Partners – People – Processes

Laboratory Efficiency Improvement Efforts
City of Milwaukee Public Health Laboratory

Steve Gradus, PhD, D(ABMM)
Laboratory Director

Sanjib Bhattacharyya, PhD
Deputy Laboratory Director

Kwadwo Owusu-Ofori, PhD
Laboratory Operations Manager

Acknowledgments

APHL LEAN Workshop & QI Group

APHL - National Center for Public Health Laboratory Leadership (NCPHLL)

APHL - LEAN Leadership Group of NCPHLL

APHL GRANTS (5 grants)

MHD Administration and Staff

‘Partners’

MHDL Laboratory System Improvement Program (L-SIP)

Research

Workforce Development

Milwaukee L-SIP Impacts

APPENDIX C Examples of Incidental System-Strengthening Apart from Strategic Planning

Visiting Researchers to Local PH Lab: discuss possible research collaborations:

1. Professor of Pharmacology: Concordia University – Toxics and poor birth outcomes
2. Physician neotnatologist with Medical College – poor birth outcomes and toxics
3. Engineer from Marquette University investigating environmental impact of waste water and need for parasitology analysis
4. Director of research center, UW-Milwaukee: possible toxics and health outcomes
5. Professor of Pharmacology Concordia University: need for TB susceptibility testing

Speaking requests regarding public health, LSIP and the PH laboratory

1. Keynote address to area research group: PH research/programs, including LSIP,12/11
2. Medical College of Wisconsin education day symposium: Fall 2012
3. Medical College of Wisconsin: provide seminar on aspects of PH research: Jan. 2013
4. PH Lab molecular testing: Milwaukee School of Engineering BioMolecular Program
5. Concordia Pharmacology Dept: PH molecular testing and applied research

Strengthening ongoing relationships

1. Milwaukee School of Engineering: PH lab staff appointment to Biomolecular Program
2. Marquette University lectures in undergrad PH course: MU Course Director on LSIP
3. Seminars to UW Water institute
4. Milwaukee Area Technical College – internship interests/collaborations

Interface with other local research consortia or planned discussions

1. NIH funded Clinical and Translational Science Institute: 8 institution research consortium – contacts known, discussions resulted
2. Meet with CTSI Director and Community Engagement collaborations have been identified.
3. NIH funded Children's Environmental Health Sciences Core Center – MHDL affiliated, participation.
4. Medical College of Wisconsin, Institute for Health and Society – contacts known, discussions planned
5. UWM School of Freshwater Sciences – contacts known, discussion planned
6. UWM Zilber School of Public health – MHDL affiliated – discussions to continue

Grant applications

1. Concordia University – Tuberculosis susceptibility testing
2. Concordia University - Toxics in at risk women
3. Marquette University – Parasitology related
4. Medical College of Wisconsin – HWPP Grant submitted

Appendix 8 - Milwaukee's Laboratory System Improvement Program (L-SIP) Timeline

Project Timeline

2010 (Grant #1)

- 6-1-10 Contracted consultant (6-1-10 – 9-30-10)
- 10-29-10 LSIP website ("LSIP Lab Communicator") goes live.
- 11-18-10 ASSESSMENT DAY!
- 2-25-11 Assessment report posted on LSIP website. Spike in website hits.

2011 (Grant #2)

- 6-3-11 Laboratory Advisory Committee (LAC) meets. Strategic planning with assessment results begins. Identify 1 to 3 priorities.
- 8-2-11 MLAC Meets with Subject Matter Experts (SME)
- 12-14-11 MLAC and SME Meeting

2012 (Grant #3)

- February – June 2012 Community Co-Chairs'(4) and Subcommittees' (3) Activities

2013 (Grant #4)

- March 8, 2013 4-Community Co-chairs Meeting
- April 25, 2013 Laboratory Science Career Forum
- May 29, 2013 Workforce Development Task Force

Milwaukee L-SIP Goal:

