

BRIGHAM HEALTH



BRIGHAM AND
WOMEN'S HOSPITAL

Installing New Automation and Analyzers in a Confined Lab Space: *Why Our Big Bang Approach Saved Implementation Time and Produced a Better TAT*

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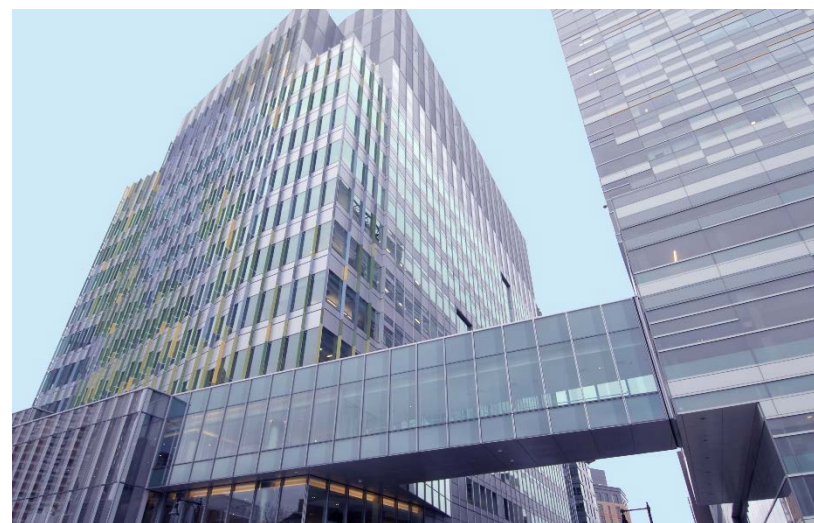


HARVARD MEDICAL SCHOOL
TEACHING HOSPITAL



Brigham and Women's Hospital

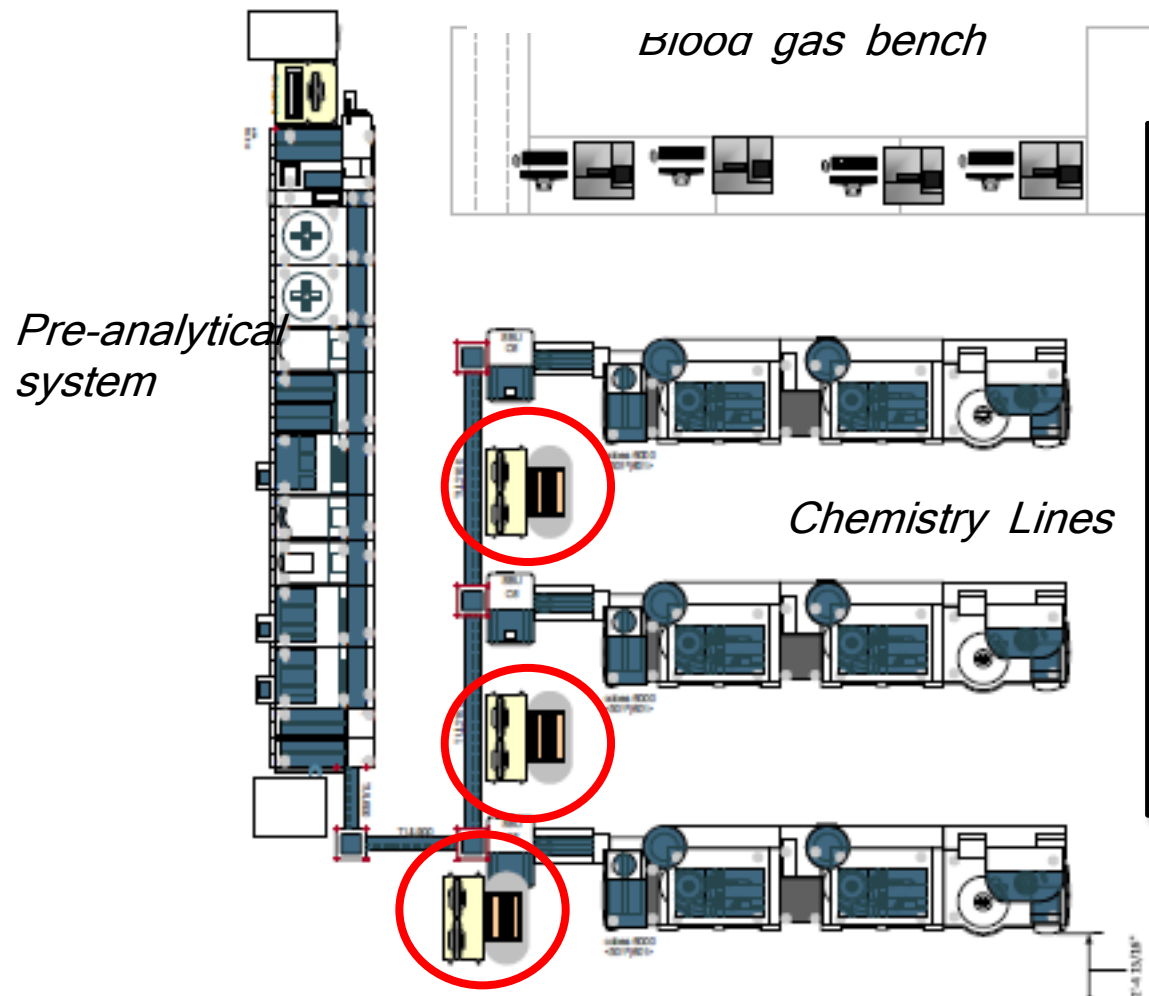
- 793-bed hospital
- Founding member of Partners Healthcare Network
 - 16 members
- Brigham and Women's (BWH) Clinical Pathology
 - 5000 specimens/day
 - Multiple analyzing areas



BWH Clinical Pathology Labs

- Chemistry
- Special Chemistry
- Hematology
- Special Hematology
- Coagulation
- Special Coagulation
- Mass Spectrometry
- Serum Protein Electrophoresis
- Reproductive Endocrinology
- Clinical Immunology
- Client Services (Reference lab)
- Microbiology

General Chemistry Area (Jan 2017)



Problems:

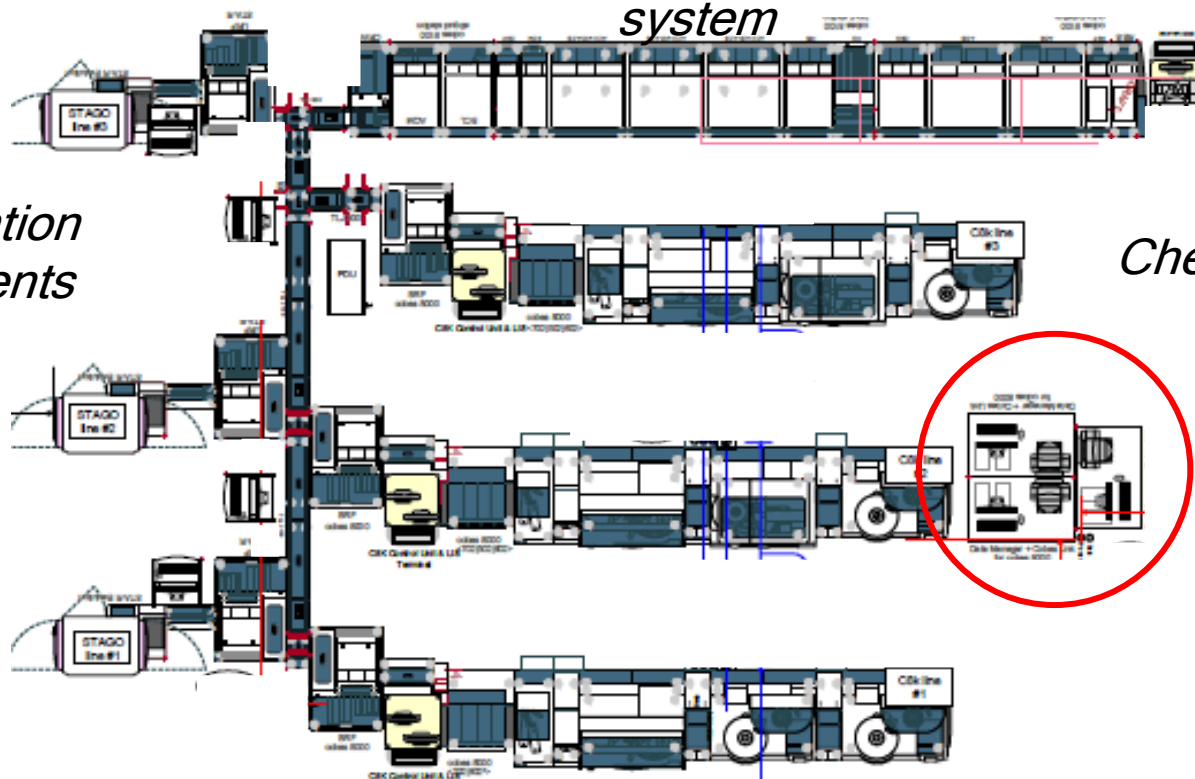
- 1. Frequent downtimes due to instrument age*
- 2. Shorten TAT, especially for ED*
- 3. Make line coverage more efficient (breaks, off shifts)*
- 4. Introduce pre-analytical automation to coagulation analyzing area*
- 5. Heavy foot traffic in specimen process area*

