

TAT *Express*

Ron Moccio, Process Owner, Manager General Lab

Poster Presenter:

John Olinski, Senior Medical Technologist

Baystate  Reference Laboratories

Define: Project Charter

Business Case: Work areas are cluttered and inefficient. Increased organizational workflow needed to free up space to improve process. The inefficiencies leads to increase TAT, compromise Quality and increased staff frustration.

Problem Statement: Stat TAT for BPreg and Lytes is greater than 60 minutes and Troponin's is greater than 40 minutes for 90% of results. Goal is less than 50 minutes. Effect is delayed ED patient treatment & through put.

Goal: Reduce ED BPregs and Lytes TAT to less than 50 minutes and Troponin's to less than 30 minutes, 95% of the time.

In Scope: Process starts when Chemistry sample is received in the LIS by LCRI and ends when the result is accepted in LIS by Chemistry Tech.

Out of Scope: All tests other than monitored tests and non ED locations and Routine tests from ED.

Define: Chemistry Project Team

Team Members:

Sponsor: Mark Provost

Champion: Bob Bourgeault

Process Owner: Ron Moccio

Subject Matter Experts:

Recorder – Lisa Piepul

Photographer – Kathy Walsh

Communications – Jim Shields, Bob Cross,
Norman Ramirez, Janet Polito

Ad Hoc: Rest of Department Lab Employees



Estimated Timeline:

Project Start Date: October 16, 2007

Target End Date: December 16, 2007

Process Improvement Method:

Lean Six Sigma Kaizen Event

Define: Communication Plan

Chemistry Project Communication Plan				
Document	Receipients	Responsibilities	Update Frequency	Actions Taken
LIS Mailbox Note	Technical Staff, LCRI Staff	Jim, Bob, Norman, Janet	Weekly	End of week summary of activities being sent out, ongoing
Staff Department Meeting	Technical Staff	Jim (Days), Ron (Eves), Bob (Nights)	Monthly	Monthly ongoing, weekly as needed
Bulletin Board	All BRL Employees	Lisa, Kathy	As Needed	Information up, to be updated when needed
Word-of-Mouth	Medical Director, Champion, Sponsor	Ron	As Needed	Ongoing communication to Champion and Medical Director, Sponsor when available, request to share Project details externally (working on communicating with ER)
Lab Links	BRL Employees	Jim, Bob, Norm, Janet	Quarterly	Short article to be written and included in Nov. publication
eMail	Chemistry Management	Ron	As Needed	Project discussed at formal bi-weekly meeting and at other times as needed

Define: Chemistry SIPOC

Supplier	Input	Process	Output	Customer	Needs	Requirements	Measurements
ED Physicians	Test Request	Specimen Received in LCRI in LIS	Results	Emergency Department	Results	Accurate Results	TAT
ED Patient	Specimen	Specimen to Chemistry Processor	Specimen			Fast Results	
ED Tech Associate							
		Deliver to Work-					
		EL 2010 (Troponin)					
		MPA (E170 & P Mod)					
		Result Accepted in LIS					

