

# Using Workflow Redesign in a New DNA Isolation Laboratory to Cut TAT, Improve Productivity, and Advance Patient Care

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Nicole Muenchow, Supervisor DNA Core and Clinical Trials & Cellular Therapies

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# Versiti – Who Are We?

## Our Mission

We are ***Blood Health Innovators*** who enhance lives through **discovery, diagnosis, and treatment.**

## Our Vision

We will **expand the frontiers of patient health** through the integration of science, medicine, and service.

## Our Core Values



### Do Right Always

Uncompromising Quality | Unflinching Honesty  
| Unwavering Stewardship



### Strengthen the Team

Be Inclusive | Collaborate with  
Courage | Cultivate Community



### Find a Better Way

Embrace Curiosity | Enlarge the Conversation  
| Generate Solutions



### Make Results Happen

Inspire Urgency | Ignite Passion |  
Drive Performance

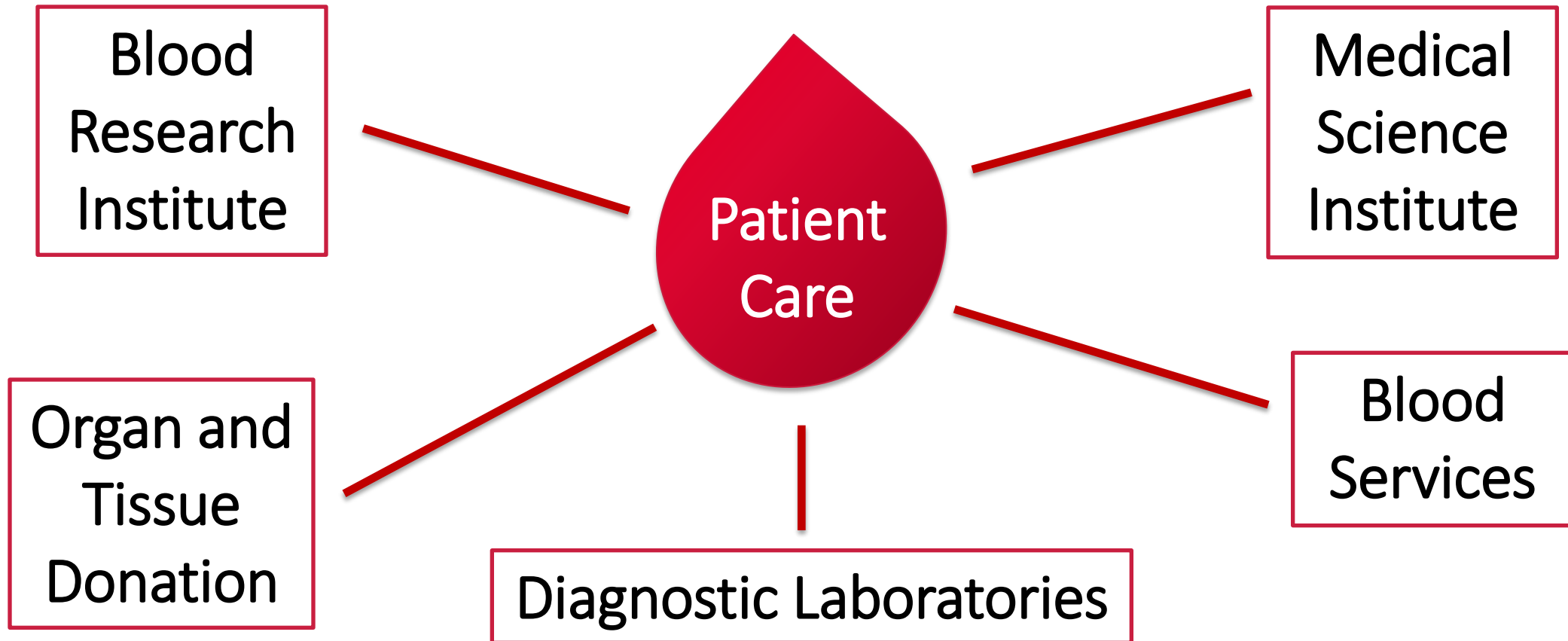


# Versiti – Our Foundation

Everything we do starts and ends with patient care...



# Versiti's Diversity – Multifaceted Care



# Versiti Diagnostic Laboratories

- Use innovative tests and unparalleled expertise to help physicians **deliver better care to each patient.**
- Network of locations (WI, MI, IN, IL)
- Comprised of multiple areas of expertise:
  - Histocompatibility Lab
  - Immunohematology Reference Lab
  - Molecular Oncology and Genetics Lab
  - Hemostasis Lab
  - Platelet & Neutrophil Immunology Lab
  - Donor Testing Lab



- DNA Core Lab
- Clinical Trial Services
- Transfusion Services (Children's Hospital of Wisconsin)
- Product Development Lab
- Applied Research Lab

# Versiti Diagnostic Laboratories

- Versiti Diagnostic Labs → Wide variety of tests
- Wisconsin Labs → Most diverse test offerings
- Diagnostic Technology Shift → Molecular testing
- All Wisconsin Labs → Molecular testing
- ↑ Molecular tests = ↑ DNA isolations



# Purpose: Find a Better Way

- **Focus: Improve patient care**
  - Accelerate turn-around-time (TAT)
  - Decrease resources & waste
  - Decrease quality risks
- **Need: Continuous improvement**
  - Standardize workflow
  - Increase efficiency gains
  - Streamline processes
  - Redesign workspace layout



- **Implement DNA Core Lab**
  - Standardized workflow
  - Centralization of tasks
  - Reconstructed lab space
  - Flexible staffing role
- **Exceeded expectations**
  - Improved TAT
  - Efficiency gains
  - Better customer service

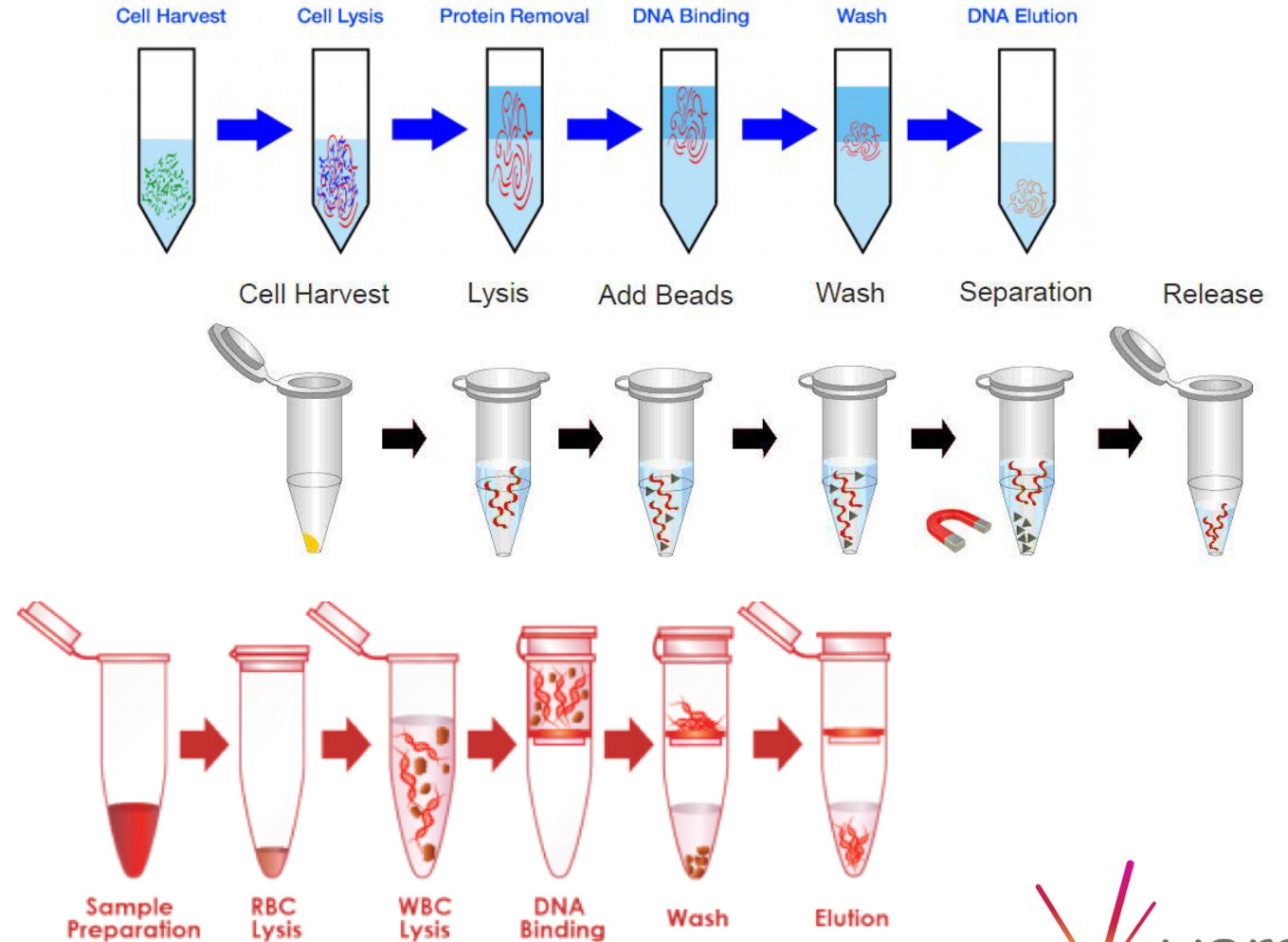
# Find a Better Way

## Objectives:

- Demonstrate how creating a standardized workflow and redesigning the layout of a workspace can create efficiency gains and reduce potential risk, for both patient samples and staff.
- Share the benefits of applying continuous improvement tools, including 3D planning, to assist in streamlining a workflow and redesigning and constructing a new workspace.
- Convey the effectiveness of performing pilot runs and the importance of continuous improvement efforts post-implementation.

