



*Lean Kaizen Event
Outreach Processing
Lab Quality Confab*

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Vice President*

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Carolinas HealthCare System Today

- CHS is the largest health care system in the Southeast as well as the third largest public, multi-hospital system in the nation.
- CHS owns, leases or manages 23 hospitals with nearly 5,000 beds and combined net patient revenue in excess of \$3.8 billion.
- CHS has a comprehensive network of physicians, including over 1,000 employed physicians and 280 residents operating in over 150 sites in the Carolinas.
- CHS has been AA-rated by both Moody's and Standard & Poor's since 1983.
- CHS is recognized nationally for its quality of care and patient service levels.
- CHS operates one of only five academic medical centers in the state of North Carolina.



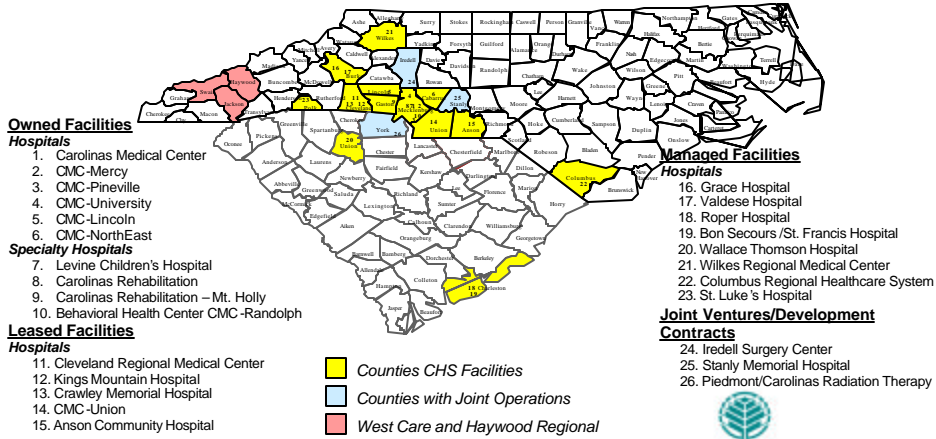
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Carolinas HealthCare System Experience in the Carolinas

Carolinas HealthCare System owns, leases or manages 23 hospitals throughout the Carolinas. Managing this diverse group of hospitals provides Carolinas HealthCare System an understanding of the issues and challenges facing hospitals in the region.



Owned Facilities

Hospitals

1. Carolinas Medical Center
2. CMC-Mercy
3. CMC-Pineville
4. CMC-University
5. CMC-Lincoln
6. CMC-NorthEast

Specialty Hospitals

7. Levine Children's Hospital
8. Carolinas Rehabilitation
9. Carolinas Rehabilitation – Mt. Holly
10. Behavioral Health Center CMC-Randolph

Leased Facilities

Hospitals

11. Cleveland Regional Medical Center
12. Kings Mountain Hospital
13. Crawley Memorial Hospital
14. CMC-Union
15. Anson Community Hospital

- Counties CHS Facilities
- Counties with Joint Operations
- West Care and Haywood Regional

Managed Facilities

Hospitals

16. Grace Hospital
17. Valdese Hospital
18. Roper Hospital
19. Bon Secours /St. Francis Hospital
20. Wallace Thomson Hospital
21. Wilkes Regional Medical Center
22. Columbus Regional Healthcare System
23. St. Luke's Hospital

Joint Ventures/Development

Contracts

24. Iredell Surgery Center
25. Stanly Memorial Hospital
26. Piedmont/Carolinas Radiation Therapy

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Carolinas Medical Center: A Center of Distinction

- Level I Trauma Center
- Academic Medical Center
- Advanced technology
- Preferred by consumers



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Serving Charlotte for more than a century

St. Peters Hospital (1878)
Carolinas Medical Center (2004)



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Children's Hospital

Busiest pediatric acute care center in the state



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Mecklenburg County's Healthcare Needs

