How Lean Helped Us in Transfusion Services and Blood Banking – and with the Hospital's Other Clinical Services

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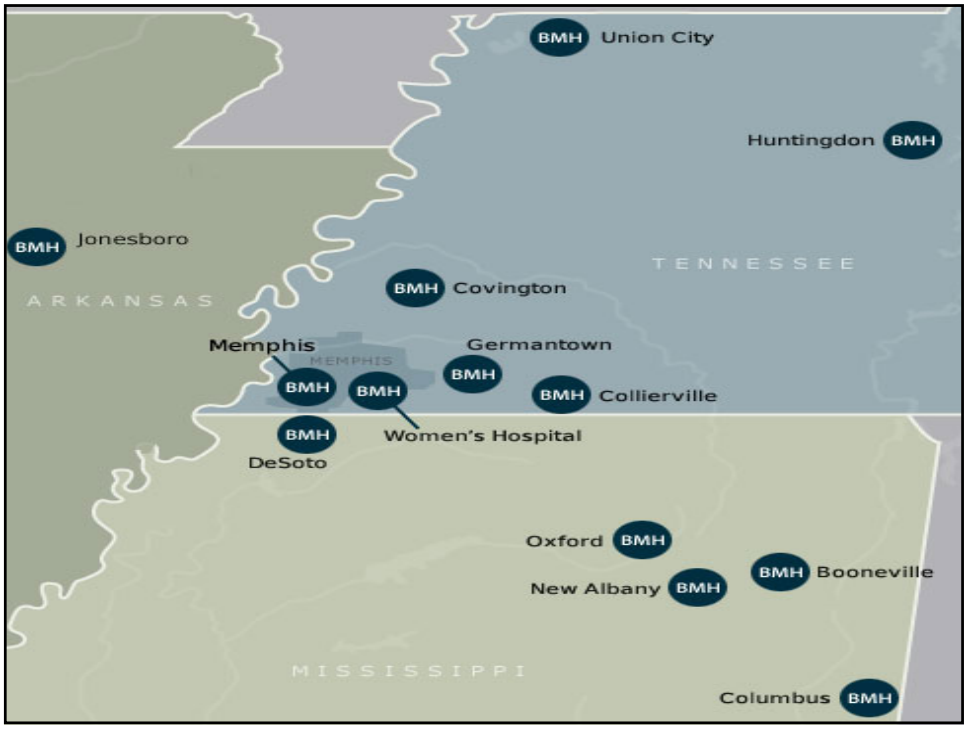
Baptist Memorial Hospital Memphis
Division of Transfusion Medicine

Baptist Memorial Health Care System

14 hospitals

- eight in Tennessee
- five in Mississippi
- one in Arkansas

BAPTIST®



Baptist Memorial Hospital Memphis

- more than 26,000 admissions
- 57,000 emergency department visits
- 15,000 surgeries
- 24,000 transfusions

LEAD:
Leadership Education and Development

December 2009:
Kick-off Manager/Director Meeting

- Key Words at Key Times
- Rounding
- Lean Thinking

Lean Thinking

relentless effort
to systematically
reduce waste
while improving
the flow of value
to the customer

Start Up Goal

Use Lean 6S to clean work area to improve and enhance workflow

- Sort
- Straighten
- Shine
- Standardize
- Sustain
- Safety

6S Results

- Workspace taken up by non-productive inventory has been reclaimed

Before

After

6S Results

- Excess visual noise and other clutter removed

Before

After

LEAD:
Leadership Education and Development

September 2010:
Presentation of Lean Projects

- BAC - Surgery
- GI Lab
- Radiology

BMH Memphis *SURGERY* 1st CASE START TIMES

LEAN Project

- Compare next day OR schedule with completed schedule of PAE exams
- Identify patients who have completed PAE with focus on the 1st case starts

  (exclude all inpatients)

LEAN Project

Patients with complete PAE who do not need any lab, prep, T&C etc.