Future Configuration

*Pre-analytical
system*

*Coagulation
Instruments*

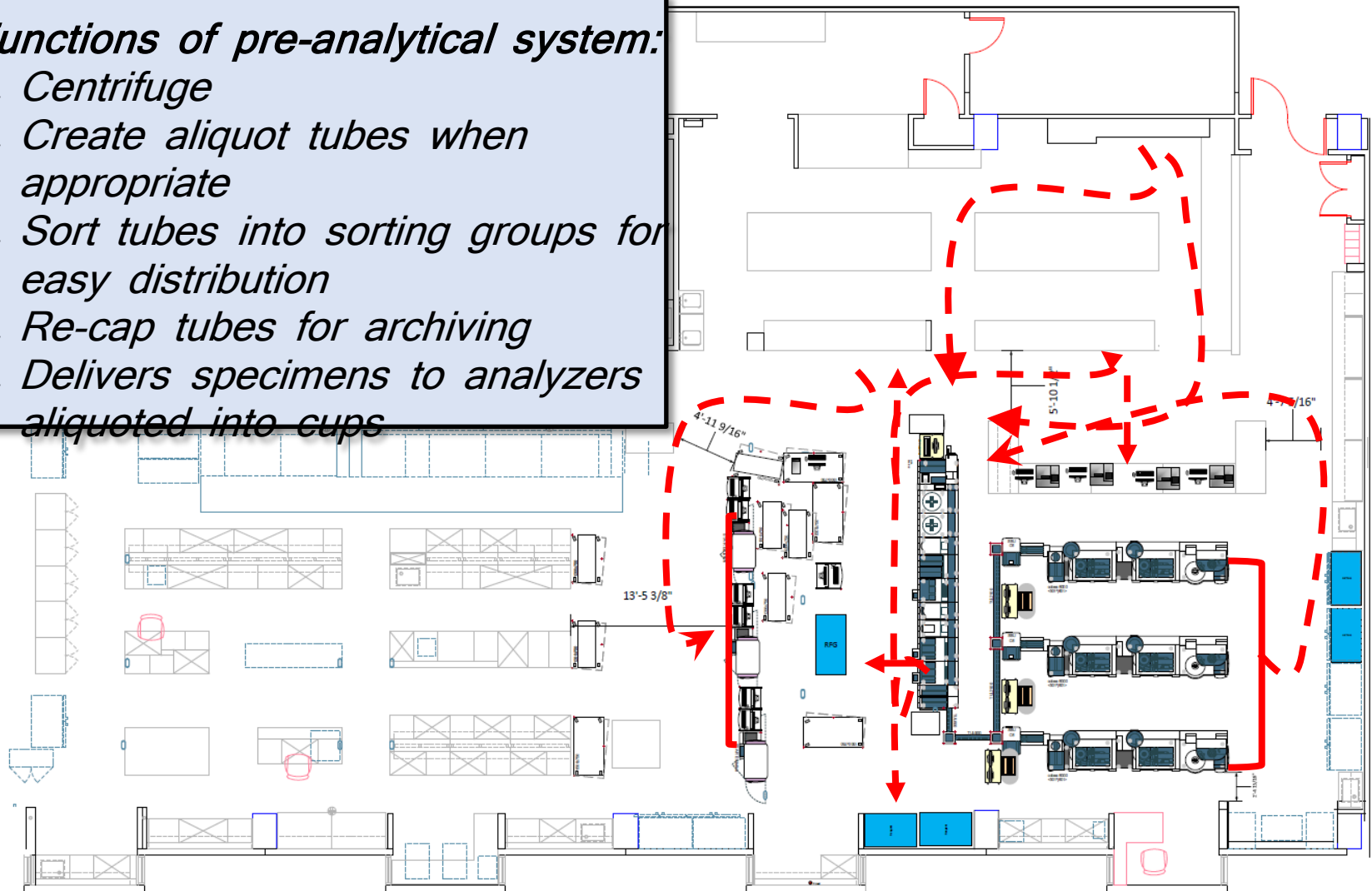
Chemistry Lines



Foot Traffic - current

Functions of pre-analytical system:

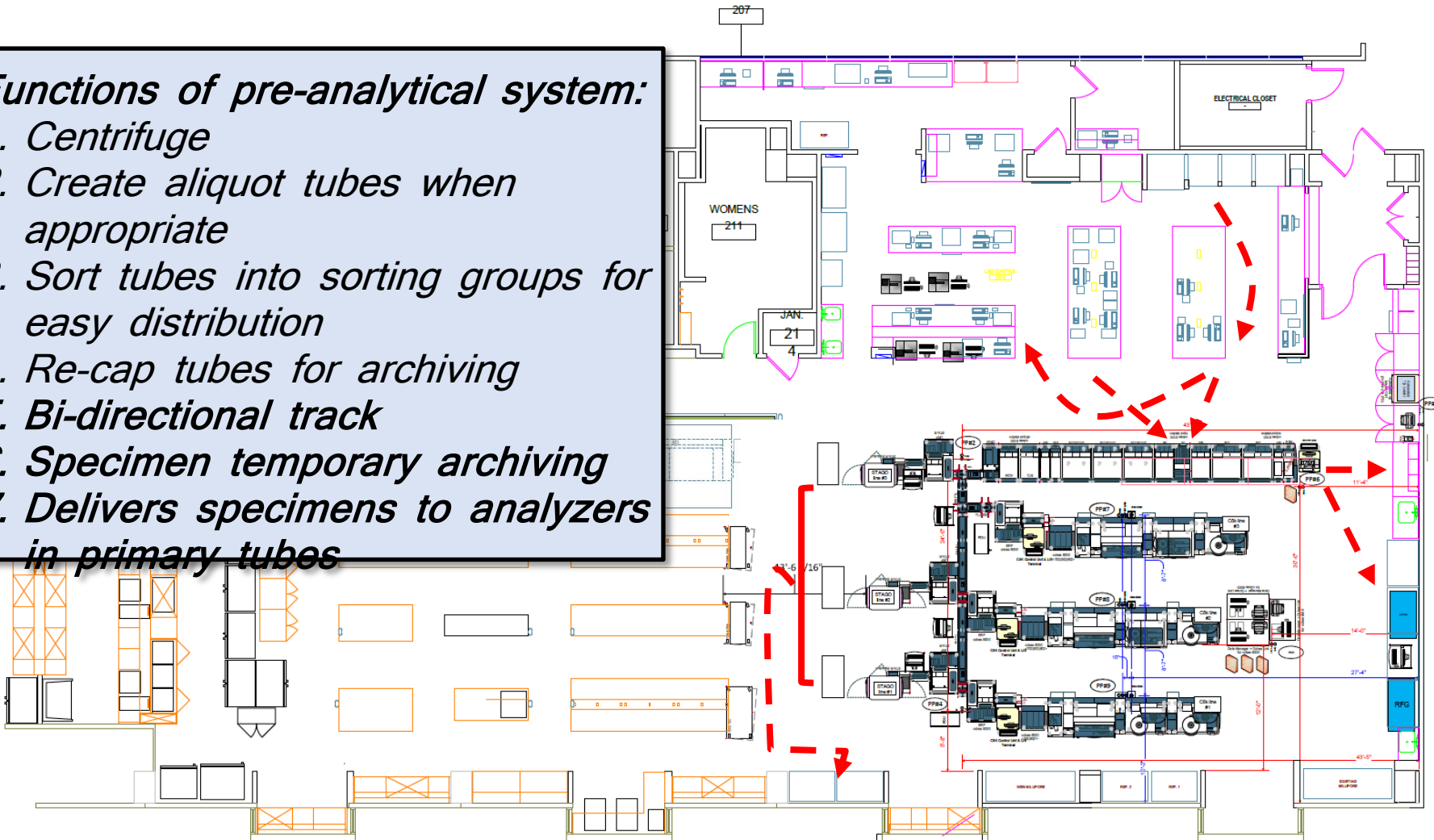
- 1. Centrifuge*
- 2. Create aliquot tubes when appropriate*
- 3. Sort tubes into sorting groups for easy distribution*
- 4. Re-cap tubes for archiving*
- 5. Delivers specimens to analyzers aliquoted into cups*