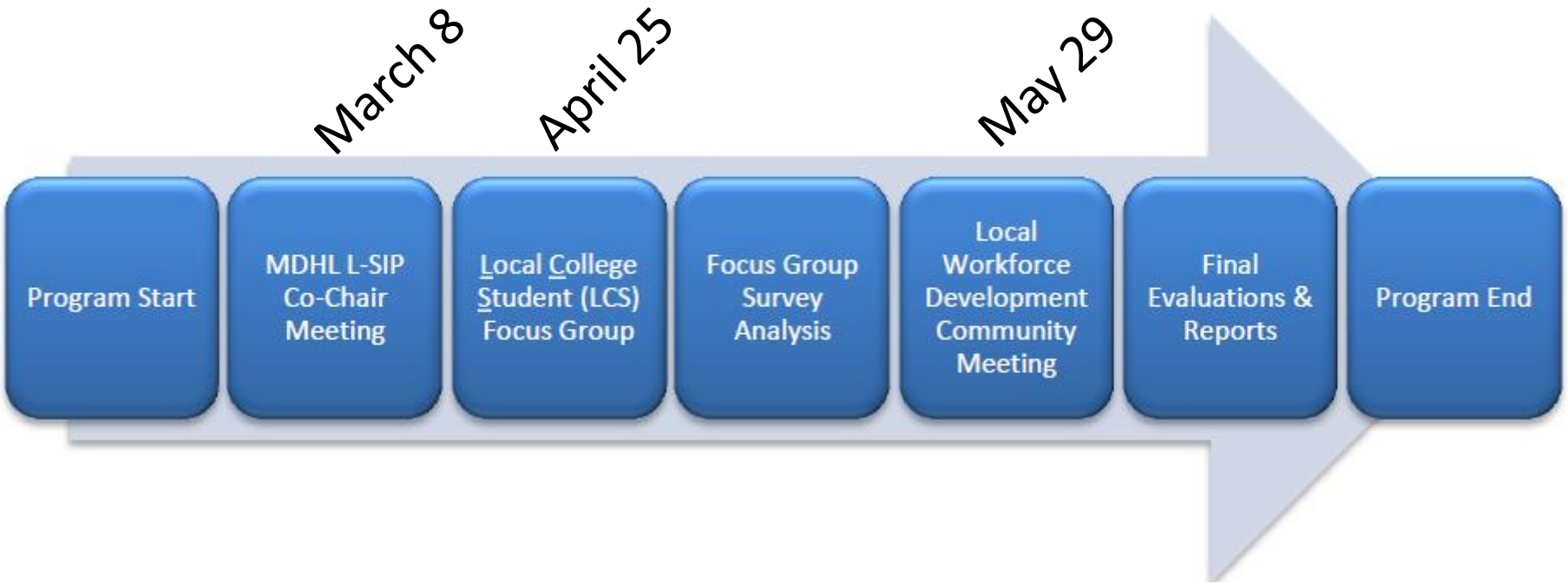
Maximizing the Local Public Health Laboratory system resources and optimizing partnership capacity in support of workforce development and research, and in so doing, support the MHD mission to become an academic health department.