- change clothes in the BAC
- go immediately to the holding area where assessment is completed and charted
- are accompanied to the holding area by a family member

PRE-OP NEEDS

- Lab, T&C
  - phlebotomist is given priority list of patients with 1st case starts
- Prep
  - completed in BAC and patient is then sent to holding area
- Medications
  - order faxed to pharmacy and med is administered in holding

OUTCOMES

- Surgery no longer '***sends***' for patients

- Patients are routed ***systematically*** to the holding area

OUTCOMES

BAC

- increased time for nurse to focus on 1st case patients that ***have not*** had their PAE performed
- huge decrease in traffic in the area in the morning
- decrease in noise level and phone calls

OUTCOMES

Anesthesia

- starts with the patient sooner since 1st cases are in the holding area

(45 min to 1½ hours prior to start time)

BMH-MEMPHIS
GI LAB

LEAN PROJECT
2010

Introduction

- Streamline Inventory in the GI Lab
  - Inventory Reduction
  - Cost Reduction

Project Summary

- conduct *Lean Assessment* to identify improvement opportunities
  - Biopsy forcep technology has not been updated in the department in 10 years
  - Forceps are purchased in small quantities, while usage is high

Current State

- Use large number of biopsy forceps
- Purchase multiple smaller quantities
  - Cost of purchasing small quantities is greater than purchasing in large quantities
- New technology available will replace two of the current forceps with one forcep

Cost Savings

Current Biopsy Forceps

Cost - $400.00 /box 20

Cost - $95.00 /box 5

New Biopsy Forcep

Cost - $425.00 /box 40

Order in boxes of 40 instead of 20 decreases the price per forcep from $20.00 to $10.62

Key Benefits

- The RJ4 will replace:
  - M0051589
  - M0051559
- Cost saving of approximately $20K annually

Additional Benefits:

New (RJ4) forcep has

- a stainless head vs. the old copper head Stainless Steel is a thinner metal, allowing for a sharper, cleaner bite, and less tearing of the tissue
- two fenestrated holes vs. one making specimen removal easier

Lean Project
2010
BMH Memphis
Radiology

Project Scope

- Clean & Reorganize Basement
  - 1620 sq feet / 13,000 cubic feet
    - X-ray films 3 BMH hospitals
    - Storage boxes from Echo, Cath Lab, and Patient Financial Services

Basement Film File Storage

Before Project: 53 isles / 6 rows high

Process

- Sort Films
- Keep pediatric films until patient is 19 years old
- Keep mammograms for 10 years from last date of visit

After Lean Project

Reduced Storage Space

- From 1620 sq ft to 300 sq ft (82%)
- Discarded 612 barrels 
- Recovered $9,800 from extracted x-ray film silver

After Lean Project
using 8 isles vs 53 of storage

Lean Project
2009

BMH Memphis
Transfusion Service

BMH Memphis Transfusion Service

- AABB Accredited Immunohematology Reference Laboratory
- Provides diverse range of blood products and services
- 21 FTEs (includes 13 ProVue Techs)

Objectives

- Invest in automation to ensure best-possible use of our staff
- Determine optimal placement of an existing and new ProVue analyzer
- Identify and facilitate improvements in specimen receipt and testing
- Enhance optimization of intellectual capital

Work Practice Analysis Team

OCD Senior Consultant on-site
1 day-all three shifts

Trained in Process Excellence Methodology

Susan South, MAOM, MT(ASCP) SBB
Six Sigma Black Belt
ValuMetrix Senior Consultant

Work Practice Analysis

- Business Needs
- Work Practice Analysis Goals
- Current State
- Future State
- Next Steps

Business Needs

•Optimize intellectual capital
•Increase operational capacity
•Enhance process effectiveness and overall quality of services
•Optimal placement for pre-transfusion testing instrumentation