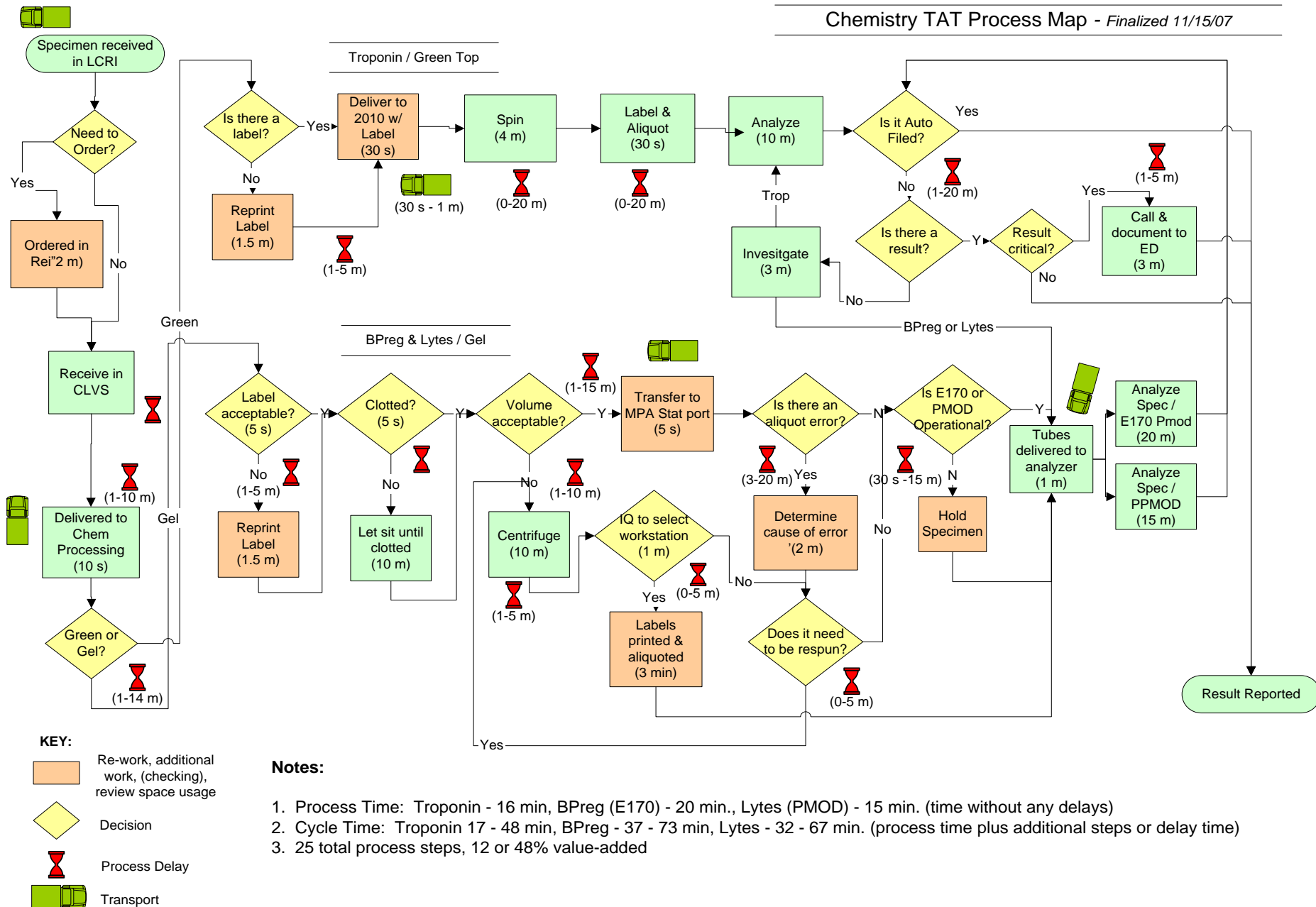
Define/Measure: Brainstorming 'Pain Points'