# DNA Isolation - Initial State

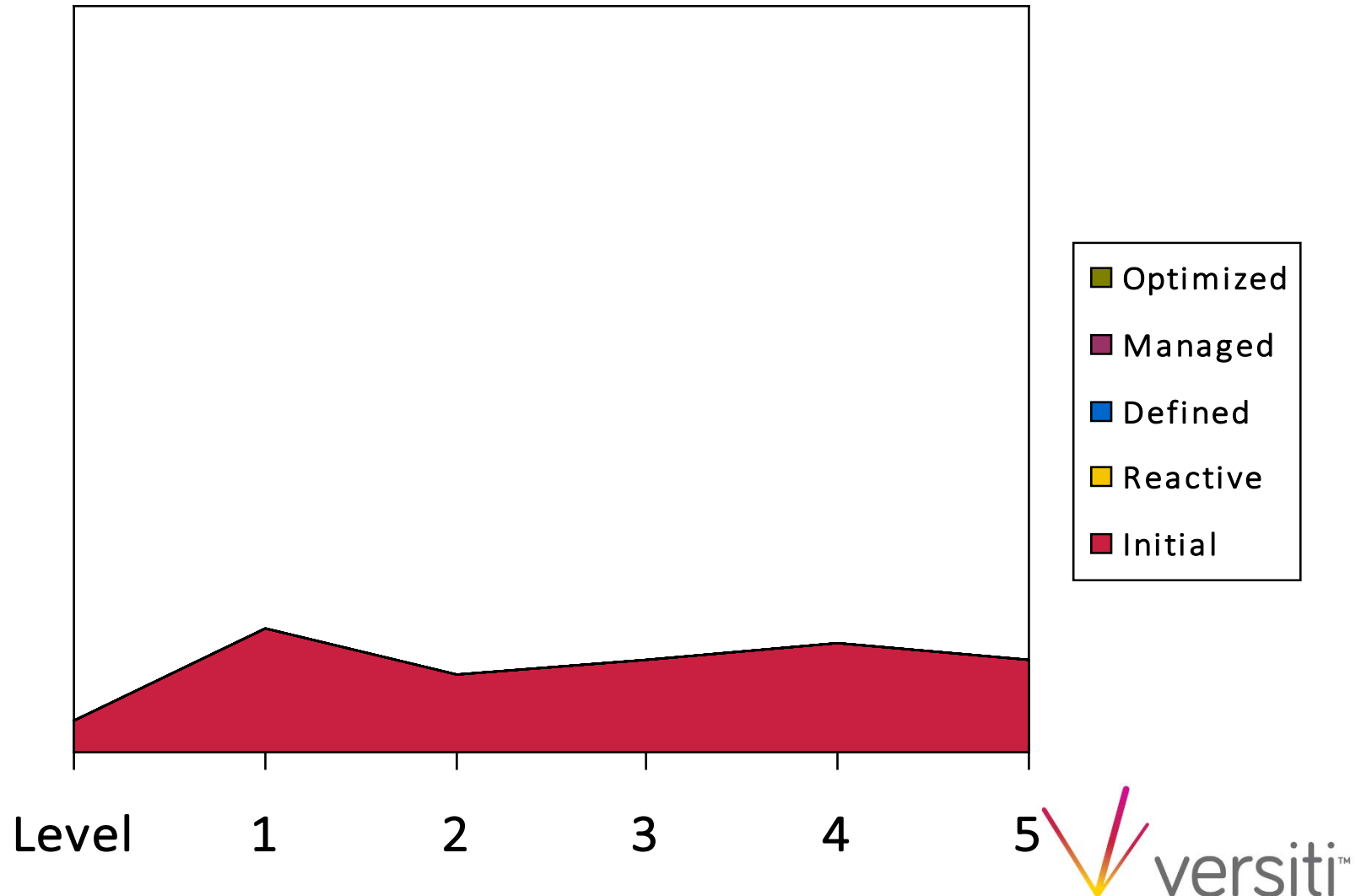
3 Labs,  
3 Manual DNA  
Isolation  
Methods



# DNA Core → Initial Maturity

## Maturity Level 1

- Variation in manual isolation methods
- Little room for growth in isolation volumes
- Continuous improvement efforts occurred in silos
- Introduced risk to quality



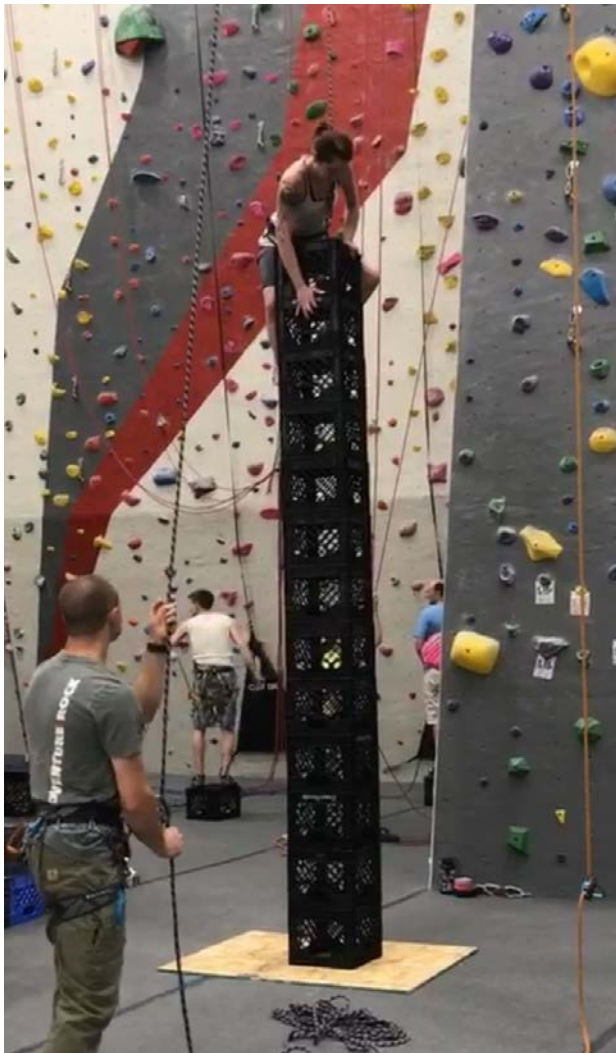
# Initial Realization of Issues

- Automated DNA isolation
- Singular process
- Dedicated staff
- Consistent scheduling



El Capitan, Yosemite National Park

# DNA Core: Reactive Creation



Learned to balance...  
...on 13 milk crates!