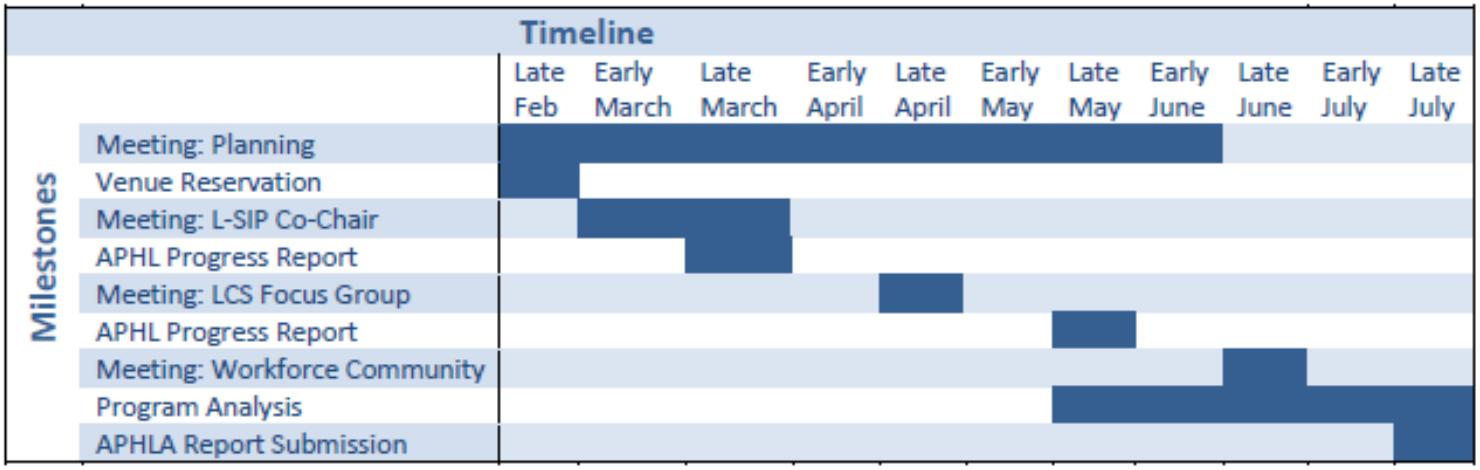
This work was supported by APHL under cooperative agreements #U60/CD303019, #1U60HM000803 and #U60HM000803(CFDA#93.065) from the CDC.
Its contents are solely the responsibility of the authors and do not necessarily represent the official views of the APHL, CDC and/or Assistant Secretary for Preparedness and Response.

APHL 2013 Workforce Development Grant

What innovative and sustainable practices could help address the workforce shortage?