Foot Traffic - future

Functions of pre-analytical system:

- 1. Centrifuge*
- 2. Create aliquot tubes when appropriate*
- 3. Sort tubes into sorting groups for easy distribution*
- 4. Re-cap tubes for archiving*
- 5. Bi-directional track*
- 6. Specimen temporary archiving*
- 7. Delivers specimens to analyzers in primary tubes*





Implementation Stages

Baseline Configuration

- Where will we validate new instruments?
 - Do we have to validate again after moving to final location?
- How would it impact our timeline if we validated and replaced one line at a time?
- Can we go through major reconfiguration and construction in the lab without compromising services?



How did we make decisions?

Teams

- Project Manager from BWH
- Project Manager from vendor
- Establish core workgroups
 - General (all teams)
 - Ops group (TDs, supervisors, Medical Directors of 3 areas and Director of Operations)
 - **Define workflows and ask for what is possible!**
 - Construction (engineering, electric, plumbing, furniture)
 - IT (vendor and BWH)

Stage 1

6 months

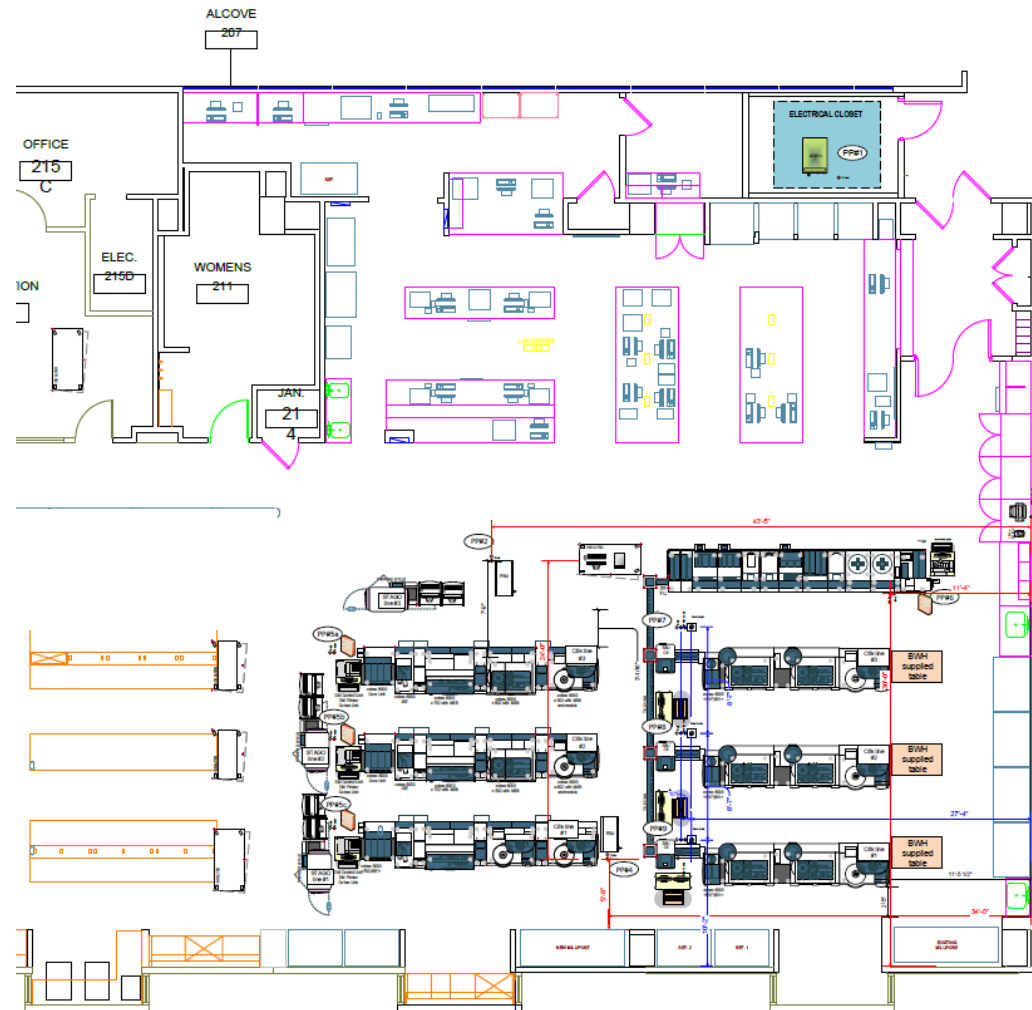
- Decisions
 - Ops group: validate all 3 lines simultaneously close to final location to avoid re-validation
 - Construction: prep new electrical room, start LCO renovation
- Actions
 - Stage 1A – LCO renovation
 - Move blood gas bench to make room for pre-analytical module (MPA)
 - Move MPA to make room for new lines



Stage 2

3 months

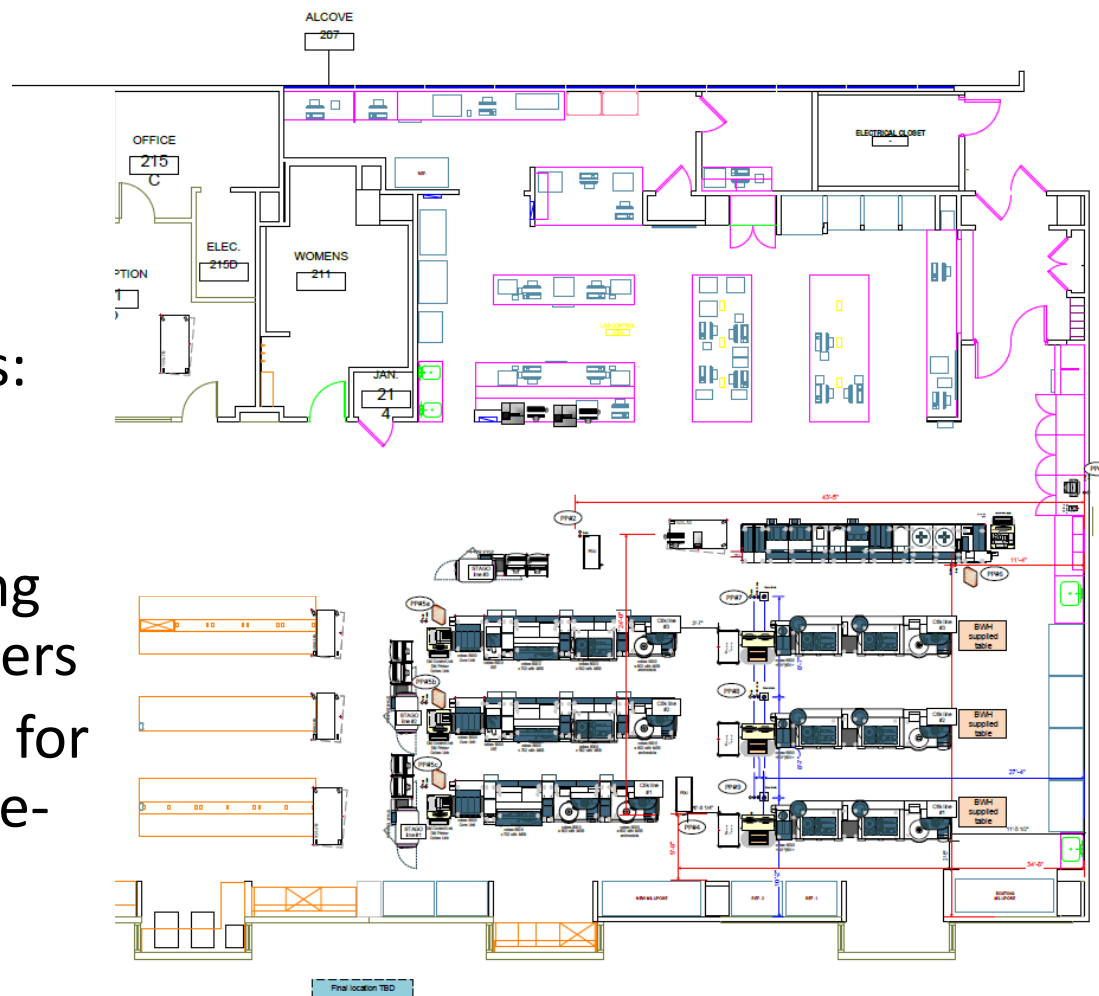
- MPA sill connected to chemistry lines
- Push coag instruments further west
- Install and begin validating and training all 3 lines of new chemistry instruments
 - Required installation of a second water source
 - Current filtration system could not handle both sets of instruments
 - Hospital water was contaminated
 - Required HVAC boost to control heat emitted from all the instruments