Four acute care hospitals
Network of physician offices



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Carolina Laboratory Network Overview

- ✍ The mission of Carolina Laboratory Network is to maintain high quality, cost efficient and timely testing for the CMC-Charlotte facilities, as well as to provide comprehensive, quality services to support the outpatient and physician office needs.
- ✍ Carolina Laboratory Network provides a broad range of testing to a variety of clients.
 - CMC-Charlotte hospitals; inpatient and outpatient testing
 - CMC-Charlotte related business (e.g. Carolina Rehab, Health Department, Behavioral Health, etc.)
 - Carolina HealthCare System owned and controlled entities, (e.g. Sardis and Huntersville Oaks Nursing homes, transplant services)
 - Some regional facilities (CCHS, Anson, CMC-Union, CMC-Lincoln)
 - Carolina Physician Network
 - Unaffiliated physician practices



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Carolinas Laboratory Network Overview (con't.)

- ✍ Carolinas Laboratory Network's core laboratory performs approximately four million tests annually.
- ✍ The outreach laboratory accounts for approximately 1.7 million tests which ranks in the upper quartile¹ of national hospital-based outreach businesses
- ✍ Core lab testing is performed at both the CMC-Mercy (anatomic pathology, molecular, and transplant) and CMC (all other areas). CMC-Pineville and CMC-University operate scaled down "acute care" laboratories.

Source: Chi Solutions National Survey.



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Carolinas Laboratory Network Volume

- ☞ Outreach Volume:
 - ✍ 2200 reqs/day
 - ✍ 528 Client
 - ✍ 1.8 M tests in 2007
- ☞ Projected volume for 2008 is 1.9 M tests



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Why Lean Principle

- ☞ Kaizen event offered a “quick hit” process change that we felt would positively impact our overall turn around times, how early our outreach processing finished each night, our overtime utilization, and improve employee satisfaction
- ☞ Lean principles gaining notoriety among hospitals and laboratories as an effective method to reduce waste
- ☞ We always knew we had waste in our process but we felt lost in understanding how to tackle and eliminate the waste
- ☞ The timing was perfect for our institution as we prepared to invest capital into space for the department. Lean could offer a chance to evaluate and maximize workflow so that we could design the space to fit our new processes
- ☞ We realized we could no longer work harder and achieve our goals. We had to figure out how to work smarter if we were going to continue to have success in our outreach program



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Engagement Objectives

- ☞ Assess, analyze and implement streamlined processes for the outreach specimen receiving and registration area.
- ☞ Use lean methods to perform a rapid design (kaizen event) of the outreach specimen receiving area from the point that the couriers drop off specimens until they are delivered to the laboratory testing departments.
- ☞ Determine optimal layout and work cell configuration, options to standardize work and balance staff workload such that workflow is significantly improved.



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Kaizen Event Structure

- ☞ **Phase 1: Planning and Preparation**
 1. Select an Area
 2. Select a Problem for Improvement
 3. Select the Team Leader
 4. Select the Team Members
 5. Prepare the Area
- ☞ **Phase 2: Implementation**
 1. Understand the Current Situation
 2. Make the Improvements
- ☞ **Phase 3: Presentation, Celebration & Follow Up**



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Understanding the Current Situation

1. Observe the area and gather data
 - ☞ Learn to see wasteful work and identify the type of waste
2. Map the process
 - ☞ Videotape and draw spaghetti diagrams of worker movement or draw a tube travel diagram
3. Do time studies of all operations
 - ☞ Time work at each stage of the process and identify wasteful waiting
 - ☞ Time individual work elements and identify as value-added or non value-added
4. Count work in progress
 - ☞ Evaluate where work is "resting" in between stages and why