GRANT MILESTONES



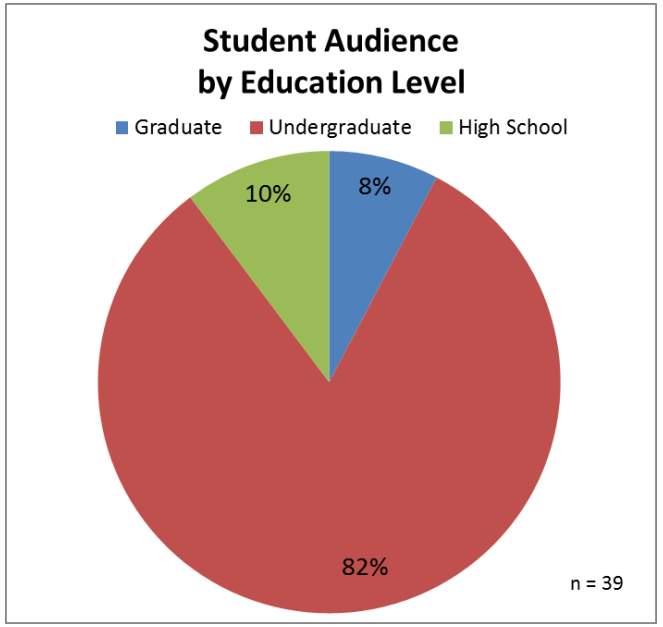


Student Career Forum

UWM-Zilber School of Public Health

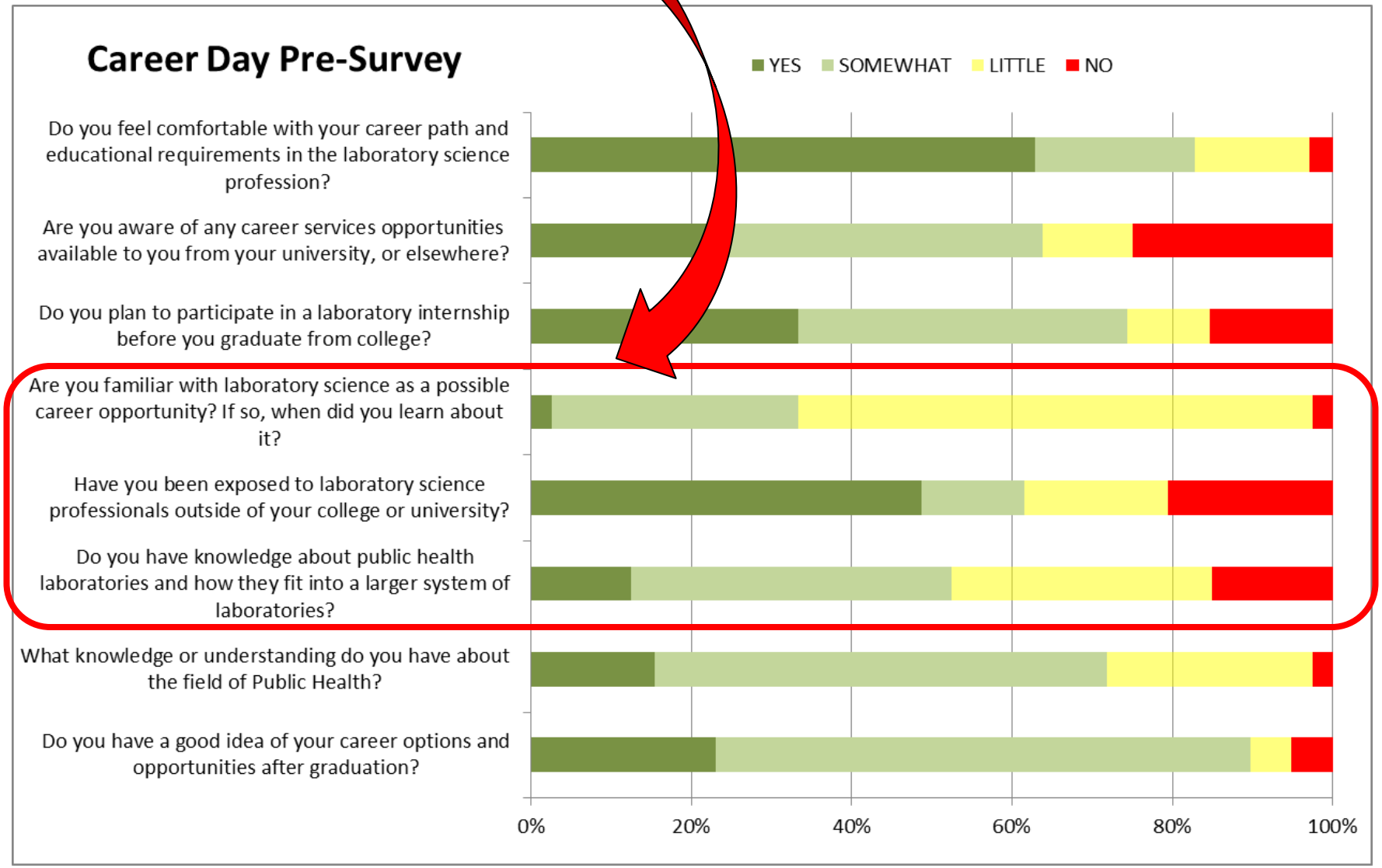
April 25, 2013

CAREER FORUM
- COMMUNITY ENGAGEMENT

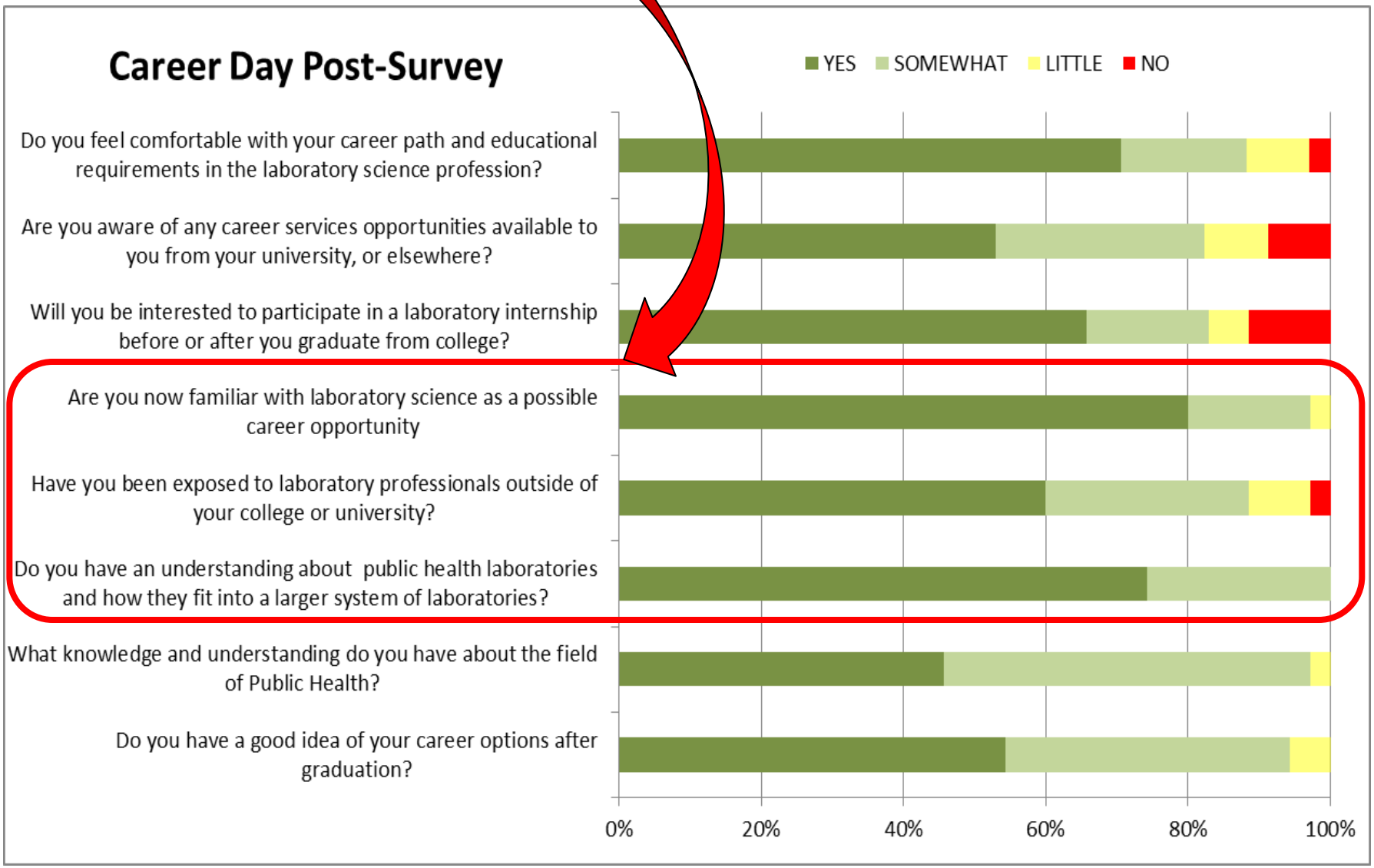


Students (#)	Presenters (#)	Student Advisors (#)
Graduate Undergraduate Technical College High School	Milwaukee Health Dept. WI State Crime Laboratory Gen-Probe, Inc Aurora Consolidated Labs Medical Examiner's Office Milwaukee Metropolitan Sewerage District WI Dept. of Agriculture, Trade, and Consumer Protection	UW-Milwaukee Milwaukee School of Engineering Concordia University of Wisconsin Alverno College Wisconsin Lutheran College

CAREER FORUM
- SUEVEY RESULTS



CAREER FORUM
- SUEVEY RESULTS



Career Forum Student Feedback

"The Laboratory Science Career Forum was an amazing life changing experience and exposed me to a lot more connections I didn't have before! So thank you..."

"I wanted to reach out to you and let you know that the Laboratory Career Forum was incredibly helpful. Thank you so much for letting me know about it!"