Work Practice

Collection Method
Interviewed leadership personnel and general staff

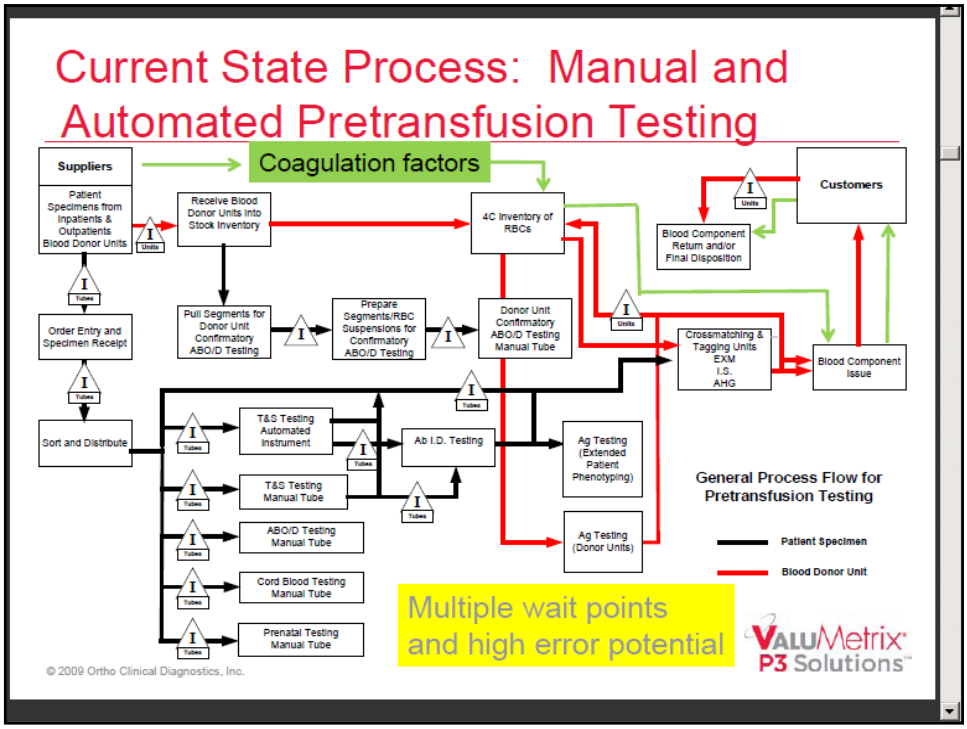
Documented:
•Specimen flow
•Operator process flow
•Process opportunities
•Physical plant opportunities

Optimal Analyzer Location

- Follow flow of orders to test result release
- Note walk patterns
- Interview staff
- Take digital photos
- Minimize distance traveled by staff and samples

Current State
Process Strengths

•Site leadership
•Automation implementation experience
•Electronic crossmatch implementation
•Team of enthusiastic personnel
•Sense of teamwork among personnel
•Emphasis on quality and safety

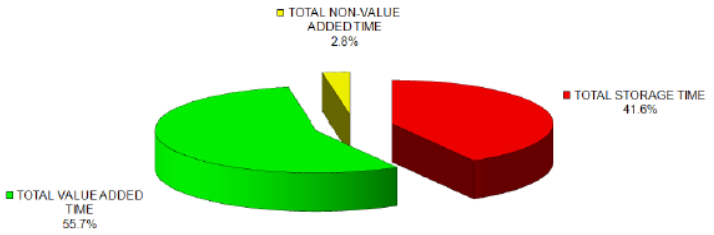


Summary: Process Steps

Category	High Level	Defect Opportunities	% Defect Reduction
Manual Tube 2 cell screen	18	112	15%
Manual Gel	10	58	56%
ProVue	4	7	95%

Specimen Flow: T&S on ProVue

Current Product Process Flow:
Routine T&S



Total time: 1:21:00

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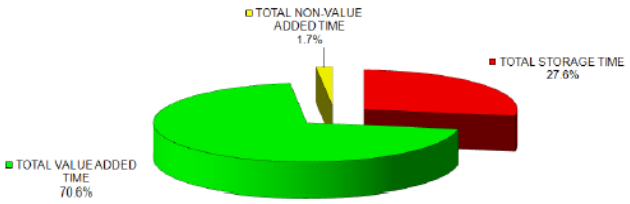
Specimen Flow: T&S on ProVue