Chemistry Brainstorming Exercise Notes

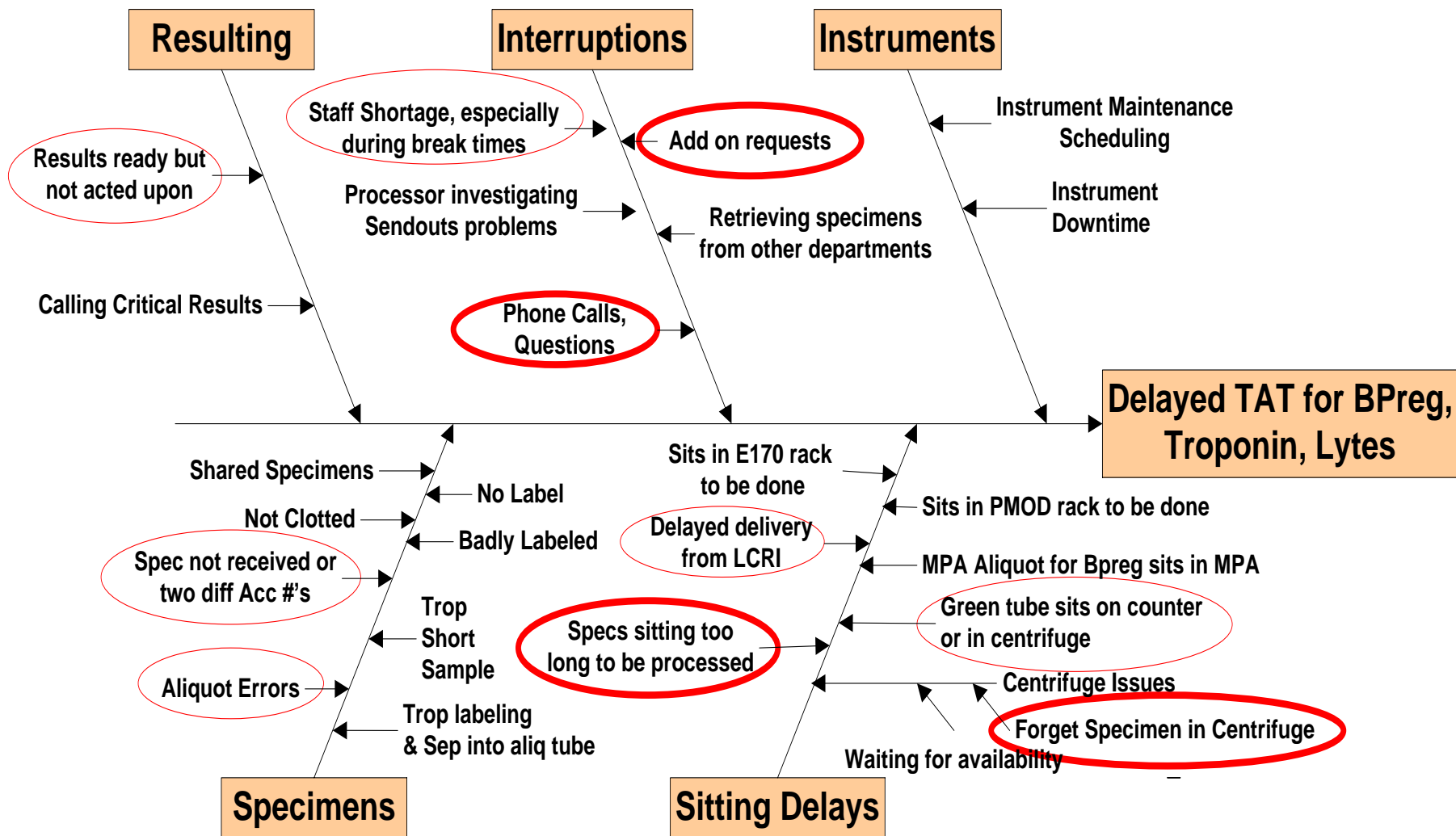
Analyzer Location & Work Flow	Add On's	Processing Space & Organization
Integra Analyzer, no space, long walk	Add on's ordering, retrieving, deleting	Processing not enough benchspace for routine processing
Integra area no bench space, too close to PPMOD	Trying to come up with a better method of finding lost specimens	Lack of Processing space
Location of Analyzers		Need more space for delivered samples
Asile between INT & MODPP needs to be wider		Ref Labs errors Proc Lab Corp
Key instruments needed for 3rd shift very far apart		
Trop TQ's long walk		
Traffic flow through lab		
TDX/FLX area and Amniotic fluid benches - poorly organized		

Capacity	Misc. Items
Pmods unable to handle workload	Making sure our Stats & Routines get to the correct places & in a timely manner
Working output buffer racks for MPA	Communication between LCRI & Chemistry, Keeping it open
Finding a centralized location for sample to be distributed to instruments	Telephone calls interfere with Processors completing work
Organization of urines original cups	

Measure: Current Chemistry Process Flow



Analyze: Cause and Effect Diagram



Analyze: Baseline Measures

		1/1/07 to 1/14/07	4/1/07 to 4/14/07	7/15/07 to 7/30/07	10/1/07 to 10/14/07
Troponin	Test Volume	586	677	659	595
	TAT for 90%	47 min	43 min	47 min	45 min
	TAT for 95%	59 min	52 min	55 min	52 min
Lytes	Test Volume	1,468	1,627	1,692	1,485
	TAT for 90%	68 min	65 min	65 min	68 min
	TAT for 95%	79 min	81 min	74 min	78 min
BPreg	Test Volume	142	161	185	165
	TAT for 90%	110 min	84 min	93 min	101 min
	TAT for 95%	129 min	100 min	117 min	110 min

Current Goal:

Resulted within 60 min.
90% of the time

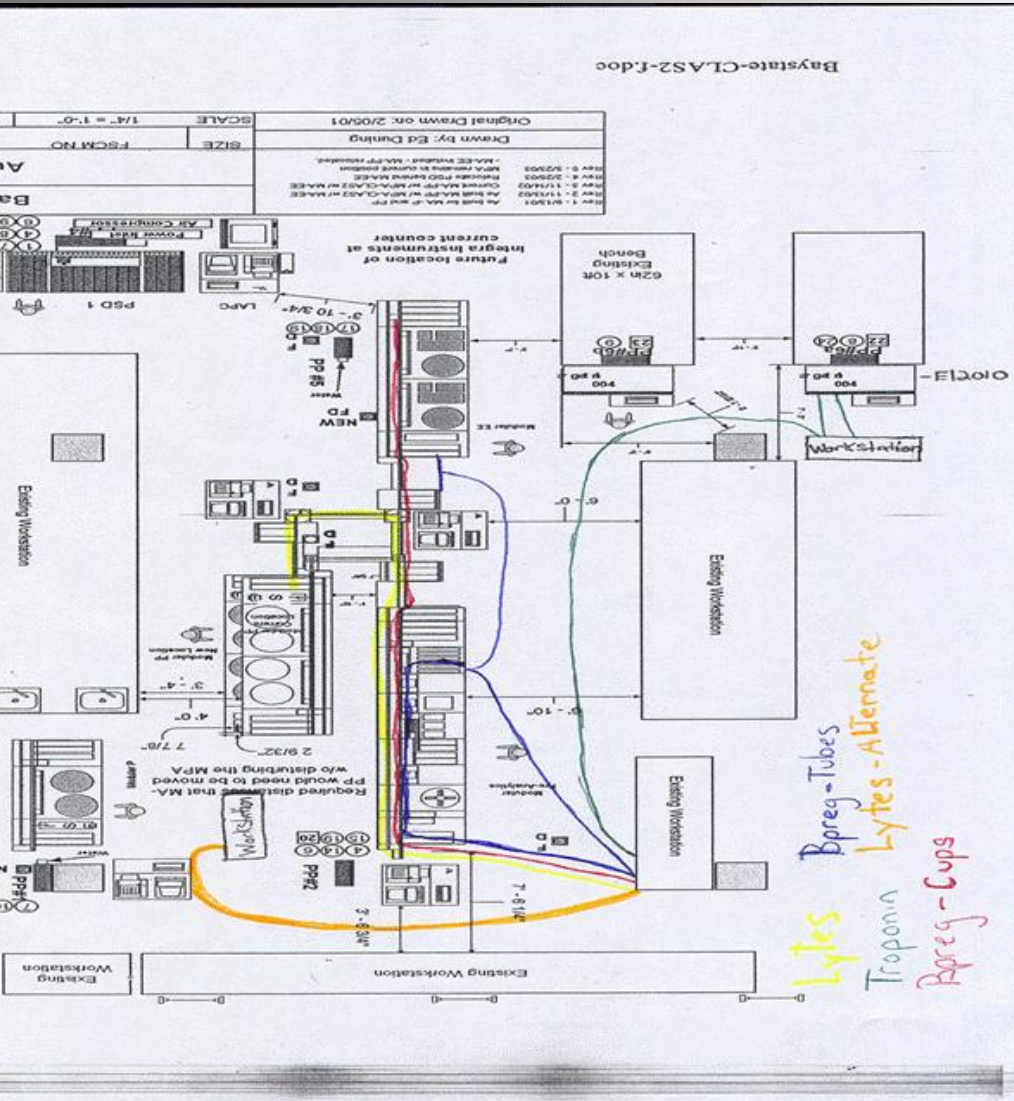
Future Goal:

Lytes & BPreg resulted
Within 50 min.,
Troponin's within 30 min.,
95% of the time

Impressions:

1. Poor TAT performance – Why?
2. Very eye opening, much room for improvement
3. Why the difference between Lytes & BPregs?
4. Troponin's only test meeting current goal