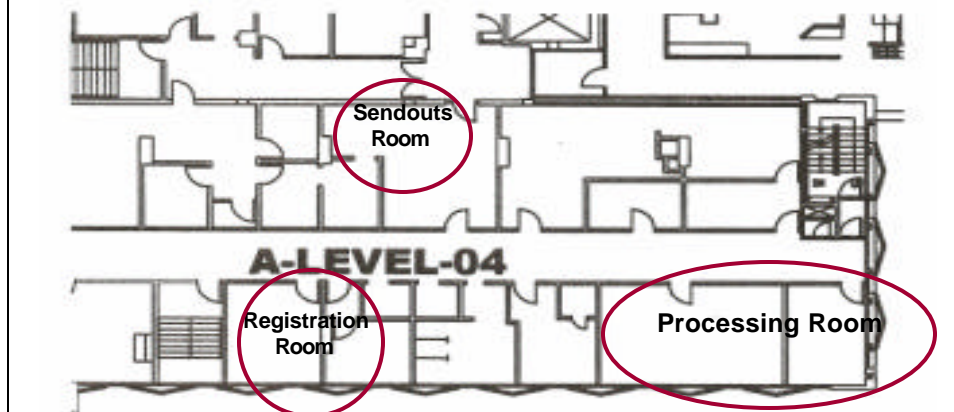
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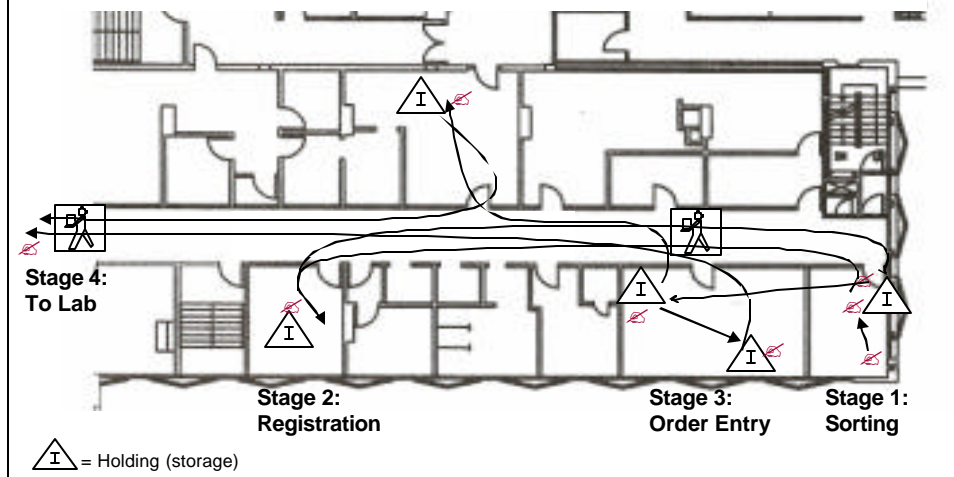
Current State Assessment: Staffing and Work Areas

- ✍ Monday-Friday, budgeted staff of 16.5 FTEs are deployed to three work areas.
- ✍ Working 19 employees (some part-timers); peak period from 4 PM – 12AM
- ✍ Couriers finish specimen deliver around 9 PM; staffed until work is complete
- ✍ Average leave time is 3:56 AM for the past 6 months; goal is 12:00 AM
- ✍ Overtime is averaging 9.96% in FY 07; goal is less than 4.44%



Current State Assessment: Tube Travel Diagram

- How do samples move through the work area and how many steps does it take to transport them from one stage to another?
- Total Steps = 366 steps
- All the staff was walking some or all of the route often: chaotic flow, lots of people walking about, difficult to see if work was getting done



Current State Assessment: What Are the Value-Added Jobs?

<u>Stage</u>	<u>Time per Batch</u>
1. Sorting	2:30 minutes
2. Registration	15:00 minutes
3. Order Entry	35:00 minutes
4. Quality Control	5:00 minutes
5. Transport to Lab	2:00 minutes

Batch = 15 patients

Total Value-Added Activities = 59:30 minutes
This is the time it should take to register a batch of 15 patients with no waste in the process!






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Current State Assessment: What Are the Non Value-Added Jobs?