## 2015→DNA Core Creation

- Process “owner”
- Technology shift
- Centralization of tasks
- Dedicated resources

# DNA Core Creation

- **Molecular Lab Oversight**
  - Process ownership
  - Direct leadership
- **Dedicated Resources**
  - Hired 2 dedicated DNA Core Techs
  - Additional Lab Technologists staffed each day from 3 different labs
- **DNA Isolation**
  - Implemented new automated system
  - Created singular manual isolation process
- **Dedicated Workspace**
  - Centralized location for automated isolation

# Tight Spaces

**Ante Room: Sample drop-off**



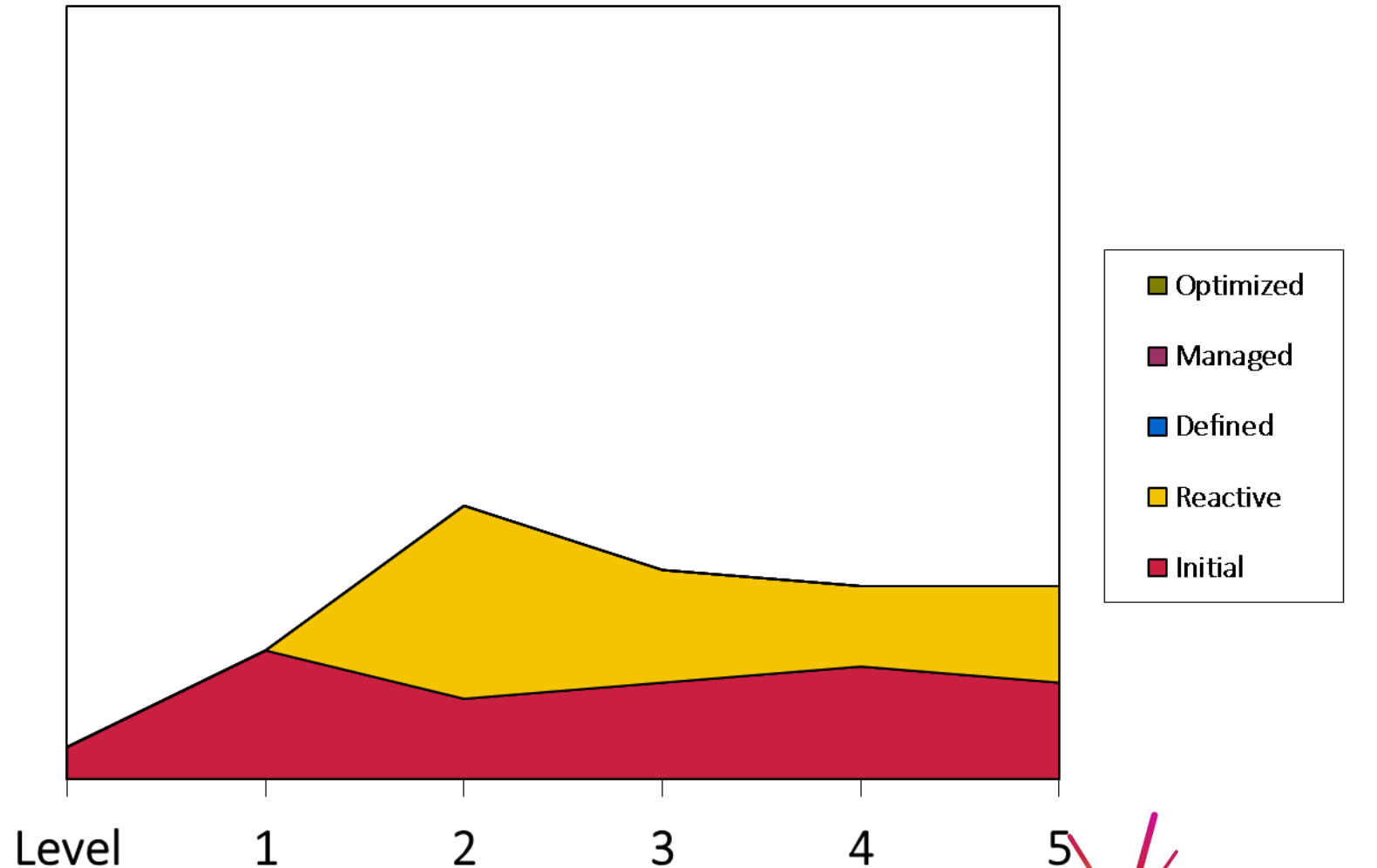
**DNA Core: Automated Isolation**



# DNA Core → Reactive Maturity

## Maturity Level 2

- Dedicated DNA Core Techs had limited opportunities
- 3 Labs rotating 6 Lab Technologists for ½ days
- Scheduling nightmare
- Difficult to cross-train and maintain competencies
- DNA Core Techs do not complete manual isolations



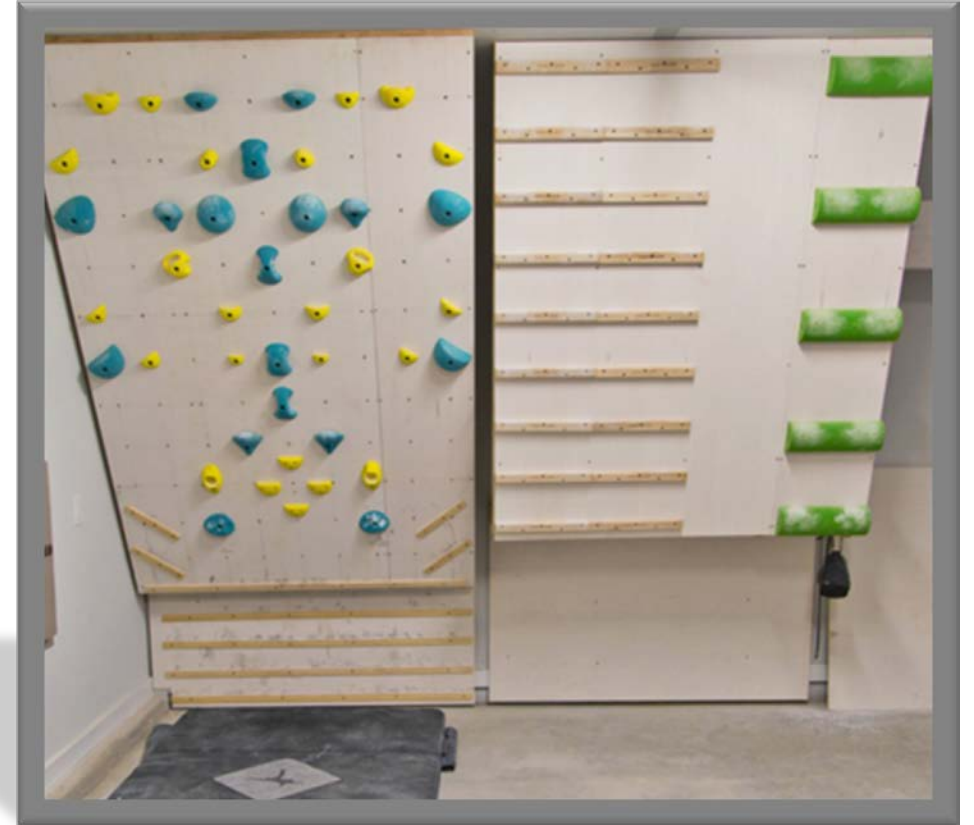
# DNA Core: Defined Project

## 2016 → Define Project and Key Objectives

- Create robust processes that ensure quality
- DNA Core to become independent lab
- Define workflows
- Refine DNA Core staffing model
- Flexibility to sample volumes

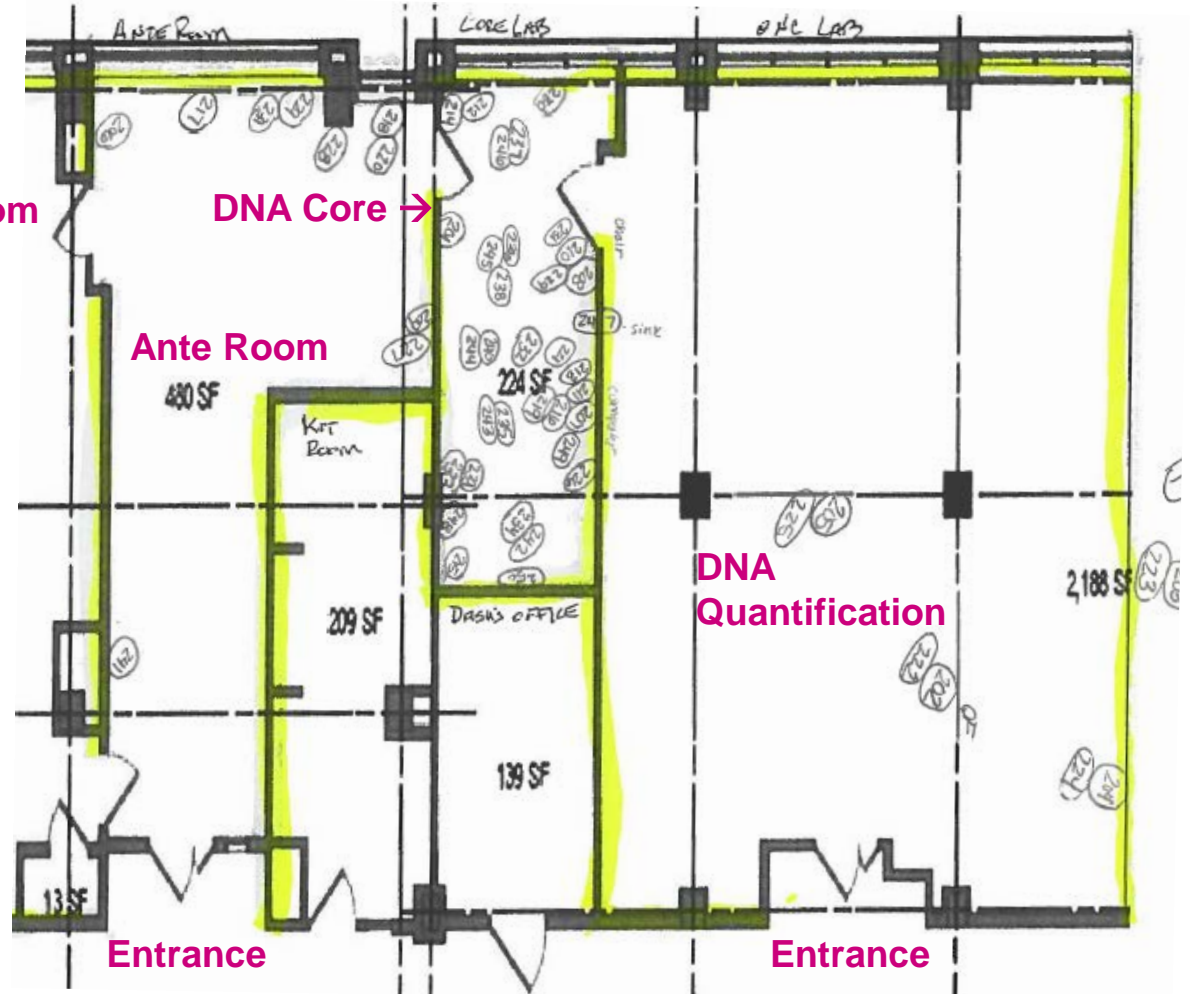
Refocused on the goal....