Stage 3

1 week

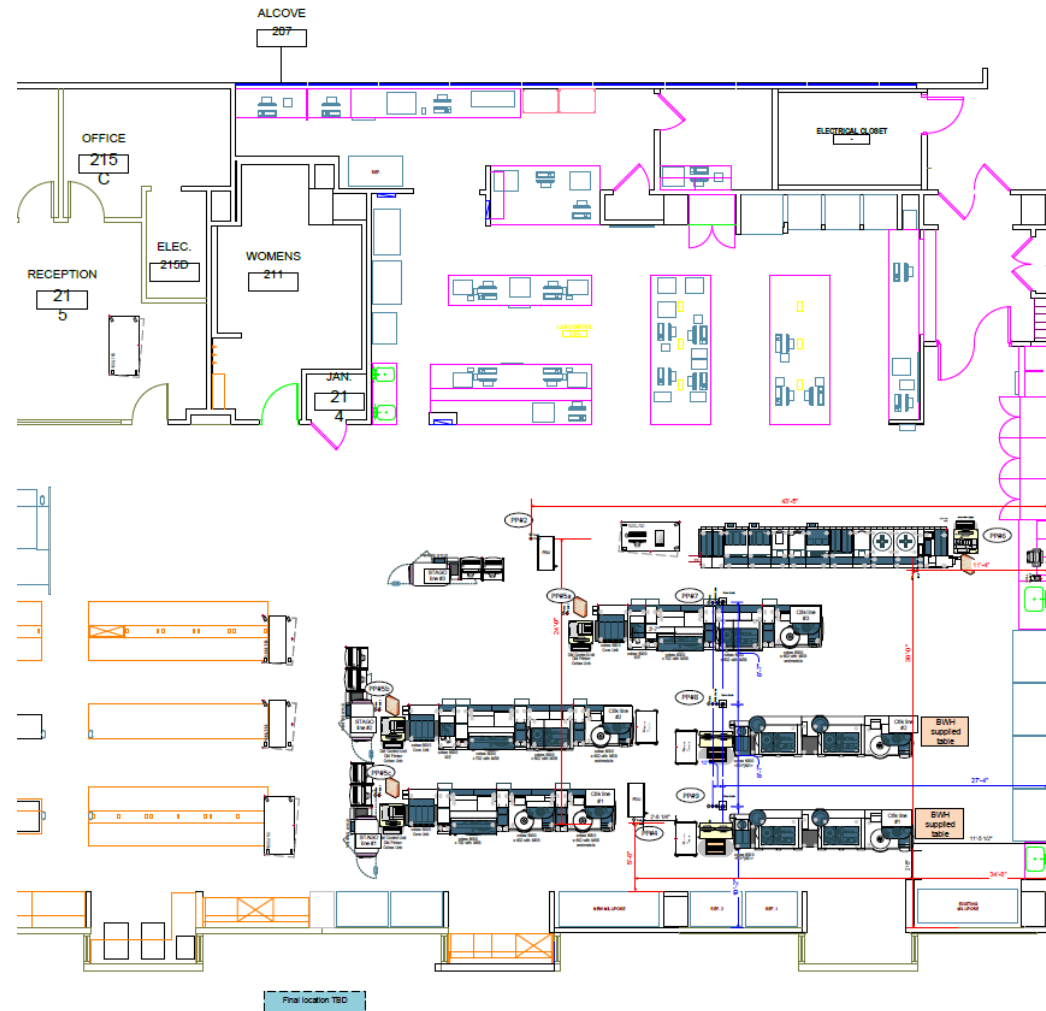
- Remove track to disconnect MPA from chemistry lines
- Unanticipated problems:
 - Increase in TAT for routine testing – manual step of taking specimens to analyzers
 - Decided to use MPA for just aliquoting and re-capping/archiving



Stage 4

2 weeks

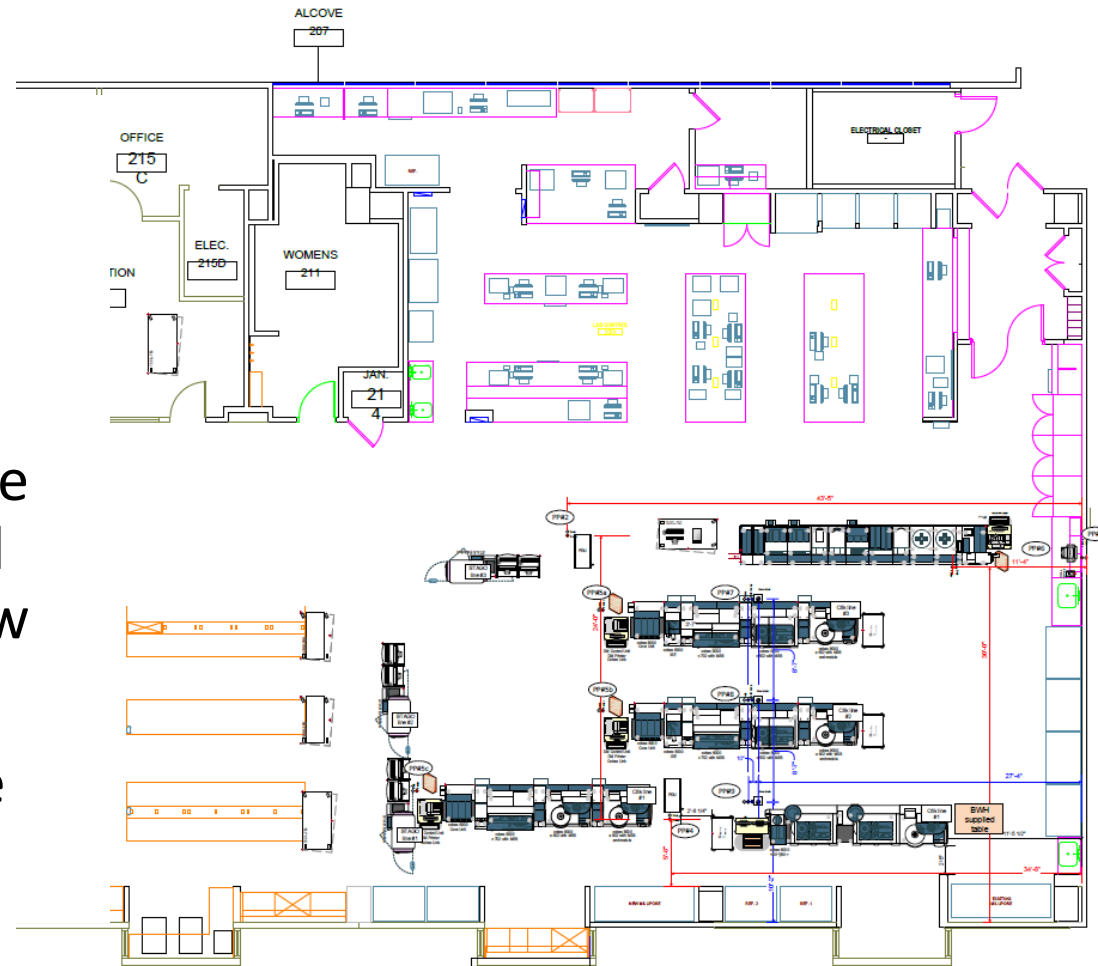
- Live lines:
 - Old 2
 - Old 1
 - New 1
- Made sure that complete test menu is covered (all tests validated on all new lines)
- Remove Old 3 and move New 3