<u>Stage</u>	<u>Time per Batch</u>
1. Sorting	2:30 minutes
2. Holding (Storage) 	45 minutes
3. Registration	15 minutes
4. Holding (Storage) 	1:05 hours
5. Order Entry	35 minutes
6. Holding (Storage) 	1:13 hours
7. Transport to Lab	2:00 minutes
8. Quality Control	5:00 minutes

Batch = 15 patients

 = Inventory (waste)

Total Non-Value Added Activities = 3:03 hours
These are activities that bring no value to your customers, like waiting, human motion, overproduction, defects, inventory.



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Current State Assessment: What Is the Current Turnaround Time?

- ✍ Defined as the average time it takes to complete all steps in a defined process; includes both value-added and non-value-added activities
 - Total Value-Added Activities = **59:30 minutes**
 - Total Non-Value Added Activities = **3:03 hours**
- ✍ Seventy-five percent of the Outreach Registration cycle time is classified as waste
 - Most service organizations have 50-80% waste without even knowing it
 - Learning to see waste raises awareness and Lean tools work together to eliminate it from the value-added (important) work

**Current Turnaround Time = 4:02:30 hours
(of which 75% brings no value to your customers!)**



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Current State Assessment: Current Wastes

- ☞ Waste of Processing
 - ✍ No FIFO system
 - ✍ Separate rooms for Sorting, Registration & Order Entry
 - ✍ Separate job duties for Registration & Order Entry
 - ✍ Pulling reqs to sort specimens from couriers
 - ✍ Stopping to call for missing information
 - ✍ Too many old requisitions in use



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Current State Assessment: Current Wastes (con't.)

- ☞ Waste of Inventory
 - ✍ Multiple waiting stages for processing
 - ✍ Too many supplies piled up
 - ✍ Supplies scattered and disorganized
 - ✍ Need to 5S



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Current State Assessment: Current Wastes (con't.)

- ☞ Waste of Waiting
 - ✍ Waiting for reqs to go to Registration
 - ✍ Waiting for reqs to come back from Registration
 - ✍ Signing in specimens (fluids, bone marrows)
 - ✍ Slow response time from label printer
 - ✍ Waiting for couriers to drop off specimens



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Current State Assessment: Current Wastes (con't.)

- ☞ Waste of Motion
 - ☞ Staff milling about: miscellaneous reasons for staff to move off their stations (get more work, move bins, make copies, solve problems, etc.)
 - ☞ Moving specimens around before they go to the lab
 - ☞ Computer stations all over the lab for Order Entry
 - ☞ Not enough/correct materials at workstations



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Current State Assessment: Current Wastes (con't.)

- ☞ Waste of Production (Over- or Under-)
 - ☞ Staff leaving workstations too frequently
 - ☞ Batching and counting reqs
 - ☞ Work not moving through (due to problems)
 - ☞ Holding finished work at Order Entry
- ☞ Waste of Transport
 - ☞ Moving reqs back and forth
 - ☞ Moving bins around to Registration and Order Entry



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Current State Assessment: Current Wastes (con't.)

- ☞ Waste of Defects
 - ✍ Separating reqs from the samples
 - ✍ Workers working differently in the same job
 - ✍ Mislabeled specimens
 - ✍ Lost specimens
 - ✍ Missing tests on reqs
 - ✍ Ordering wrong tests



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New Process Wish List

- U-shaped "line" to bring processes closer together
- Team environment (small groups)
- Work station that is "work friendly"
- Support tech role serving work cell and feeding the line
- One room for all staff
- Eliminate bins
- Build QC into the line; near-time; 100%
- Reduce handwriting
- Less walking around by workers
- Logical flow to the space
- FIFO
- Production kanban
- Don't take client calls in area before 5 PM
- Inventory more organized
- Keep workers working (less motion, less personal calls)
- Standardized work
- Better process for STATS