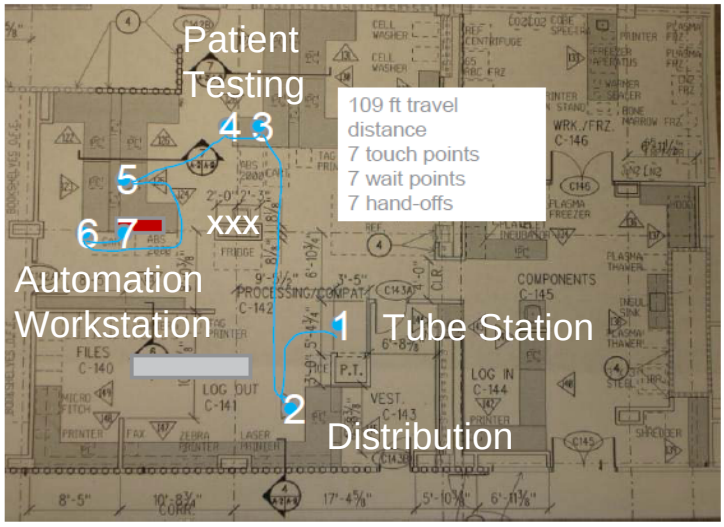
Current Product Process Flow:
ASAP T&S



Total time: 1:05:00

ValuMetrix P3 Solutions

Specimen Flow: T&S on ProVue



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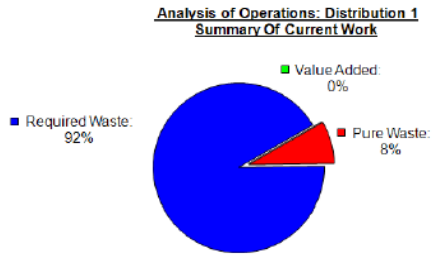
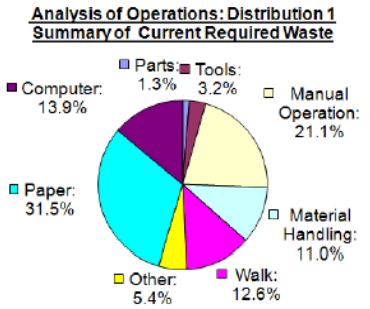
Specimen Flow

Category	Routine T&S	ASAP T&S
Current Time	1:21:00	1:05:00
Approximate Expected Time	0:52:00	0:49:00

Operator Process Flow: Distribution Operator Example



8% Pure waste



31.5% of required waste is related to paper

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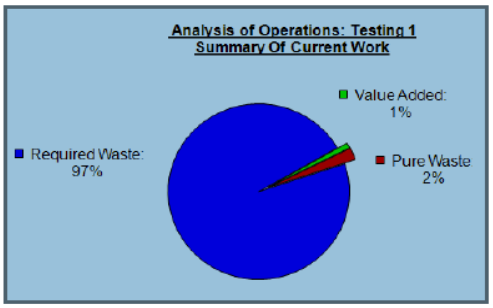
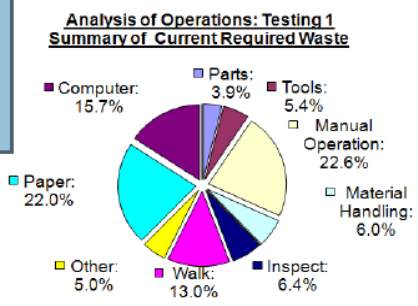
Operator Process Flow: Testing Operator



2% Pure waste



Approx. 22% of required waste related to paper and 22.6% to manual operations.

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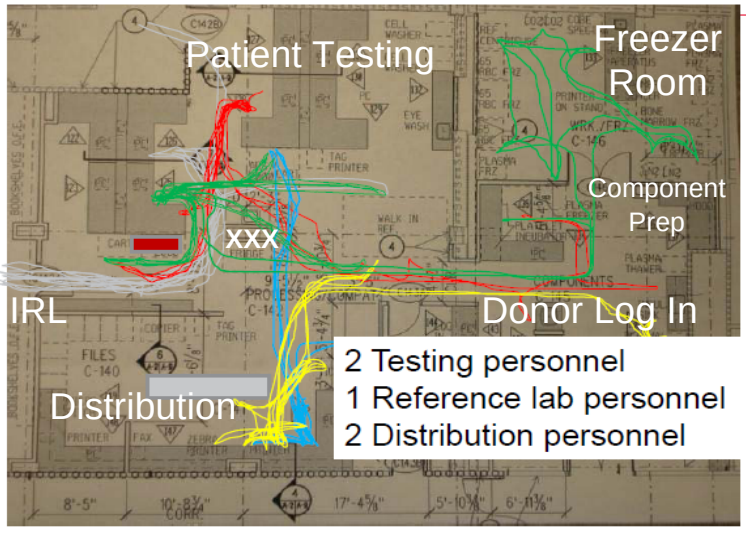
Operator Process Flow