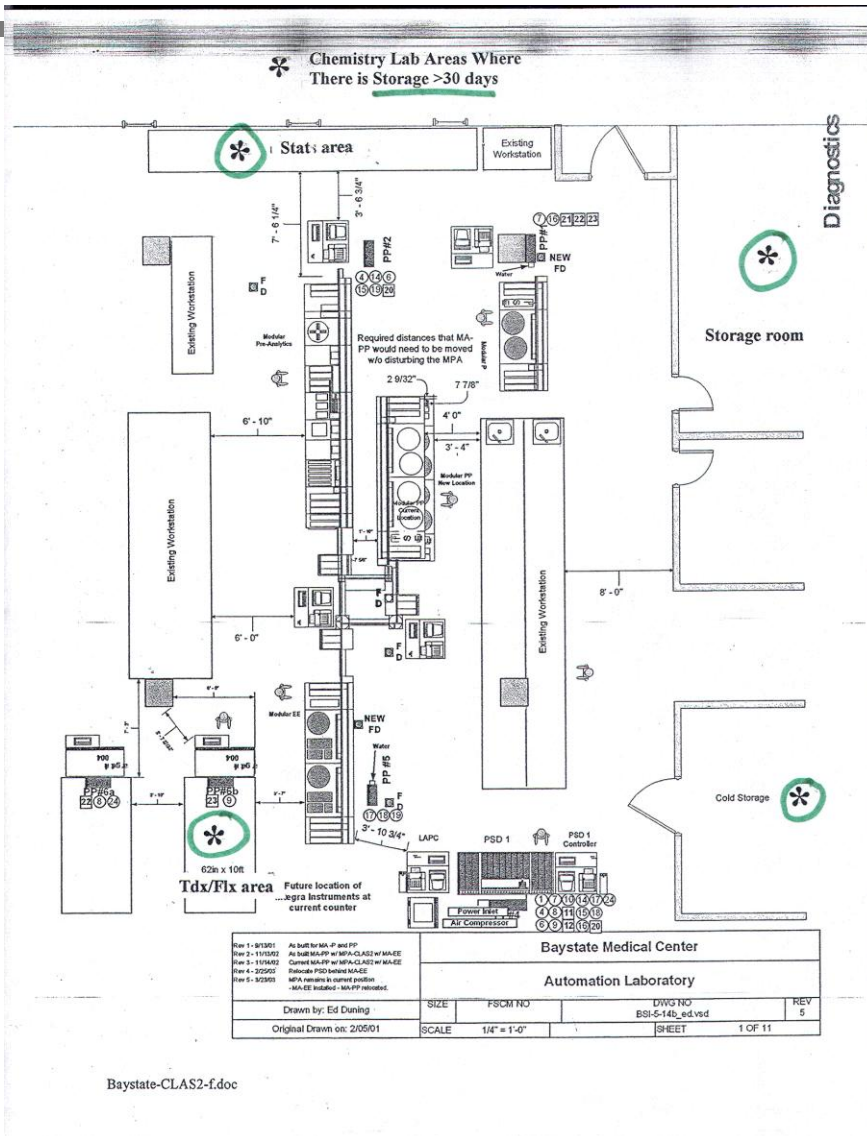
Analyze: Spaghetti Map of Test Workflow



Impressions:

1. Looks rather efficient – don't believe it
2. Shift to shift workflow variation is minimal
3. Excessive distance from Processing to 2010 for Troponin
4. Excessive distance for Lytes when PP down, distance for PMOD Maint Lytes
5. When MPA is on tubes, BPreg can sit in sample sorter too long
6. Trop centrifuge is a walk, therapeutic for Stat person
7. BPreg chance for waiting during EMOC Maint

Analyze: Inventory Stores > 1 Month Supply



Impressions:

1. No problem, more space with declutter
2. Main storage too far from instruments
3. Clean out drawers / cabinetry
4. Keep more working supplies at bench

Analyze: TAT Case Study Review (3 Studies/Shift)

STAT ED BPREG CASE STUDY

Shortest TAT

RECEIVED IN LAB: 0925

SEEN ON THE EL2010 ANALYZER: 0931

RESULT AVAILABLE: 0953

RESULT VERIFIED: 0956

TOTAL TIME: 31 MIN GOAL MET!! 19 MIN < 50 MAX

STAT ED BPREG CASE STUDY

Longest TAT

RECEIVED IN LAB 6:55 PM

SEEN ON E170 ANALYZER 7:35 PM

RESULT AVAILABLE 7:56 PM

RESULT VERIFIED 8:00 PM

TOTAL TIME: 65 MIN SHORT DRAW WHICH RESULTED
IN PROCESS DELAY

Impressions: Process delays occur in two main areas (1) time between specimen receipt in LCRI to time on analyzer,(2) PMOD aliquot error occurrence