City of Milwaukee Public Health Laboratory

Workforce Development Team Meeting

Milwaukee School of Engineering

May 29, 2013

WORKFORCE DEVELOPMENT TEAM MEETING

Facilitated Discussion

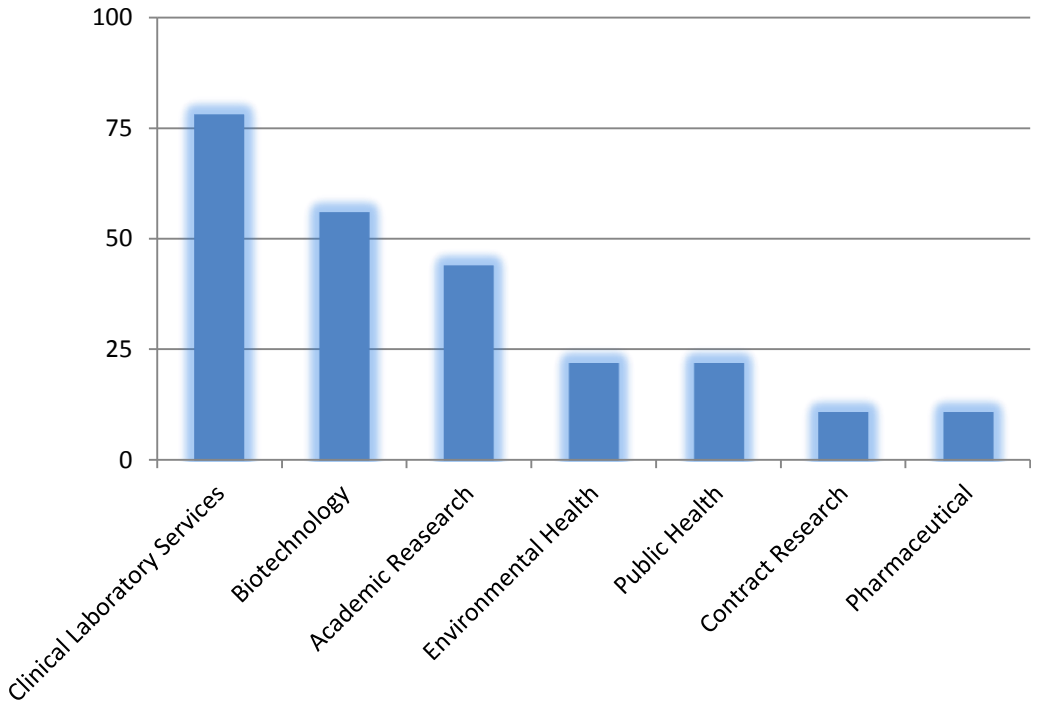
A professional consultant facilitated brainstorming sessions, gap analysis, and design of 'Strategic Plan' objectives

Initial Perspectives – Career Opportunities

Is there a local demand for your students once they graduate? (YES - 88%)

"All of our students have accepted jobs well before graduation - this has been a trend for several years."

"The hospitals and clinics ask for our students. 90 percent of our students get hired before they finish the program."



WORKFORCE DEVELOPMENT TEAM MEETING
- COMMUNITY ENGAGEMENT

Participants At-A-Glance:

11 Academic Institutions/Programs

3 Laboratory System Employers

2 Wisconsin Workforce Development Experts

WORKFORCE DEVELOPMENT MEETING
- RESULTS

Through facilitated discussion and activities, the group targeted **7 overarching strategic goals** to improve workforce development in the **LPHL System**:

- **Expand internship (student and teachers) opportunities**
- **Diversify PHL workforce**
- **Secure funding for workforce development**
- **Create pathways that highlight a variety PHL careers**
- **Standardize collection of workforce data in a shared resource system**
- **Develop strategies to inform graduate and undergraduate students/teachers**
- **Develop marketing campaign for general public**

City of Milwaukee Public Health Laboratory

Innovations in Public Health Laboratory System

Workforce Recruitment and Retention

- Outcomes - *Developed Methods for …….*
1. ……. designing and implementing career forums for the emerging workforce
2. ……. collecting workforce information from PHL system stakeholders for a gap analysis (perspectives)
3. …… engaging system stakeholders in strategic planning for workforce development