Stage 5

1 week

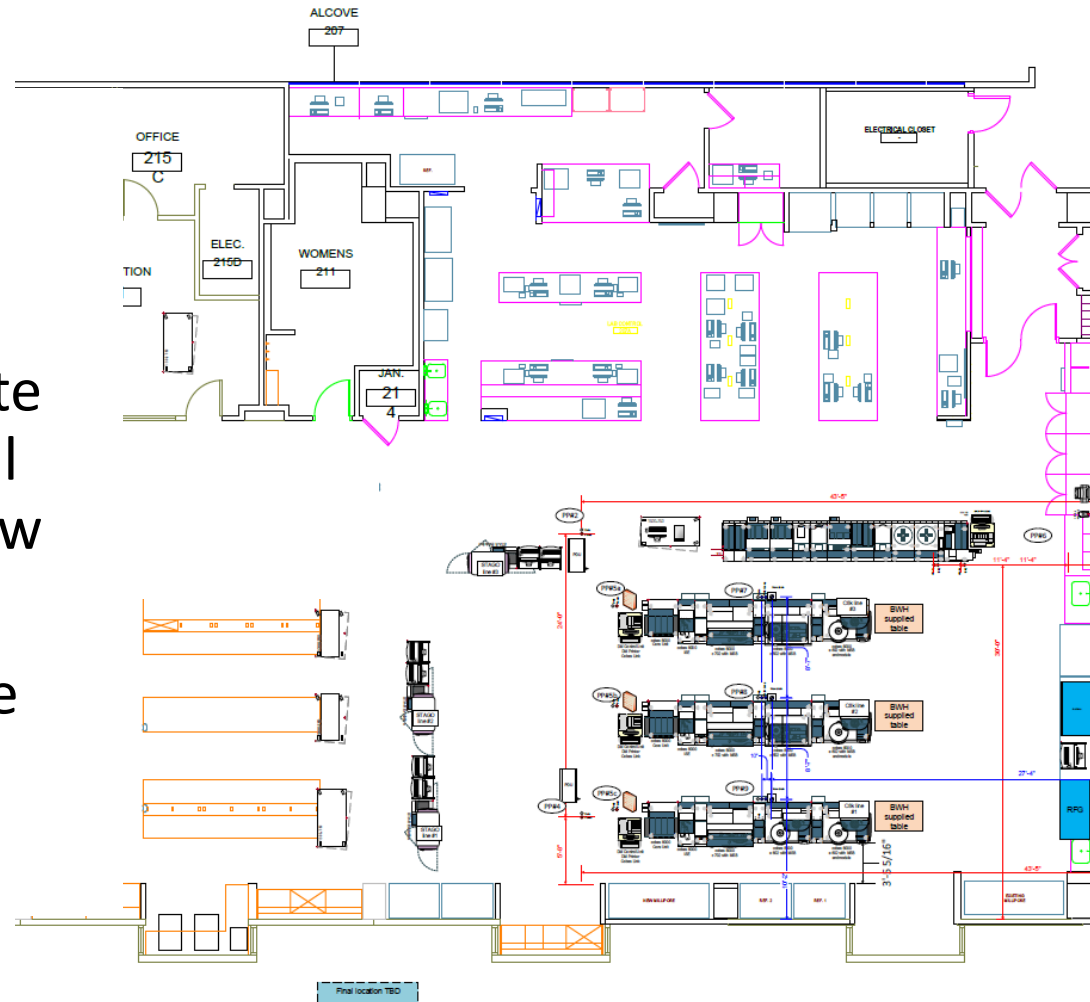
- Live lines:
 - New 3
 - Old 1
 - New 1
- Made sure that complete test menu is covered (all tests validated on all new lines)
- Remove Old 2 and move New 2



Stage 6

1 week

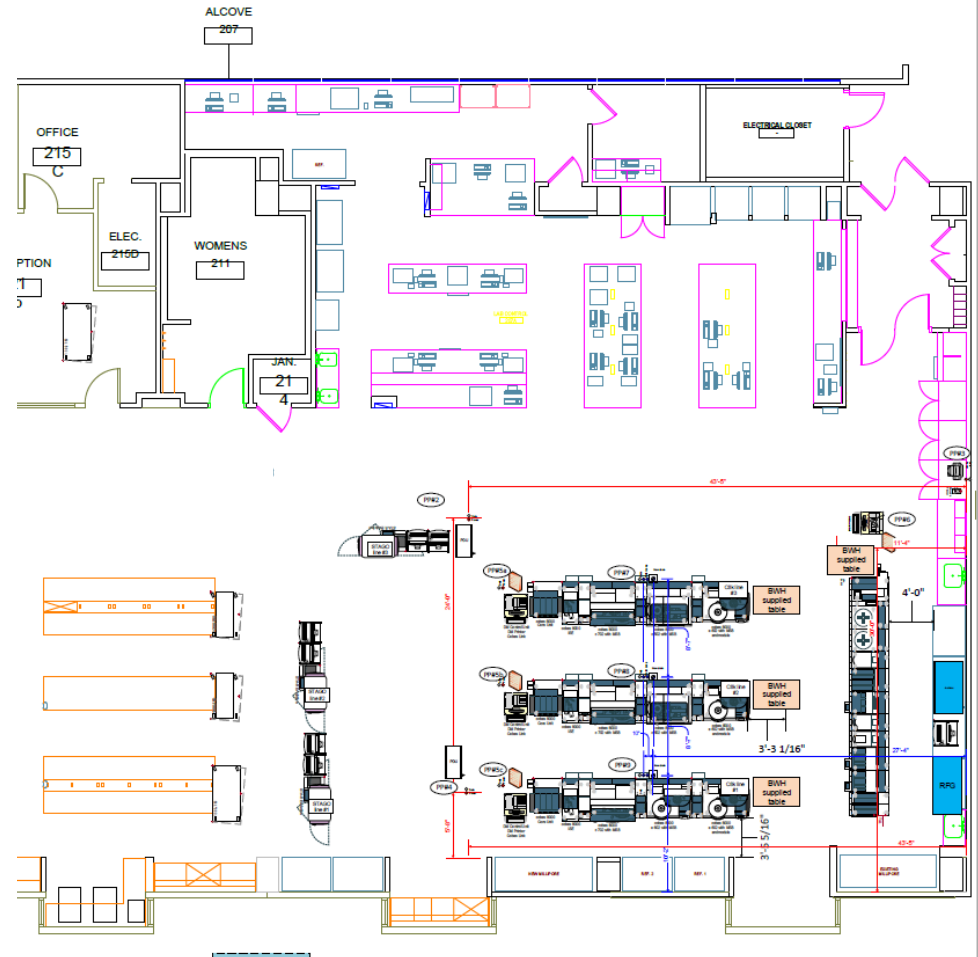
- Live lines:
 - New 3
 - New 2
- Made sure that complete test menu is covered (all tests validated on all new lines)
- Remove Old 1 and move New 1