Improve: Brainstorming *Potential* Solutions

				Selection Criteria					
Area	Proposed Solution	Valid?	Able to Commit ?	High Impact	Realistic	Standardizes a Process	Employee Accept	Implement in < 30 days	Low Cost
BPreg	Change B Preg to Qualitative Test done on 2010	?	Y	Y	Y	Y	Y/N	N	Y
BPreg	For BPreg on 2nd shift, rUn on GC on 2010	N	?	N	Y	N	Y/N	Y	Y/N
Trop	Change to gel green tube	?	N	Y/N	Y	Y	Y/N	N	Y/N
Trop	Reassign Trop testing to Slot Person	?	?	Y	Y	Y	Y/N	N	Y
Trop	Trop to Ref area	?	N	Y/N	Y	Y	Y/N	N	Y
Gen	Have critical results called from Call Center	N	N	N	N	Y	Y/N	N	N
Gen	Stat centrifuge in Stat area / Stat Spin	?	Y	Y	Y	Y	Y/N	N	N
Gen	Educate LCRI about TAT's	Y	Y	N	Y	Y	Y/N	Y	Y
Gen	logs	?	Y	Y/N	Y	N	N	Y	Y
Gen	TAT Graph	Y	Y	Y	Y	Y	Y/N	Y	Y
Gen	Move Proc to Stats	?	N	N	N	Y	N	N	N
Gen	Reduce calls transferred from LCRI	Y	Y	Y	Y	Y	Y/N	Y	Y
Gen	Educate Employees on areas that specimens sit	Y	Y	Y	Y	Y	Y/N	Y	Y
Gen	Strict Stat education, make employees aware of TAT & goals	Y	Y	Y	Y	Y	Y/N	Y	Y
Gen	Shorter barcode labels	Y	N	Y	Y	Y	Y/N	N	Y
Gen	Eliminating & decreasing phone calls	Y	Y	Y	Y/N	Y	Y/N	N	Y/N
Gen	Pmod on track	Y	N	Y	Y/N	Y	Y/N	N	N
Gen	Autofile for other Chem tests	Y	Y	Y	Y	Y	Y/N	Y	Y

Above initial *Potential* solutions list shared with department, feedback used to expand list and assist in finalize prioritization of actions to be taken.

Improve: Implementation Plan

	Solution Description	Task Leader(s)	Comments	Week of 10/29	Week of 11/5	Week of 11/12	Week of 11/19	Week of 11/26	Week of 12/3	Week of 12/10	Week of 12/17	Week of 12/24	Later
	Solutions to Impact Overall Department												
1	TAT Graph / Completion	Robert	Weekly in place, to add daily Lytes TAT and enhance graphics Daily LYTES TAT by shift is being posted for techs review.		C								
2	Reduce transferred calls LCRI,	Lisa	Jim to monitor, collect call type data to identify improvement opportunities							C			
3	Educate on specimens sitting	Norman & Kathy-1st, Bob & Janet- 2nd	Case studies are being posted identifying where the specimens are sitting which results in an increased TAT. Also the case studies for the fastest TAT are also being posted.						C				
4	Autofile Chemistry Test	Ron			C								
5	Stat centrifuge in Stat area / Stat Spin Reduced the centrifuge spin time from 10 to 6 minutes.	Norman	Reduced the centrifuge spin time from 10 to 6 minutes.							C			
6	Ensure overdue logs are reviewed timely	Ron										C	
7	Strict Stat education, increase employee awareness of TAT & goals	Team	Done in staff meetings & case studies, etc.			C							
8	Acknowledge & celebrate success	Jim	Include all shifts e-mail sent to employees letting them know of successes, Feb Lean Showcase										C
9	Monitor MPA errors to identify opportunities for improvement	Norman	To develop the monitoring process										C
10	Reinforce the use of MPA's Stat port	Kathy						C					
11	LCRI to 'receive' specimen prior to chem delivery	Ron	Discussion with Day Shift Lead, communicated to staff		C								
12	Improve tracking of primary tube location	Jim	Primarily Immunology shared specimen needs Immunology no longer takes the primary tube without replacing it with a tube indicating the specimen is in Immunology.				C						
13	LCRI time from receipt to Chem drop off monitoring	Lisa, Ron	Ron to work with Lisa to develop an audit process, Review has indicated the samples are not sitting in LCRI after being received in the lab.								C		
14	Review job duties once 2010 moved to assure 'load leveling'	Bob, Janrt, Kathy	To be reviewed on all 3 shifts, All three shift have developed a plan for operating once the Elecsys 2010 is moved to the STAT area.						C				
15	Minimize the reach to place specimen on STAT MPA port	Kathy	Current situation shorter staff need to stretch more than desired to gain access to port. The TSM computer has been relocated to allow better access to the MPA Stat Port.					C					
16	Declutter Integra	Jim	Done in staff meetings & case studies, etc.			C							
17	Declutter Stat bench	Kathy											C
18	Declutter Processing	Kathy, Norm				C							
19	Declutter 2010	Kathy											C
20	Declutter Reference Lab/Urine Processing	Nomr											C