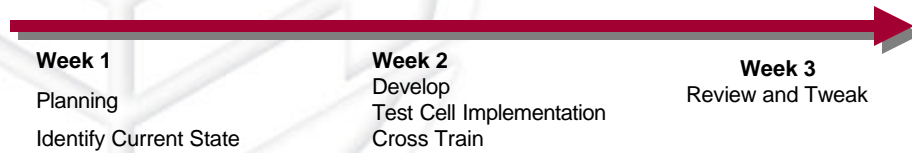


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Timeline for Event



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Post Mortem

What Worked

- Had more control over the pace of production
- FIFO for sure!
- Waste of storage is gone
- Mixed patient type “forces” production
- Workers stayed at their stations
- Stats went immediately to the front of the line
- QC done before samples get to lab
- Problems get addressed on the spot

What Didn't Work

- Some staff thought they worked slower; some thought it was too controlling
- Staff not used to sitting so long
- Space constraints still an issue
- Need a “pre-sort” stage from gray bins to smaller bins
- No room on station for extra tubes
- Need better storage for consumables at work stations



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Measures of Success

- Reduced lead-time through receiving/processing area with rapid hand-off to the automation line and other testing areas, resulting in improved overall test turnaround time
- Reduction in proportion of non value-added work as a percent of total work and improved staff productivity
- Reduction in the amount of staff overtime as an outcome of improved workflow
- Reduction in operator walking
- Significant reduction in wait times for unprocessed specimens
- Let's check our outcomes . . .



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Outcomes: Department Leave Times

- ☞ Leave Times are tracked as a performance indicator for department
- ☞ Average Leave Time (past 6 months) = 3:56 AM
- ☞ Average Leave Time Through August is 1:08 AM
- ☞ Reduction of 2 hrs and 48 minutes



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Outcomes

- Current Accessions/Month of August
40,874
- Registration Accuracy – 99.81%
- Ordering Accuracy – 99.80%



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Outcomes (con't.)

Lean Indicators	Before	After	Change	Goal (90 days)
Lead Time Reduced	4:02 hr	2:20 hr	42% decrease	2:00 hr
Reduction in Wait Times	183 min	80 min	56% decrease	60 min
Worker Steps Reduced	366	237	35% decrease	150
Reduced as a % of Total Work	75%	57%	35% decrease	50%
Leave Time	3:56 AM	1:08 AM	2:48 hr improvement	12:00 AM



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The Follow Up

- ☞ In many ways, kaizen events are never over
- ☞ Results must be monitored
- ☞ Improvements should be continually made
- ☞ Monitor to do lists and complete follow-up items asap
- ☞ Keep tracking and posting result: whatever you track will improve!



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The Follow Up (con't.)

- ☞ Communication makes all the difference in success or failure
 - ⌘ Continued support from the top communicates long-term intent
 - ⌘ Describe what will happen over and over
 - ⌘ Manager visible and available to answer questions and support new way of work life
 - ⌘ An employee idea board will improve staff ownership of the new Lean culture

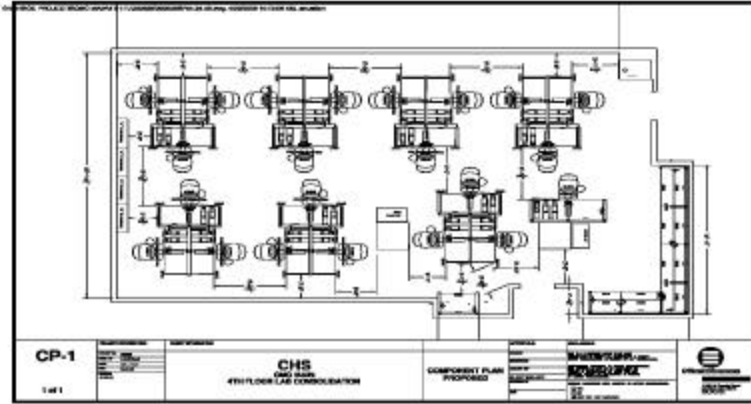


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New Workflow



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Questions and Answers



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