Started with the fundamentals...



# Identifying Areas for Improvement

- Value Stream Mapping
  - Identified pain points
  - Mapped ideal state to find resolution
- Spaghetti Map
  - Necessary equipment in multiple lab spaces
  - Congestion
  - No room for growth



# Improving Quality – Processes Updates

## Failure Modes and Effects Analysis

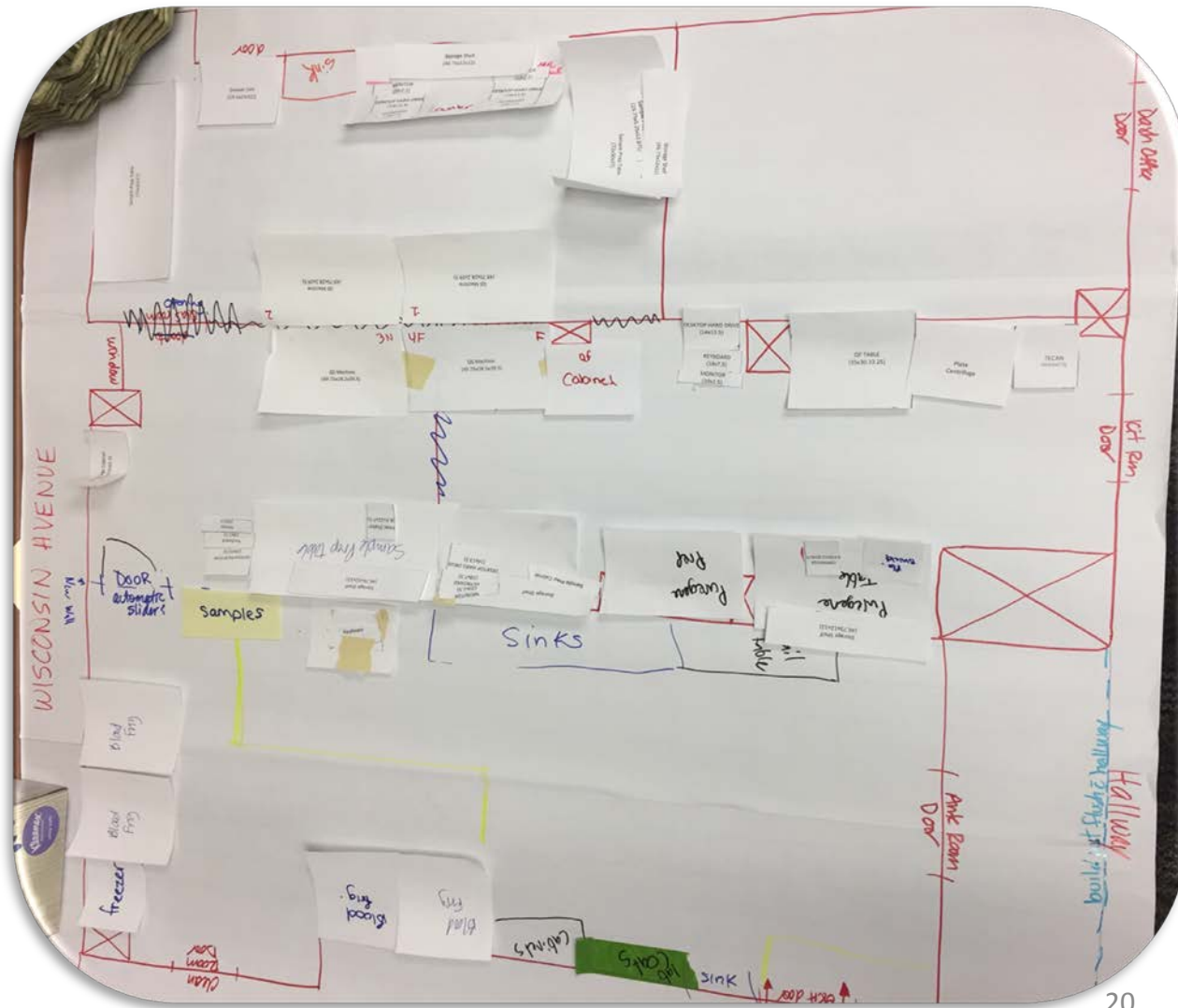
- **Quality Risks**
  - Rotate 6 Lab Technologists for ½ days
  - Competency concerns
  - Sample tracking & TAT delays
- **Quality Improvements**
  - DNA isolation procedures
    - Verification steps
    - Updated SOPs
    - Tracking logs
  - Rotate 4 Lab Technologists for ½ days

# Improving Workspace - 2D Planning in DNA Core Lab

- **Layout and Workspace:**
  - Little space for automated & manual isolation
- **Three focus groups to begin new plan:**
  - Quality/Safety
  - Cost
  - Workflow
- **Original plan:**
  - Make space in current clean room
- **Decision:**
  - Not possible from a quality perspective
  - Disruptive to other processes



# Improving Workspace - 2D Planning in DNA Core Lab



- **New plan:**
  - Start from scratch!
- **2D Design**
  - Map area and equipment to scale
  - Objects “moveable” to assist with space planning

# Improving Workspace - 3D Planning in DNA Core Lab

- Walk-through of proposed DNA Core lab space
  - Visualization of workspace prior to construction
  - Awareness to all departments
  - Input from all departments
  - Feedback and suggestions utilized in final design