Stage 7

1 week

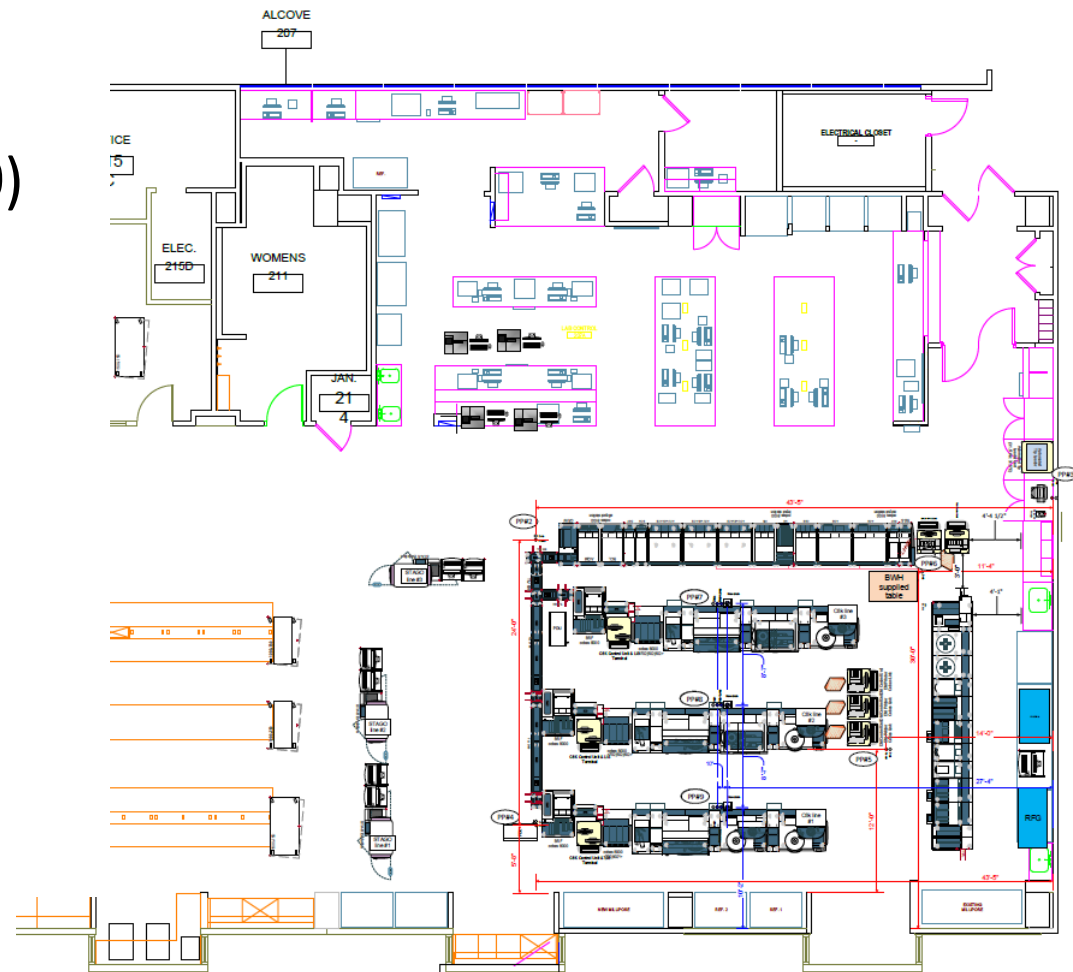
- Live lines:
 - New 3
 - New 2
 - New 1
- Move Old pre-analytical module to make room for the new one
- Old pre-analytical system still live



Stage 8

8 weeks

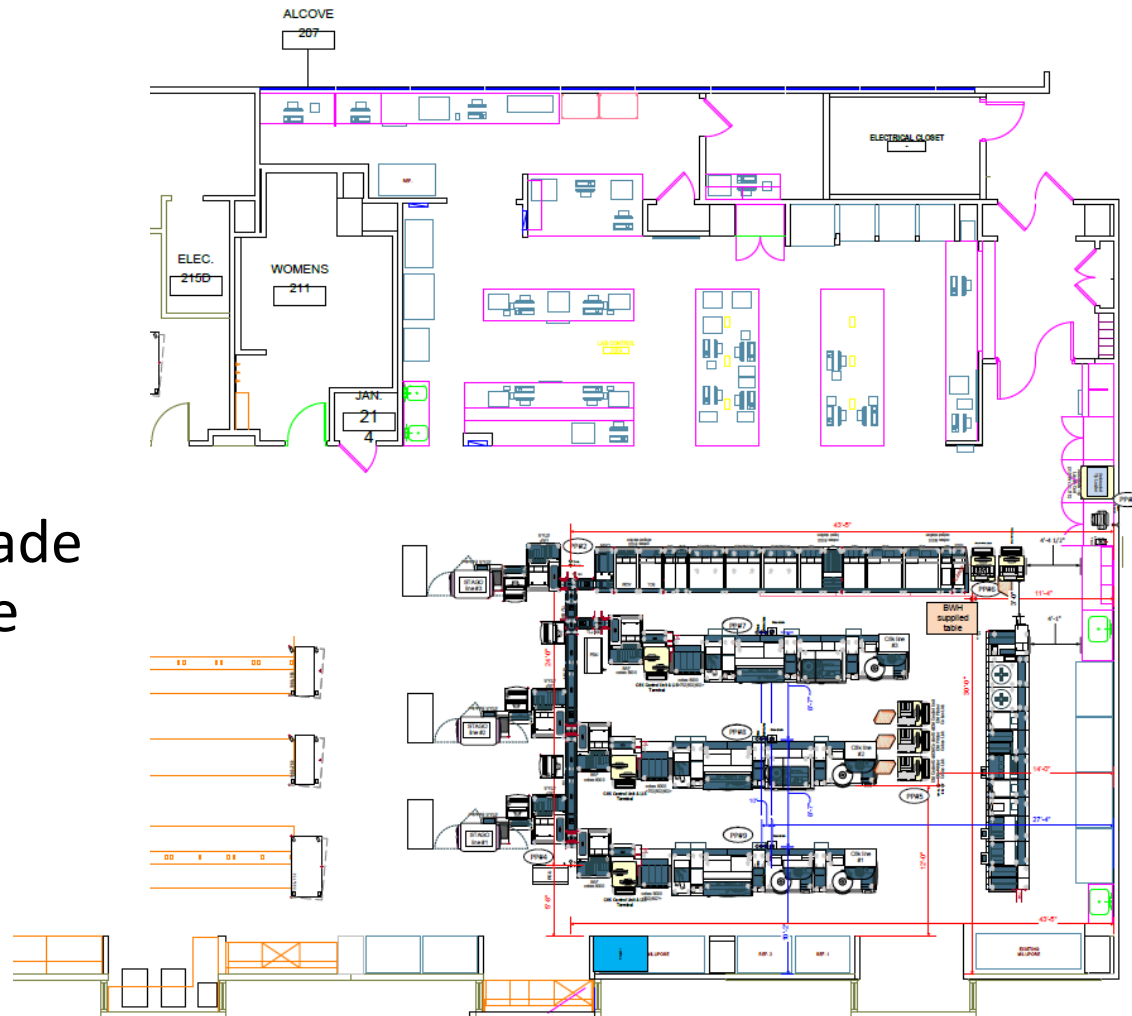
- Validation of new pre-analytical system (c8100)
 - Routing to instruments
 - Masking
 - Aliquoting
 - Sorting
 - Priority status
 - Temporary archiving
- Optimize on-board and physical workflows