Category	Dist 1	Dist 2	Dist 3	Test 1	Test 2	Test 3
Current Distance	1332	439	1614	1024	884	2045
Value Added	0%	0%	0%	1%	9.9%	0%
Required Waste %	91.9	100	100	96.8	89.7	83.9
Pure Waste %	8.1	0	0	1	9.9	0

Multiple Operator Process Flows



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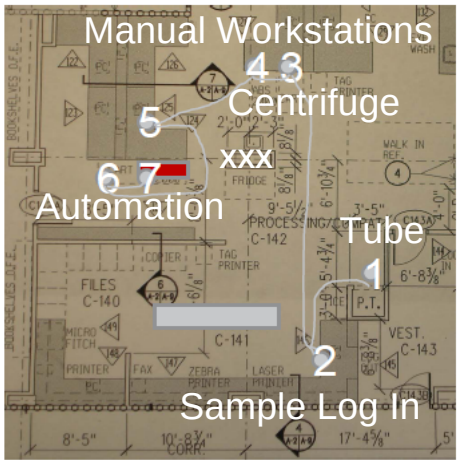
Future State Process

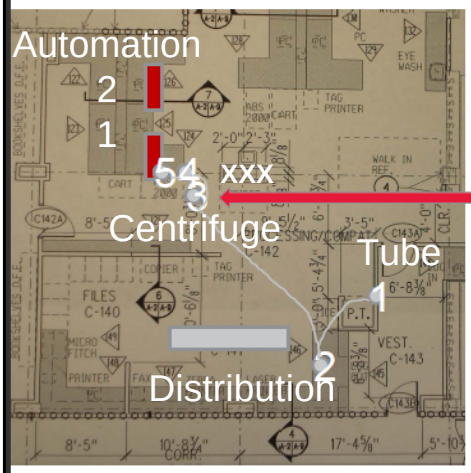
- Decrease error potential
- Standardize work
- Optimize automation
- Decrease process complexity
- Enhance service capability
- Review protocol: redundant forms, paperwork, labels, testing algorithms
- Put tools at point of use
- 5S
- Increase work space
- Standardize work assignments

Current State Layout



109 ft travel distance
7 touch points
7 wait points
7 hand-offs

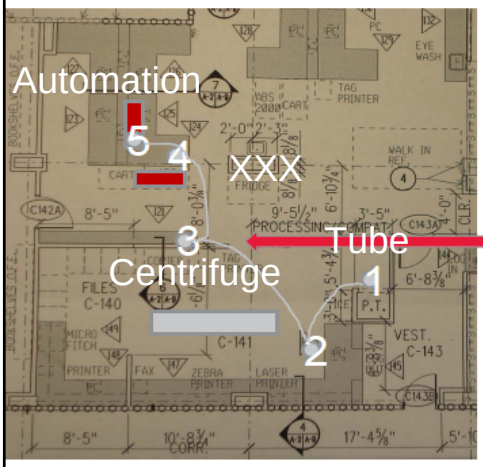
Layout Recommendation - 1



47 ft travel distance
4 touch points
4 wait points
3 hand-offs

Relocation of centrifuge and specimen triage

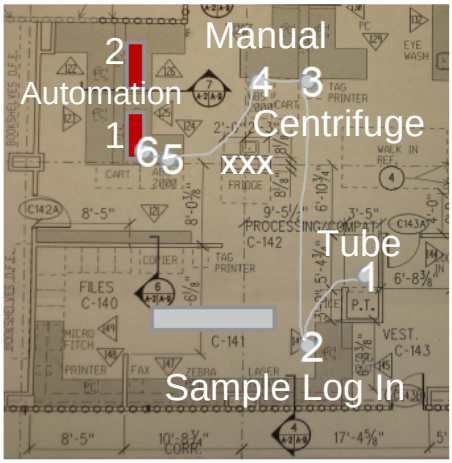
Layout Recommendation - 2



47 ft travel distance
4 touch points
4 wait points
4 hand-offs

Relocation of centrifuge and specimen triage

Layout Recommendation - 3



78 ft travel distance
5 touch points
5 wait points
4 hand-offs

Specimen Flow

Category	Routine T&S	ASAP T&S
Current Time	1:21:00	1:05:00
Projected Time Reduction	36%	25%
Projected Distance Reduction	47%	58%