## Ante Room



## DNA Core

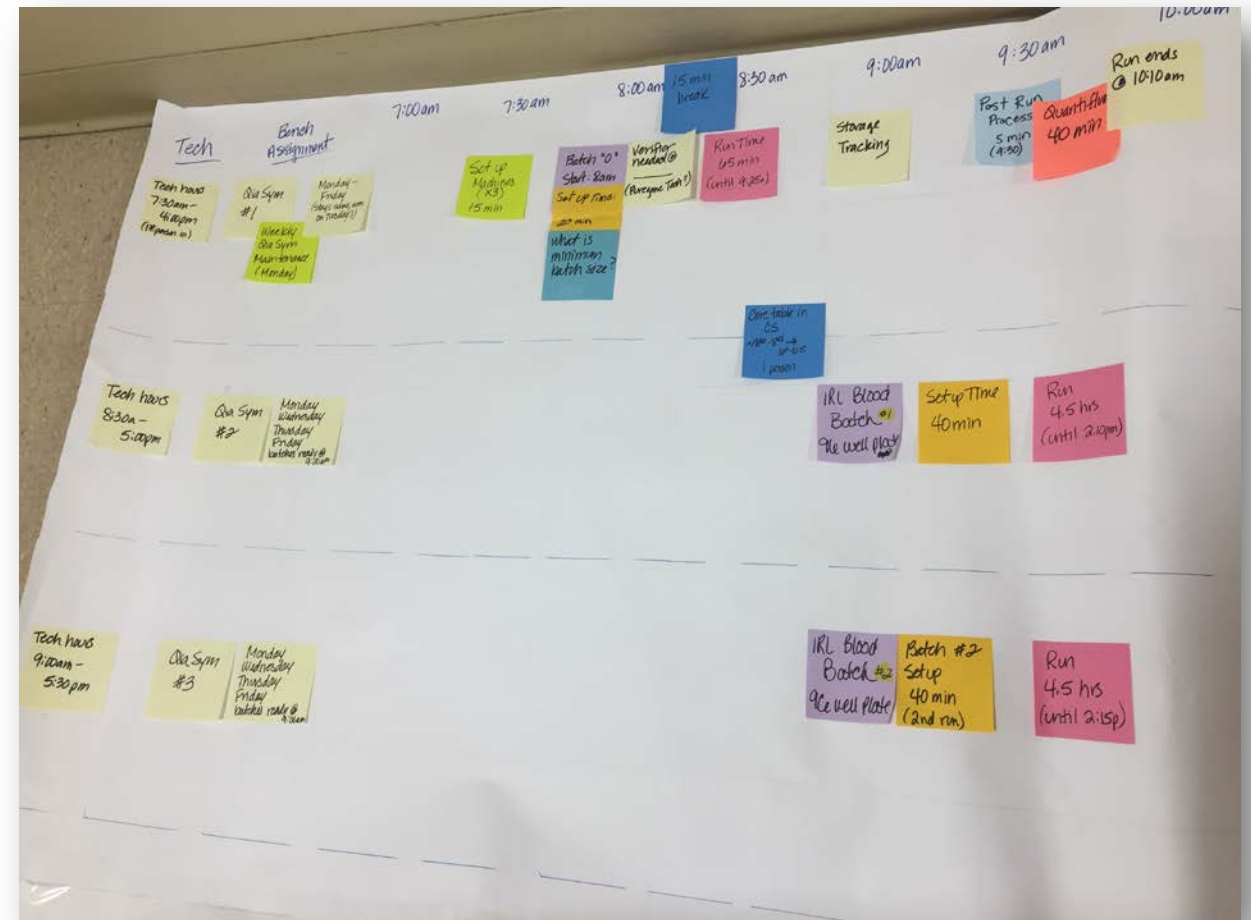


# Improving Workspace - Tear It All Down

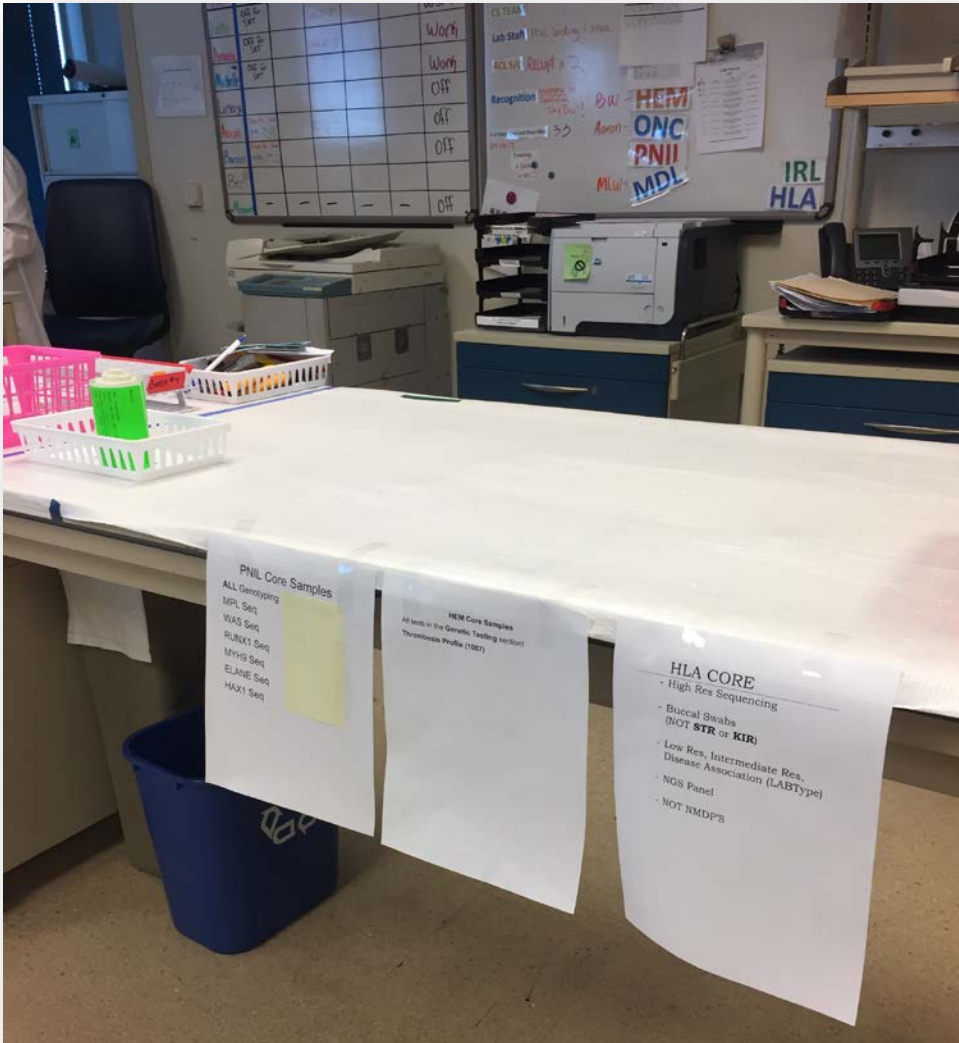


# Improving Workflow - More Than Just Construction

- **Workflow redesign**
  - Increased sample volumes
  - Sample types
  - Staff needed
  - Timing
  - Schedule Changes
- **New Roles**
  - Specimen Processing Technologist
  - DNA Core Supervisor

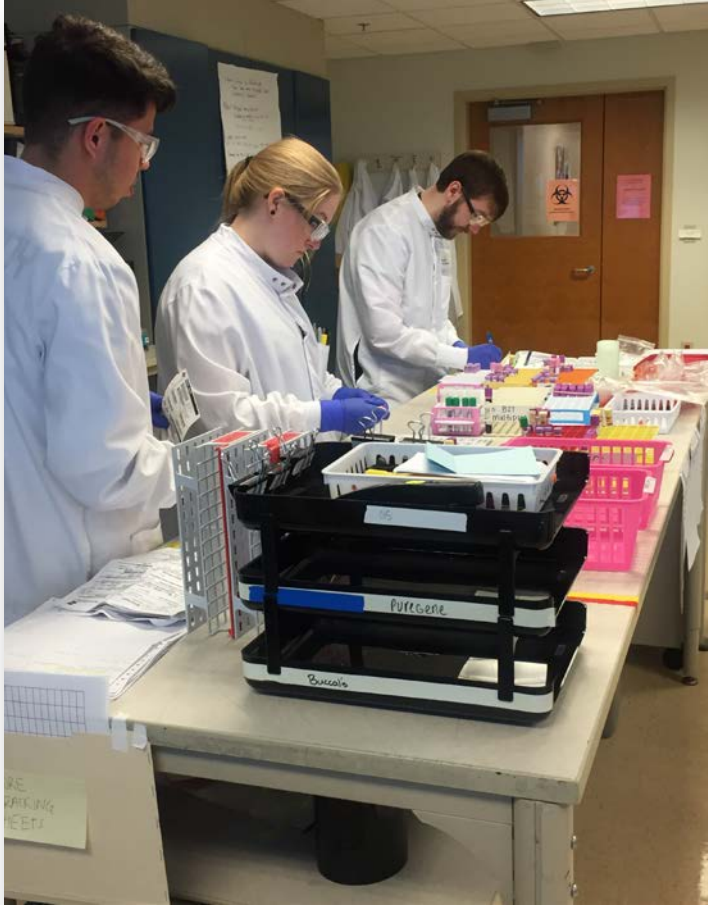


# Improving Workflow – A Pilot in Sample Processing



- **Current:**
  - Samples needing DNA isolation go to each individual lab
  - Lab routes samples to DNA Core for afternoon isolation
- **Proposed:**
  - Create DNA Core table for all samples needing DNA isolation
  - Route samples directly to DNA Core
  - Samples batched for delivery for immediate isolation