Improve: Implementation Plan

	Solution Description	Task Leader(s)	Comments	Week of 10/29	Week of 11/5	Week of 11/12	Week of 11/19	Week of 11/26	Week of 12/3	Week of 12/10	Week of 12/17	Week of 12/24	Later
	Solutions to Impact Lytes TAT												
21	Utilize Lytes TAT as a daily STAT performance indicator, post results	Bob	Lytes selected due to highest daily volume. Daily LYTES TAT by shift is being posted for techs review.					C					
	Solutions to Impact Trop TAT												
22	Implement buzzer to alert 2010 operator of centrifuge completion	Kathy	Reduces sample wait time					C					
23	Put sample in centrifuge instead of on bench	Jim	Reduces sample wait time				C						
24	LCRI announce Trop arrival like trauma/ABG's	Lisa	Jim to communicate to Lisa					C					
25	Relocate 2010 to Stat area	Ron	Anticipate move by Dec. 1st										
	Solutions to Impact BPreReg TAT												
26	Change BPreReg to qualitative test, done on 2010	Kathy, Ron	Completion anticipated in early 2008										
	Solutions to Investigate Further												
A	Review Stat Processor and Routine Processor duties / hand offs in handling Stat add ons	Janet	To be investigated.						C				
						= Proposed timeline				Minor timeline delay			
						= In process or finished				Major timeline delay			

24% or 6 of 25 Process Improvement Solutions Completed ('C') Within 3 Weeks
72% or 18 of 25 Solutions Completed Within 8 Weeks

100% or 25 of 25 Solutions Completed Within Next 6 months

Improve: Quick Hits

1. Relocated the processing section refrigerator from under the processing bench to next to the MPA OBM.
2. Removed unnecessary racks from the Immulite 2000 work area
3. Relocated the monitor used by the Roche service represented from the Reference Lab Send outs bench to a cart next to the E Module console.
4. Replaced the large sharp containers with small containers.
5. Attempting to remove Cardiac Troponin T Readers.
6. Relocated Hamilton Auto dilutor to a under the counter cabinet

Improve:

Workflow Redesign / Instrument Relocation

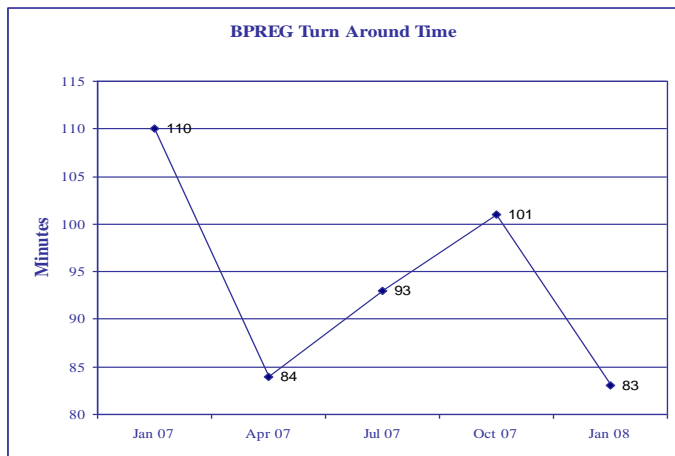
1. Approximately 120 Troponins per day
2. Travel distance reduced 3600 feet or 0.7 miles per day

BENEFIT:

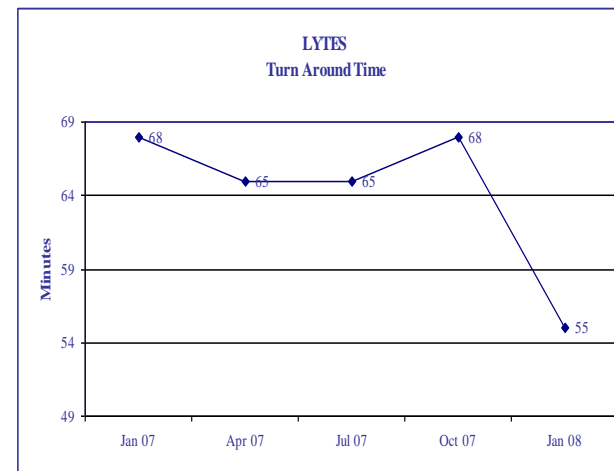
Reduced TAT results in patients diagnosed and treated faster