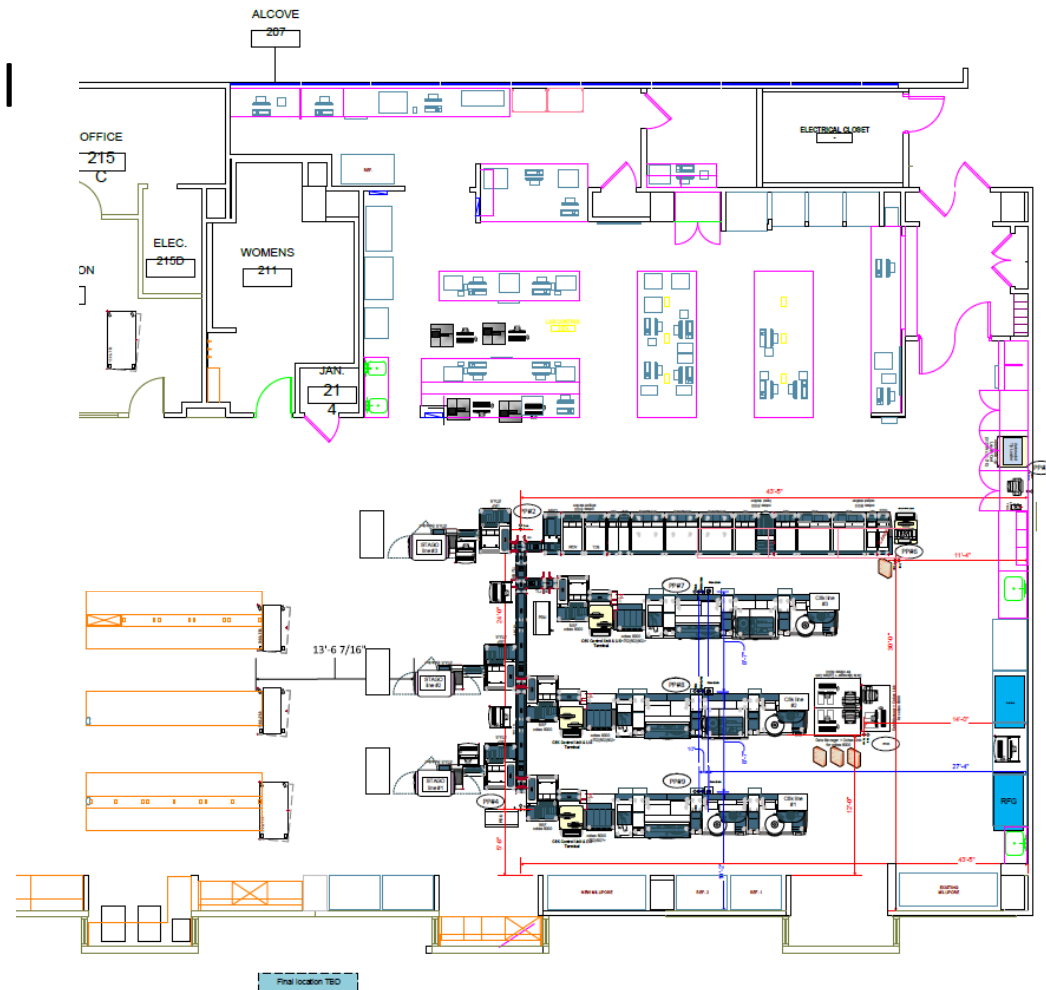
Stage 9

4 weeks

- Connect Coagulation instruments
 - Validate connection
 - Validate routing
 - Define downtime procedures
- Decided to do an upgrade of coag analyzers in the meantime → delay

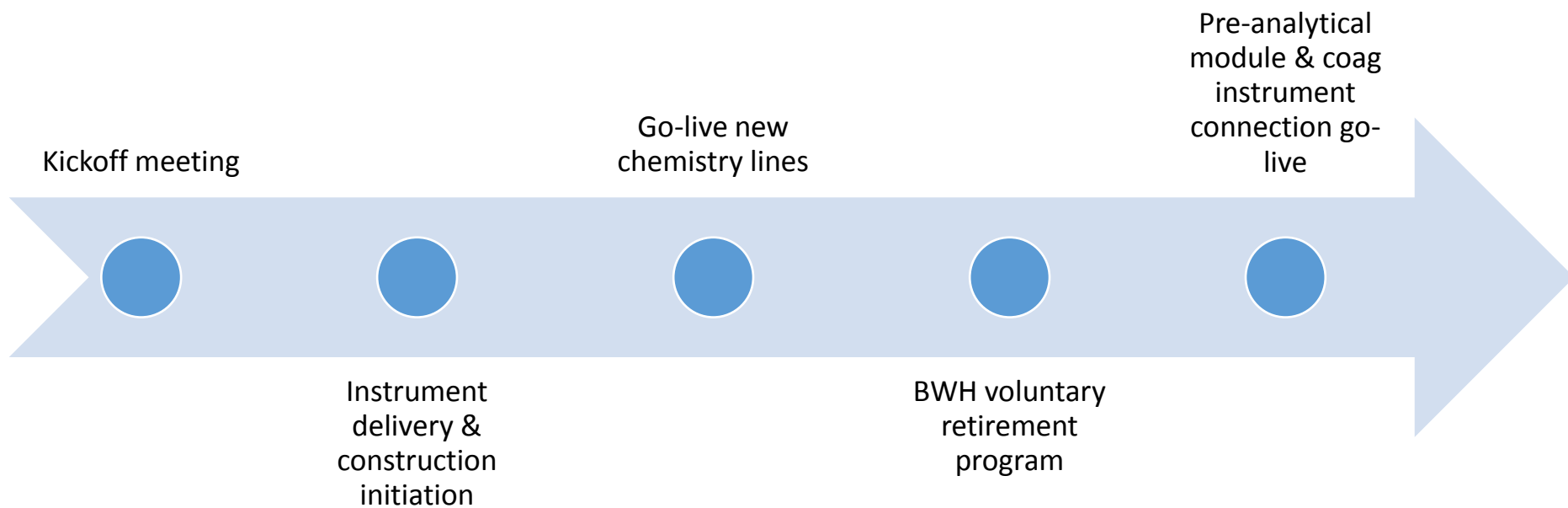


- Remove old pre-analytical system (MPA)



How did we do?

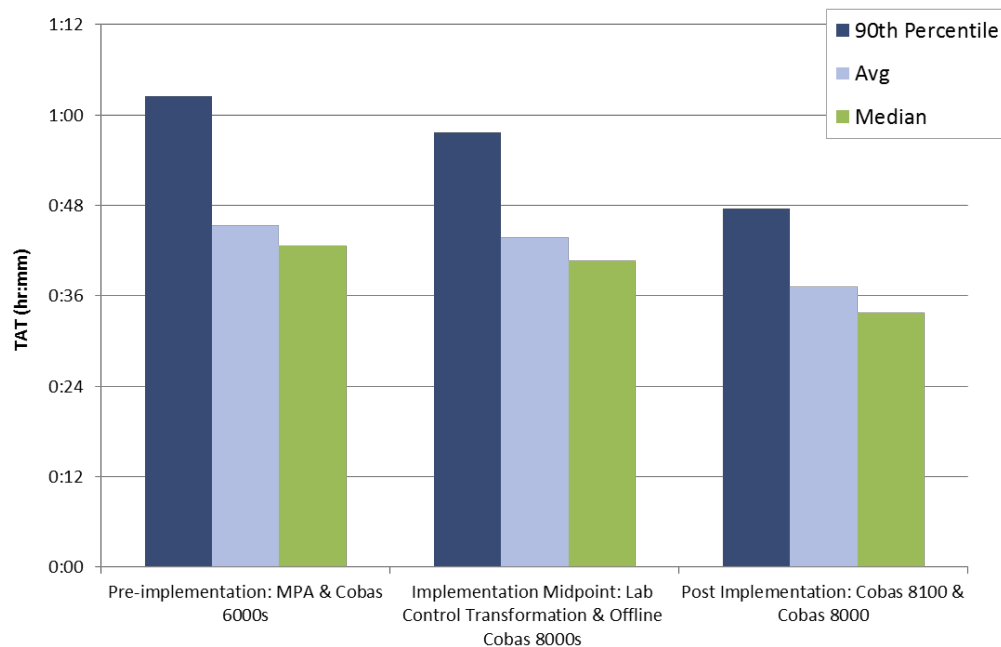
Timeline



ED Troponin TAT

Implementation Stages

Lab Control & Cobas 8100 Project TAT
 ED STAT Troponin



Implementation Midpoint:

Pre-implementation: MPA & Cobas 6000s

Lab Control Transformation & Offline Cobas 8000s

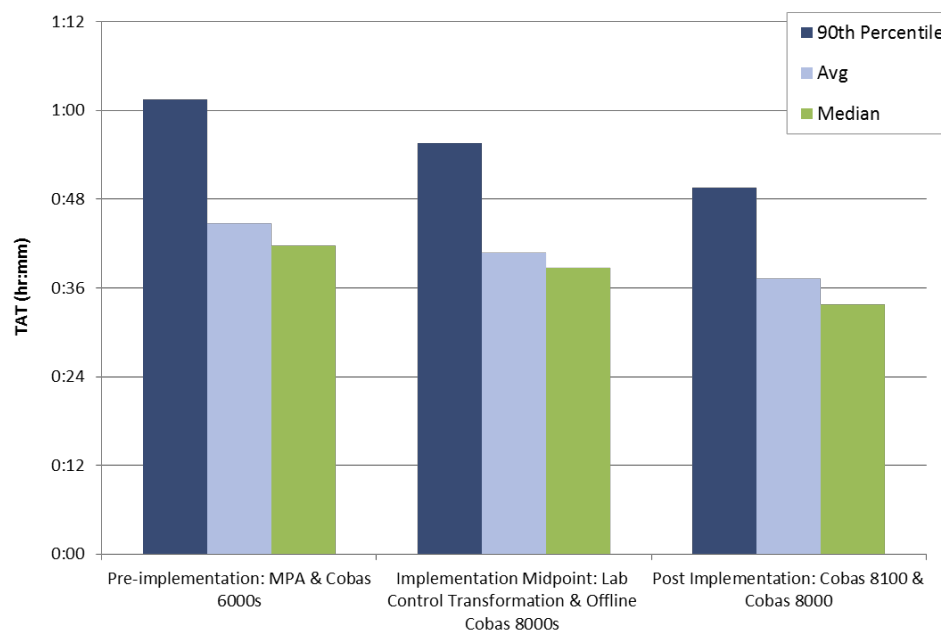
Post Implementation: Cobas 8100 & Cobas 8000

90th Percentile	1:03	0:58	0:48
Avg	0:45	0:44	0:37
Median	0:43	0:41	0:34
N	269	219	361

ED Creatinine TAT

Implementation Stages

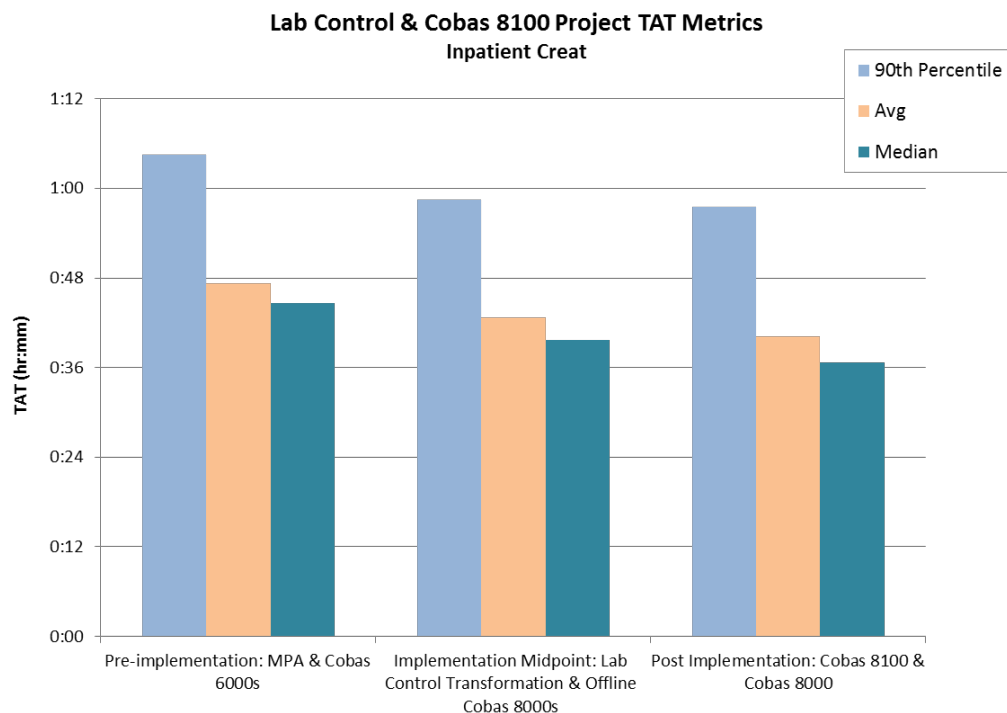
Lab Control & Cobas 8100 Project TAT Metrics
ED STAT Creat



	Implementation Midpoint:		
	Pre-implementation: MPA & Cobas 6000s	Lab Control Transformation & Offline Cobas 8000s	Post Implementation: Cobas 8100 & Cobas 8000
90th Percentile	1:02	0:56	0:50
Avg	0:45	0:41	0:37
Median	0:42	0:39	0:34
N	675	651	680

Inpatient Creatinine TAT

Implementation Stages



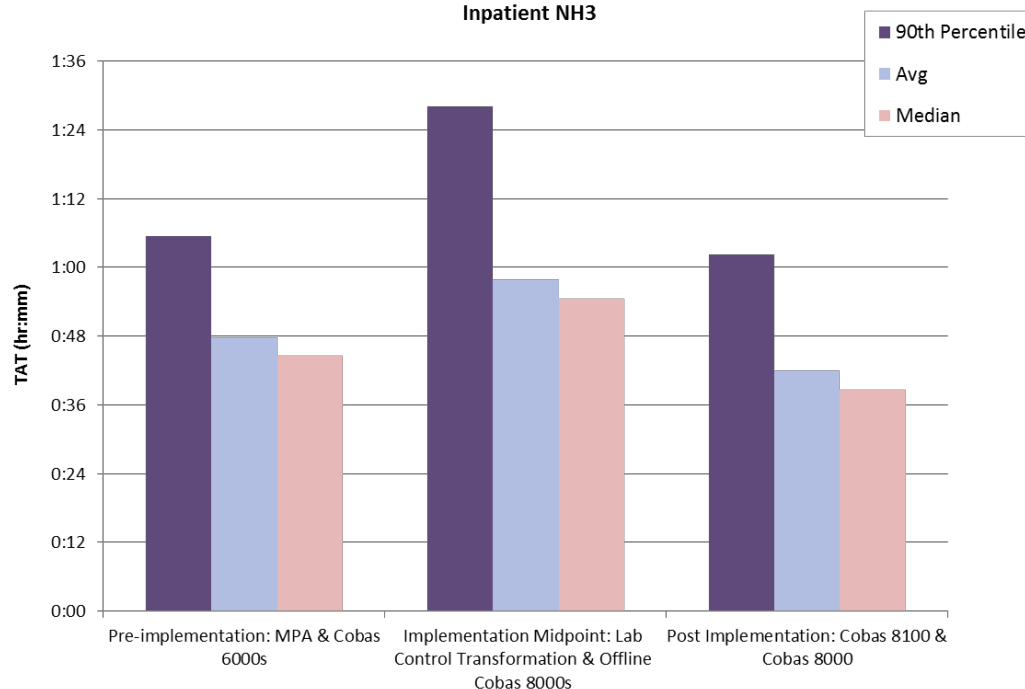
	Implementation Midpoint:		
	Pre-implementation: MPA & Cobas 6000s	Lab Control Transformation & Offline Cobas 8000s	Post Implementation: Cobas 8100 & Cobas 8000
90th Percentile	1:05	0:59	0:58
Avg	0:47	0:43	0:40
Median	0:45	0:40	0:37
N	3884	3888	3841

Inpatient Ammonia TAT

Implementation Stages

Note: Ammonia specimens are manually spun and front-loaded onto the chemistry analyzers. They do not go on the pre-analytical line.

Lab Control & Cobas 8100 Project TAT Metrics
Inpatient NH3



Implementation Midpoint:

Pre-implementation: MPA & Cobas 6000s **Lab Control Transformation & Offline Cobas 8000s** **Post Implementation:** Cobas 8100 & Cobas 8000

90th Percentile	1:06	1:28	1:02
Avg	0:48	0:58	0:42
Median	0:45	0:55	0:39
Min	0:31	0:26	0:25
N	51	33	29

LEAN = common sense

1. Focus on your customer

In the clinical lab environment there are 2 customers: clinicians and lab personnel

2. Figure out how work actually gets done

Map out existing workflows

3. Remove wasted steps and inefficiencies

4. Keep score

Data analytics

5. Empower people operating the process

Display data

6. Keep improving systematically

Keep asking for feedback from “customers”

Special Thanks...

- BWH team

- Deborah Elliott
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- Margaret Lobo
- Gail Kinchla
- Trish Senna
- Kelly Williams
- All the staff!



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- John Hildebrandt
- Rick Schonberg
- Michele Mitchell
- ...and team!