# Improving Workflow – A Pilot in Sample Processing



## Pilot Result:

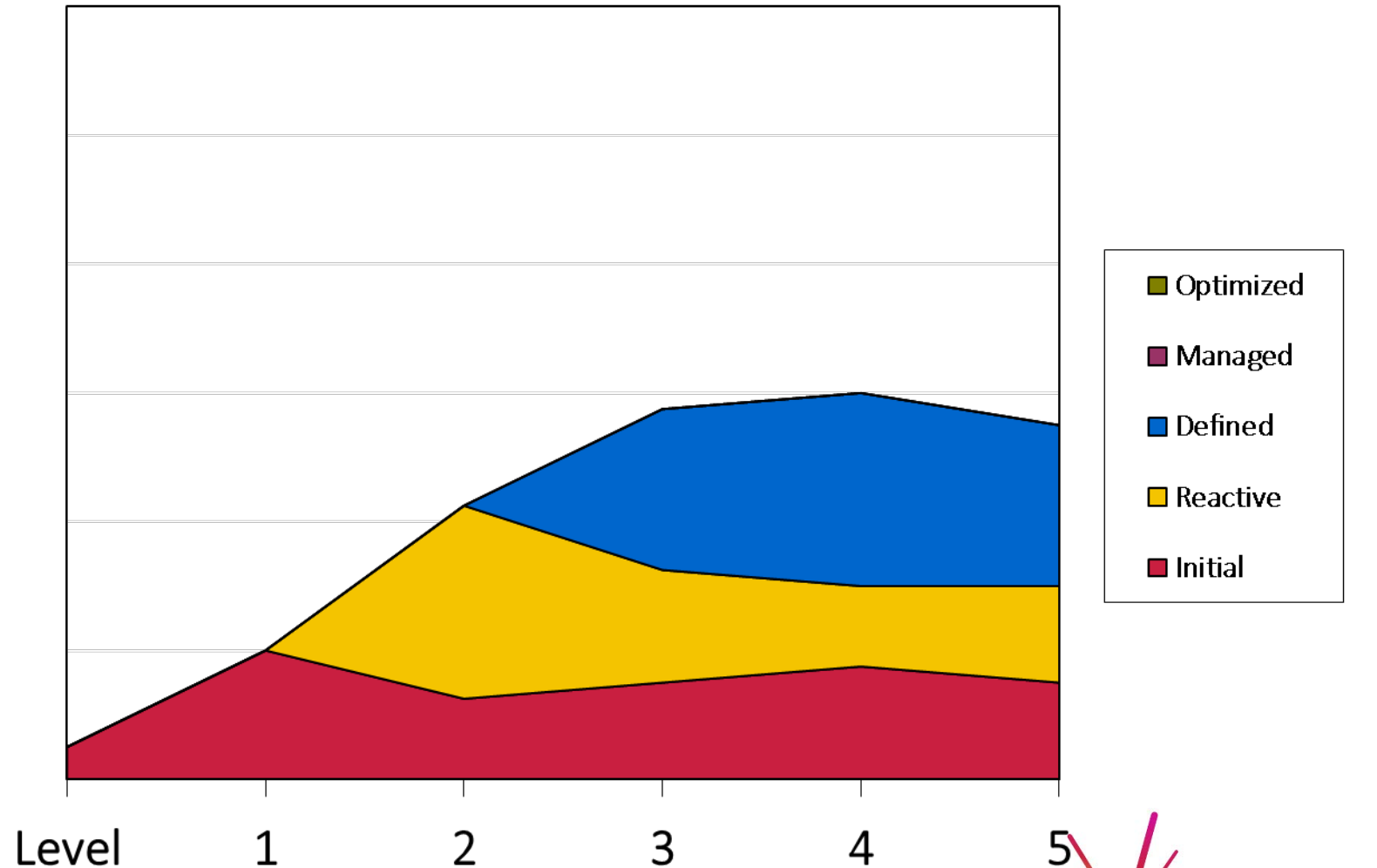
First batch ready for isolation by 10:10 am!

**Samples get to DNA Core fast and efficiently!**

# DNA Core → Defined Maturity

## Maturity Level 3

- Project started
- Key objectives identified
- Quality issues addressed
- Workflow determined
- Lab space designed
- Staff roles refined



# DNA Core Implementation

2018 → DNA Core became independent lab

- Staff in place
- Workspace constructed
- Increase sample volumes
- Workflow implemented

...Climbing Goal Achieved!



Devil's Lake State Park, Wisconsin



# Improved Staff Roles

- Specimen Processing Technologist
  - Team of 8
  - Automated & manual DNA isolations
  - Quality reviews, supply & equipment management
  - Flexible staffing role
- Supervisor – DNA Core & Clinical Trials and Cellular Therapies
  - Operational oversight
  - Flexible role