Increased patient and physician satisfaction

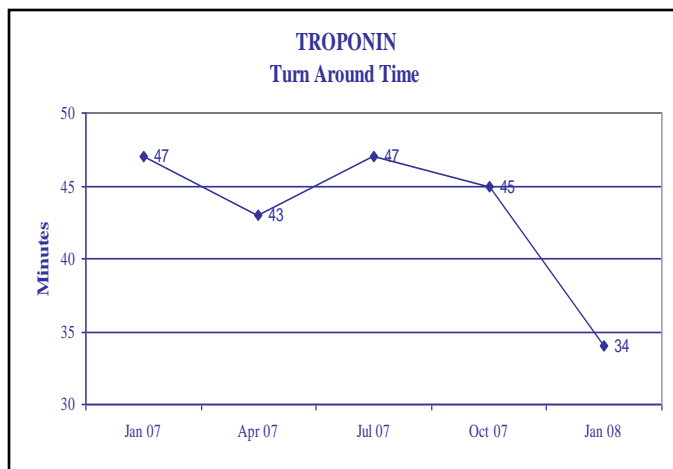
Improve: Monitoring TAT



Reduced Serum Pregs TAT 17% or 19 min



Reduced Lytes TAT 22% or 17 min



Reduced Troponin TAT 19% or 10 min

NOTE: Team realized initial project goals were too aggressive, needed to understand minimum process time and process limitations better. Future change of Serum Pregs from Quantitative to Qualitative procedure planned.

Control: Continuous Improvement

		10/1/07 to 10/14/07	12/1 to 12/14	2008 1/1 to 1/14	2/1 to 2/14	3/1 to 3/14	4/1 to 4/14	5/1 to 5/15	6/1 to 6/14	7/1 to 7/15	% Improvem ent (Oct to Jan)	% Improvem ent (Oct to Feb)	% Improvem ent (Oct to Mar)
Troponin	Test Volume	595	561	591	618	575	585	550	535	485			
	TAI min for 90%	45	39	34	32	32	35	35	34	32	24%	29%	29%
	TAI min for 95%	52	48	42	38	36	42	41	42	36	19%	27%	31%
Lytes	Test Volume	1,485	1,343	1,406	1,475	1,345	1,408	1,412	1,514	1441			
	TAI min for 90%	68	60	55	52	52	53	52	53	53	19%	24%	24%
	TAI min for 95%	78	71	61	60	61	61	59	63	59	22%	23%	22%
BPreg	Test Volume	165	141	163	158	164	129	161	58	55			
Quant	TAI min for 90%	101	74	83	69	68	86	66	81	83	18%	32%	33%
	TAI min for 95%	110	86	91	80	82	92	75	112	91	17%	27%	25%

BPreg	Test Volume								156			
Qual	TAI min for 90%	Change from quantitative to qualitative procedure resulted in major reduction.							32			68%
	TAI min for 95%								38			65%

Control: Continuous Improvement

- Reduced ED Serum Pregs TAT 17% or 19 min. initially, after implementation of a qualitative method, **further reduction of 53 min. with an overall reduction of 72 min. or 65%.** Goal achieved, average is 38 min. 95% of the time.
- Reduced ED Lytes TAT by 22% or 17 min. initially, **further reduction post Kaizen Event of 2 min., with an overall reduction of 19 min. or 24%.** Goal almost achieved, average is 59 min., 95% of the time – continued process improvement underway.
- Reduced Troponin TAT by 19% or 10 min. initially, **further reduction post Kaizen Event of 12 min., with an overall reduction of 22 min. or 31%.** Goal not achieved, average is 36 min., 95% of the time – continued process improvement underway.
- Increased staff satisfaction, engagement and workflow efficiency within technical work areas
- Increased ED satisfaction

Lessons Learned

- More than one way to look at things
- Initial decisions could be wrong
- Can't do everything as quickly as you would like to
- Some things that work on 3rd may not work on 1st
- Whole process is a good way to look at an issue, keeps you from cutting to the chase
- Quickly moving improvement process, things are being implemented
- Getting statistics for issues validate problems and assumptions
- A lot of people do not know what you think they know – i.e. TAT importance taken for granted
- Turning data into useable information – stimulates process improvement
- Learned new skills: brainstorming, use of sticky notes