

