# DNA Core: Improved Workspace

Ante Room



Manual Isolation

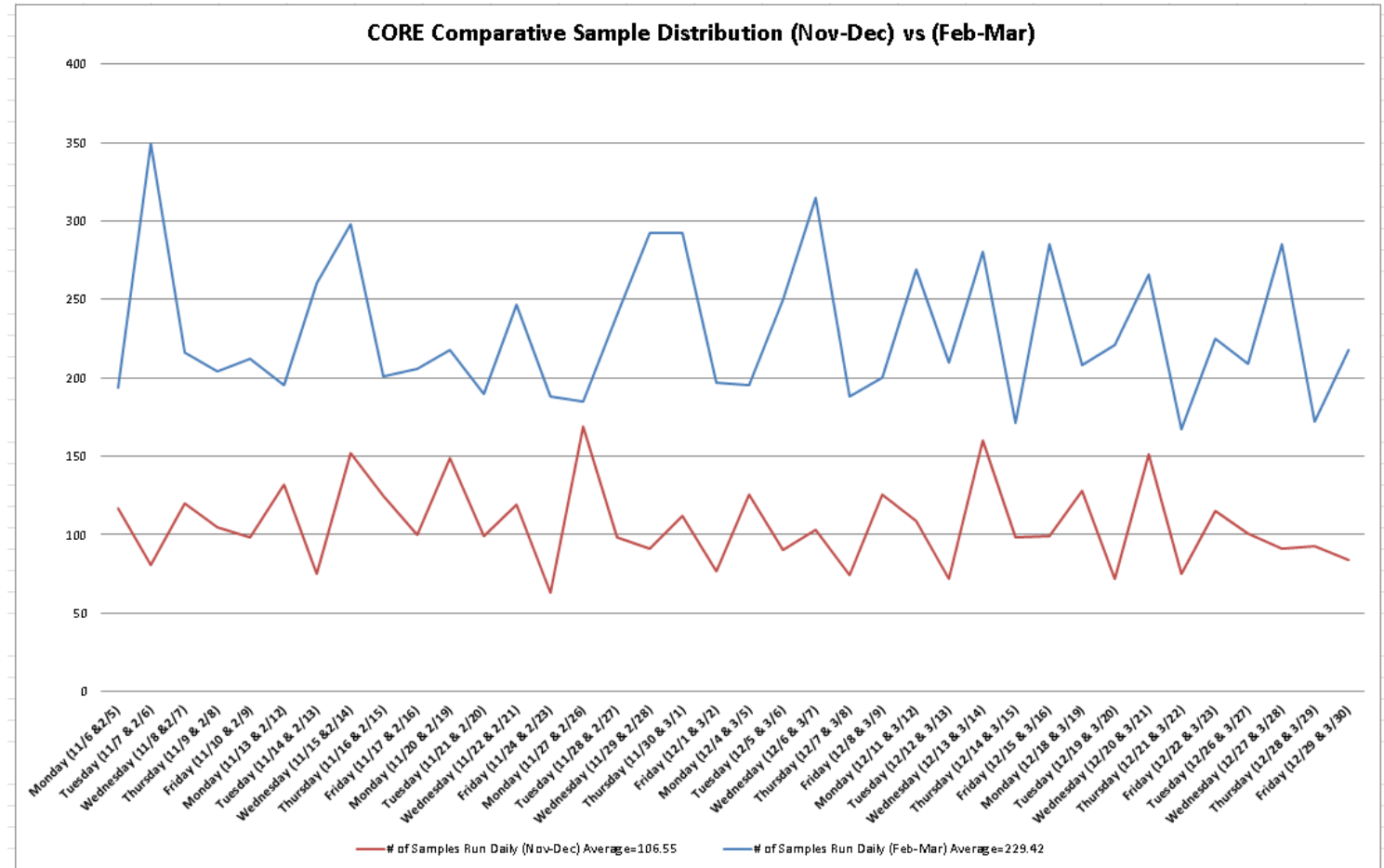


Automated Isolation



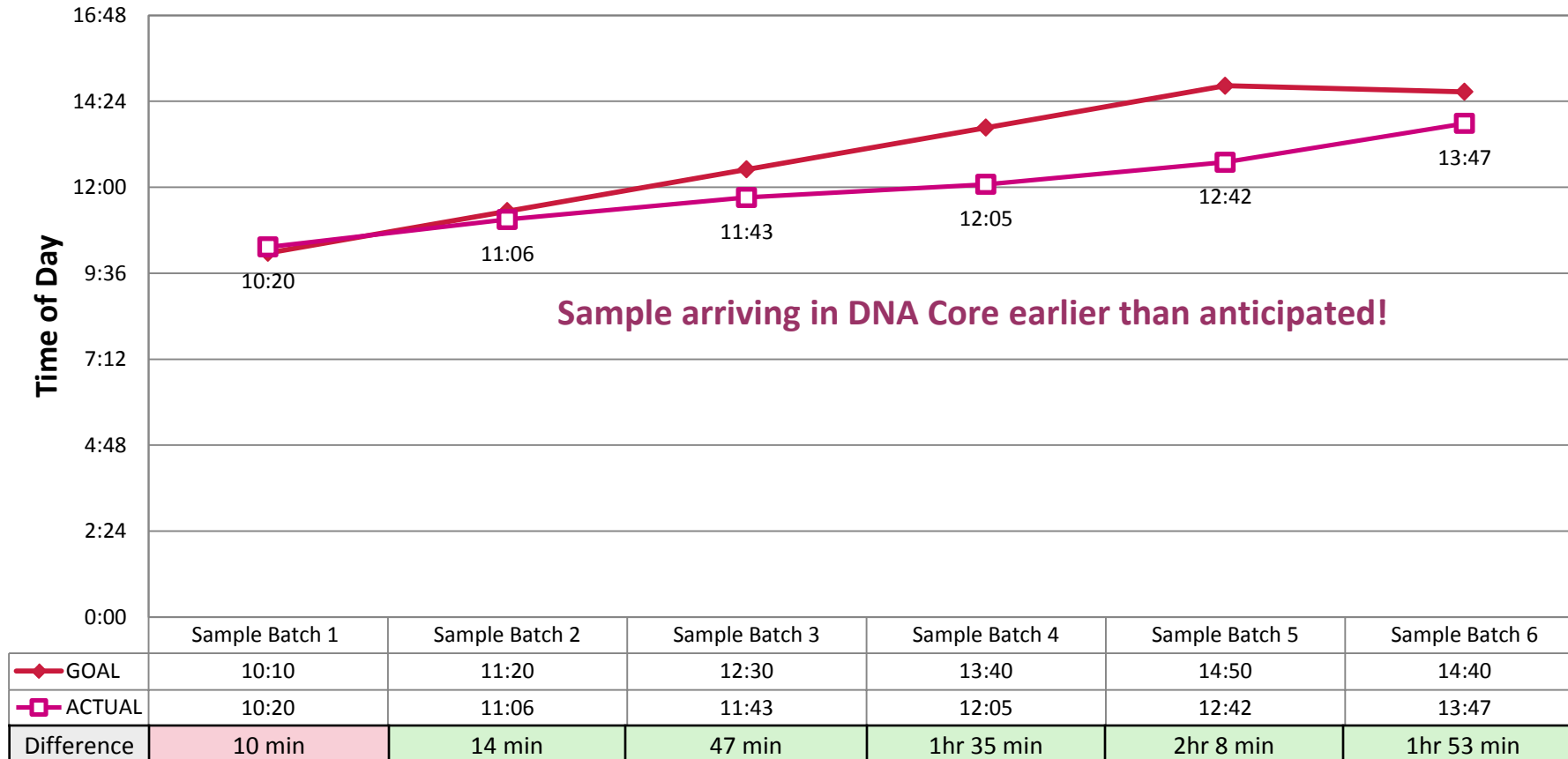
# Bring on the Samples!

- **February 2018**
  - Additional 100-200 samples per day from expansion of RBC genotyped donor units
  - Previously isolated manually by Reference Lab
- **Doubled average number of samples isolated per day**
  - Nov & Dec 2017:
    - **107** samples
  - Feb & Mar 2018:
    - **229** samples



# Improved Workflow – Pilot Targets Exceeded

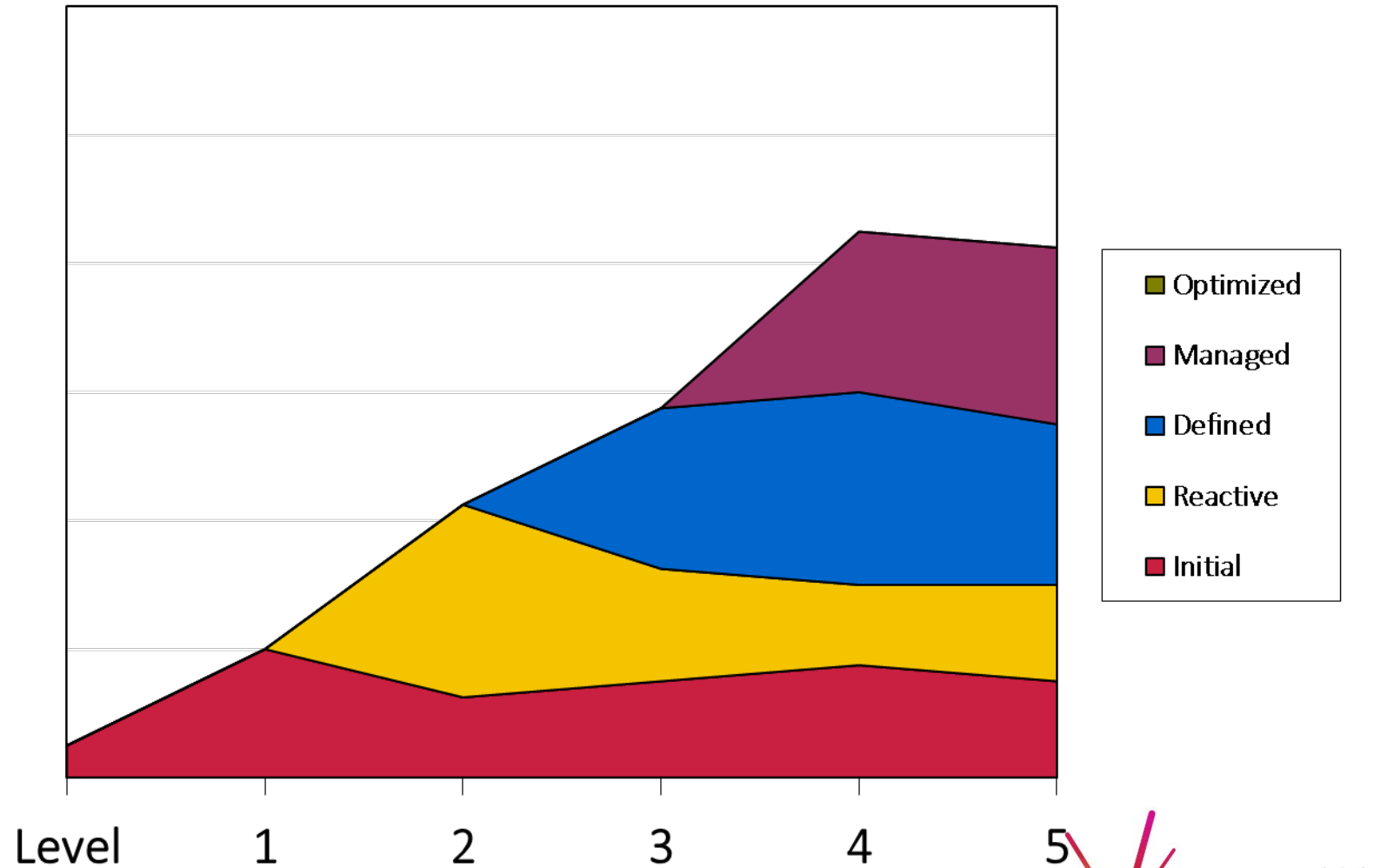
## Batch Time From Client Services to DNA Core



# DNA Core – Managed Maturity

## Maturity Level 4

- Staff in new roles
- Large new workspace
- Automated & manual DNA isolations
- Increased sample volumes
- Improved workflow
- Exceeded TAT expectations