Operator Process Flow

Category	Dist 1	Dist 2	Dist 3	Test 1	Test 2	Test 3
Projected Reduction in Time %	16.5	20.3	0	24.5	12	16.4
Projected Reduction in Distance %	27.5	74.8	0	26.7	43.2	0

Result Summary

Category	Pre-Lean Rout TS	Pre-Lean ASAP TS	Post-Lean TS	Average % Reduction
Receipt in Lab to Result	**1:21:00**	**1:05:00**	**0:49:00**	**30%**
Touch Points	**7**	**7**	**4**	**43%**
Process Steps	**18**	**18**	**4**	**78%**
Defect Opportunities	**112**	**112**	**<7**	**95%**

Result Summary

- 30% reduction in turnaround times for type and screen testing
- 25% reduction in operator time
- 95% reduction in testing process error potential
- 78% reduction in process steps for routine testing

ValuMetrix® P3 Solutions® Equation for Success

PROCESS

- Layout based on Lean principles
- Workstation design
- Optimal process flow to and through testing systems

PRODUCT

- High-quality analyzer and test methodologies
- Minimal system maintenance

PEOPLE

Increased percent of value added activity

- Ergonomically correct design
- Staff engaged in continuous improvement

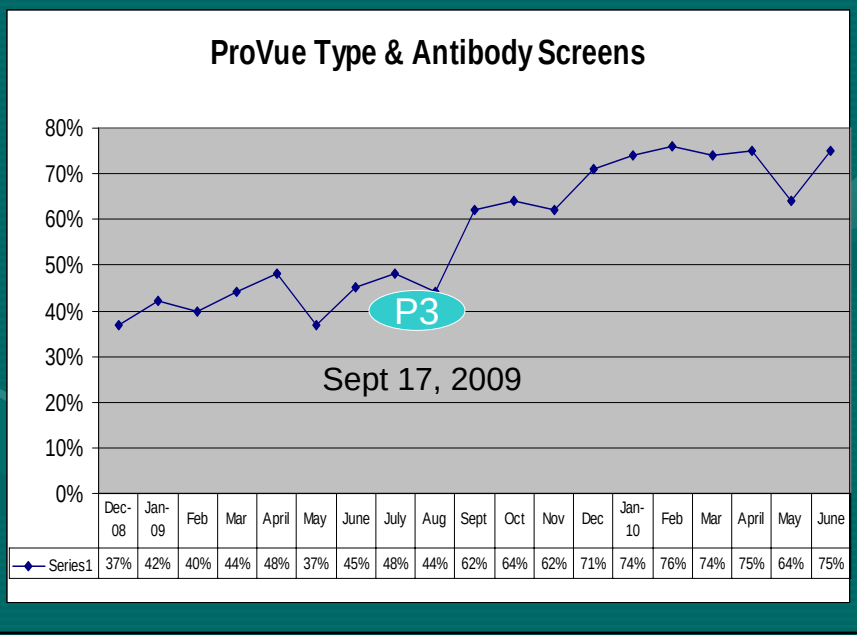
ValuMetrix® P3 Solutions® Equation for Success

PROCESS + PRODUCT + PEOPLE

= OPTIMUM PERFORMANCE

- Labor optimization
- Enhanced service levels
- Cost containment

BMH-Memphis Transfusion Service



Result Summary

- Eliminate set up of manual tube ABO & Rh
- Reduction in overall reagent cost of greater than $35,000 per year

LESSONS LEARNED

- Perform Lean 6S continually
- Be a change agent long term
- Use swiss cheese approach to nibble away at all the opportunities uncovered
- Fast track the process for major projects using a consultant
  - ValuMetrix® P3 Solutions™ offered as value added incentive to purchase 2nd ProVue

Future Lean Projects

- Blood wastage reduction
  - management of temperature-validated containers
  - interpretation of RBC temperature indicators
- Create SharePoint Site for all Cerner Millennium Sites (6 hospitals)