# Continuous Improvement Never Ceases

QIA 1	7:30-4:00
QIA 2	8:30-5:00
QIA 3	9:00-5:30

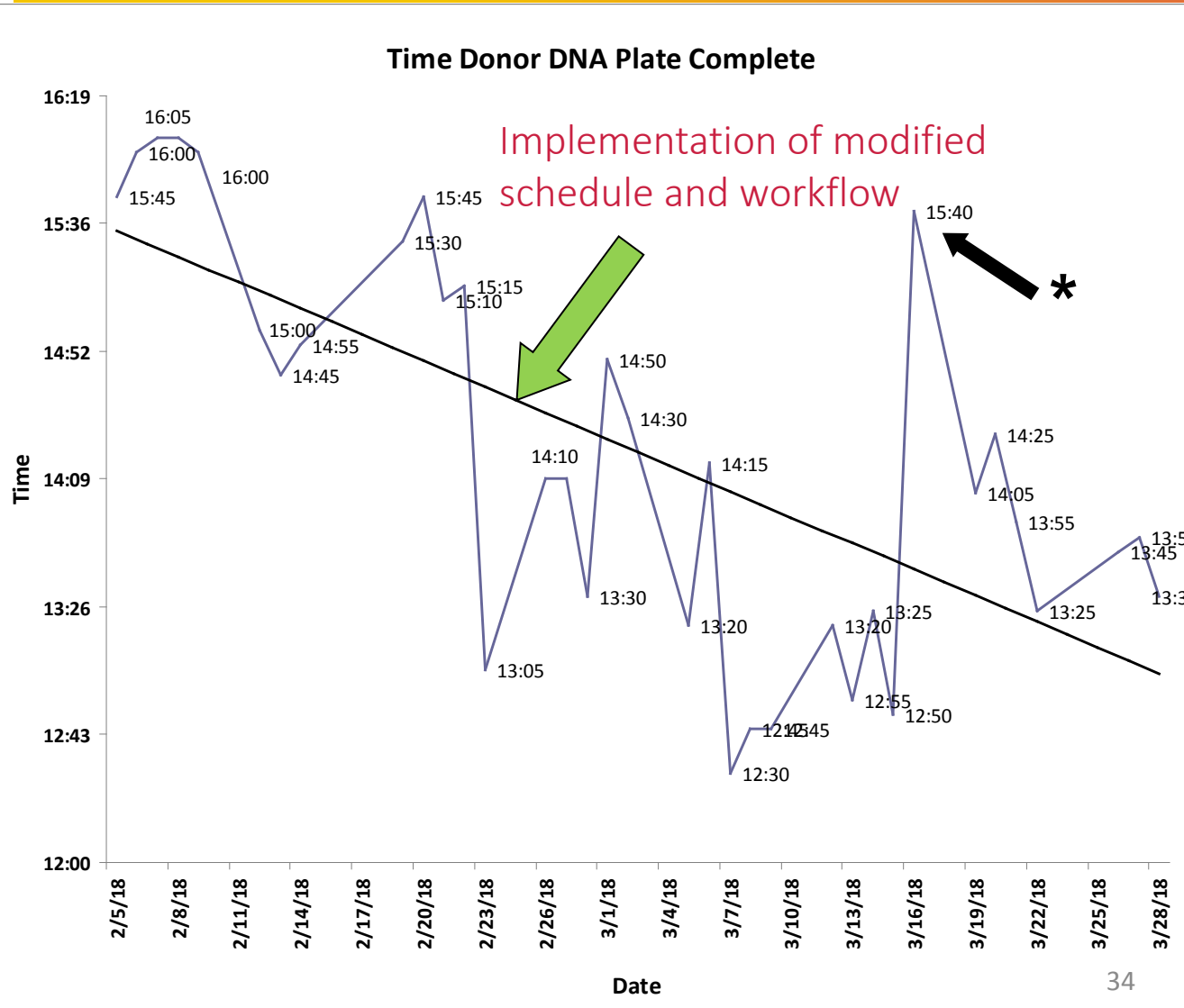


QIA 1	7:30-4:00
QIA 2	7:30-4:00
QIA 3	8:00-4:30

- Solid beginning with new workflow
- Needed to adjust based on feedback
- Accommodate an even larger volume with donor samples
- Labs needed samples back quicker even though we were meeting our targets

- Revised schedule with staff input
  - Additional staff with earlier start time to allow for verifications
- 3 DNA Core techs performing automated isolations in afternoon
- Donor Plates to DNA Core by 7:30am every day instead of mid-morning as proposed

# TAT Improvement

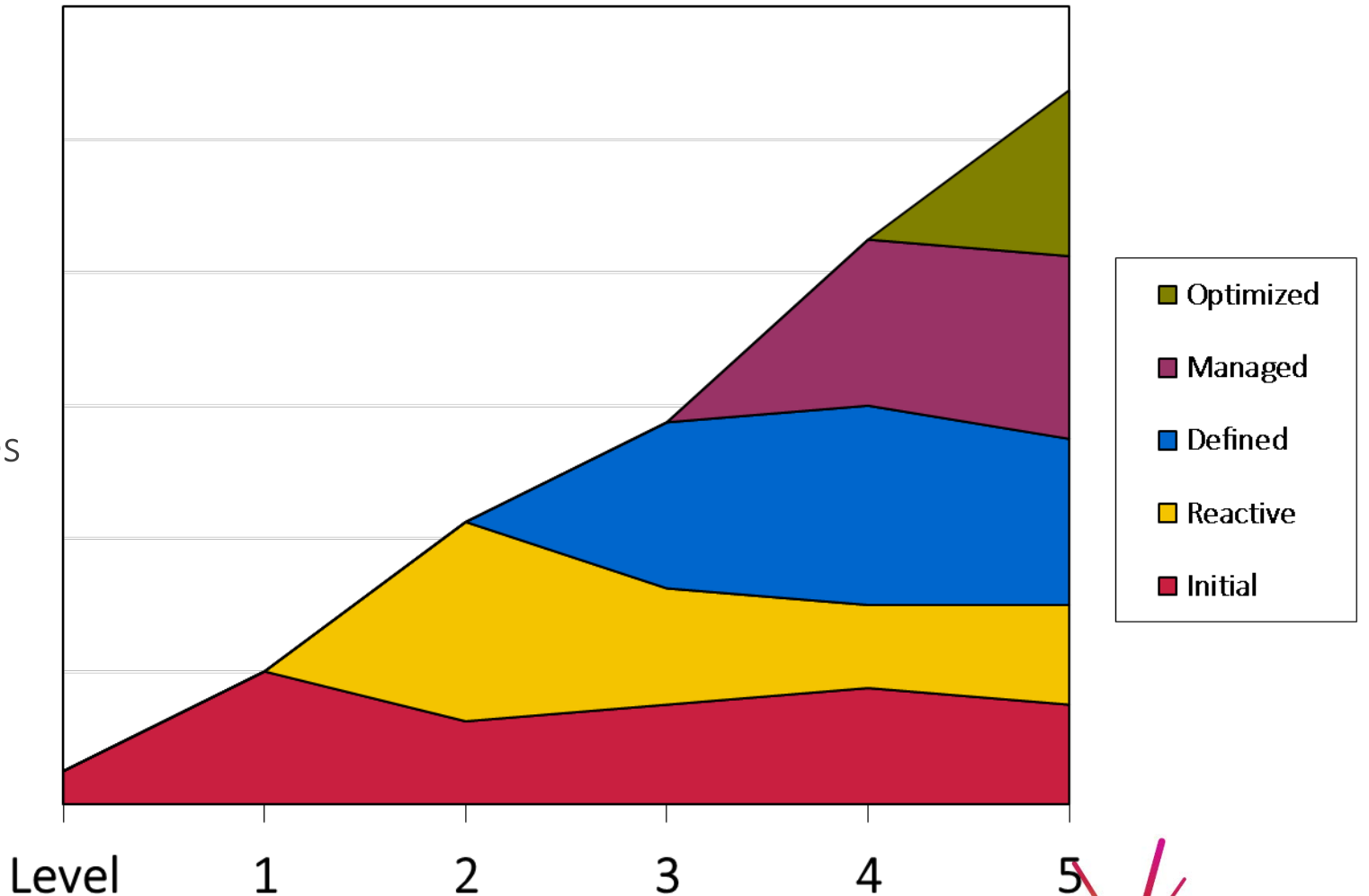


- Average time Donor DNA complete:
  - Proposed schedule: **15:30**
  - Modified schedule: **13:30**
  - \*Equipment repair
- **Outcomes:**
  - Schedule and workflow modifications improved TAT by 2 hours!!
  - Specimen Processing Tech time and efficiency savings!

# DNA Core → Optimized Maturity

## Maturity Level 5

- Creation of independent lab
- 8 Specimen Processing Technologists
  - Flexible staffing
  - Multifunctional role
  - Career advancement opportunities
- Removed Medical and Lab Technologists from DNA isolation & Client Services processes
- DNA returned to labs within hours of receipt instead of next day



**Always room for improvement!!**

# Lessons Learned

- **What we did well:**
  - Staff involvement and empowerment to make decisions
  - Prioritized project with dedicated resources
  - Piloting CS process
  - 3D Planning
  - Flexible staffing role
  - Create solutions for displaced tasks during renovation
  - Coordination of departments during construction
- **What we could have improved:**
  - Automated more steps and verifications up-front
  - More effort to simplify the process flow and hand-offs from the beginning
  - Staff involvement sooner
  - More time for instrument installation and validation

# Mechanisms to Sustain and Improve Progress



- **Continuous Improvement**
  - Huddle Boards
  - Process FMEAs
- **Specimen Integrity Initiative**
  - Quality initiative
  - Proactive identification of risks
  - Collaborative efforts among DNA Core staff and all Versiti Diagnostic Labs

**Keep Climbing and Improving Skills!**

# Questions?

Nicole Muenchow

*Supervisor DNA Core and Clinical Trials &  
Cellular Therapies*

Nicole.Muenchow@bcw.edu