MHDL Innovation Grant FINAL report

http://city.milwaukee.gov/ImageLibrary/Groups/healthAuthors/LAB/PDFs/L-SIP/MHDLL-SIPInnovationsGrantStake.pdf

Publications and Recognitions

5 APHL Grants since 2010

2013 L-SIP article in PHR

2012 & 2013 L-SIP posters

2013 NACCHO Model Practice Award

‘People’

- Building on our strength
- Empowering MHD laboratory staff
  - Motivate staff towards sustained quality laboratory practices
  - Invest on staff- QI training
  - Create a pool of qualified QI personnel

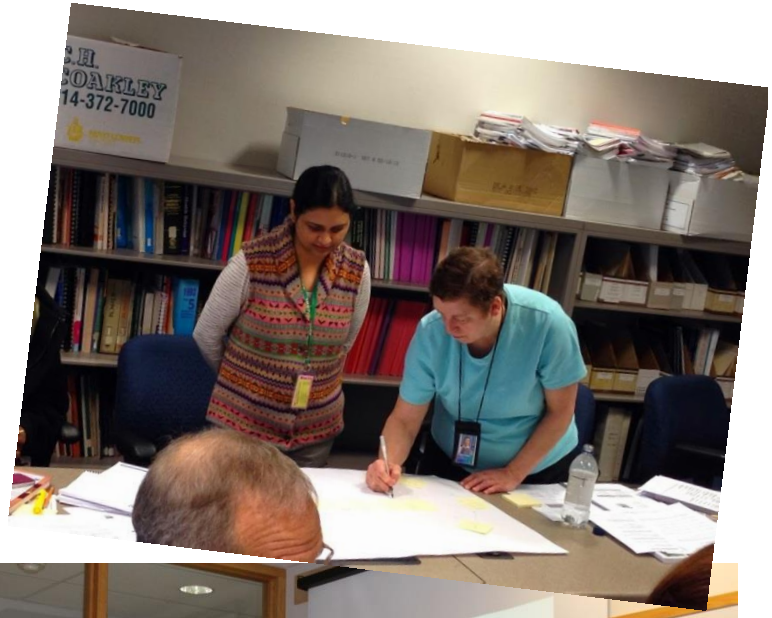
Quality Improvement Initiatives at MHDL

APHL grant supported activities: 2013 - 2014

1. ASQ Quality Associate Certification for staff
2. LEAN projects at MHD laboratory
3. Laboratory Efficiency Initiatives (LEI) for sustained quality laboratory practices

ASQ Quality 101

Quality Improvement Training



Purpose of QI Training

…..*to create* a **“Culture of Quality”** around the technical and administrative tasks that accompany laboratory testing duties

QI Training Outline

- 11 MHDL employees spent 1 week Quality 101 coursework, a training program designed by the American Society for Quality (ASQ)
  - Introduce participants to the basics of quality improvement methodology
  - Trained in 7 basic quality improvement tools
  - A survey to determine staff attitudes towards quality improvement projects in the laboratory
- 3 hours nationally standardized exam offsite

QI Tools

MHDL employees were trained in 7 basic quality improvement tools:

- cause and effect diagrams
- check sheets
- control charts
- histograms
- Pareto charts
- scatter diagrams
- run charts

Outcomes

- Eighty-percent of attendees [ASQ] Certified Quality Improvement Associates (CQIAs)- 52% of MHDL employees
- An organizational culture assessment revealed staff positive attitudes towards QI projects upon ASQ certification
- Cohort went on to create a “Culture of Quality”
  - Initiation of 5S projects to promote workspace cleanliness
  - Daily ‘huddle’ meetings to combat a “section silo” culture
  - A ‘Visual Display Board’ for workload analysis and “hot-button items” for effective lab communication

Conclusions

- CQIAs showed improvement in the quality of communication and boosting staff morale
  - Training and certifying lab scientists, admin and support staff in basic quality tools can inspire a "Culture of Quality" in a PH laboratory
- Challenges keeping staff motivated
- Avoids conflict in management practices

‘Processes’

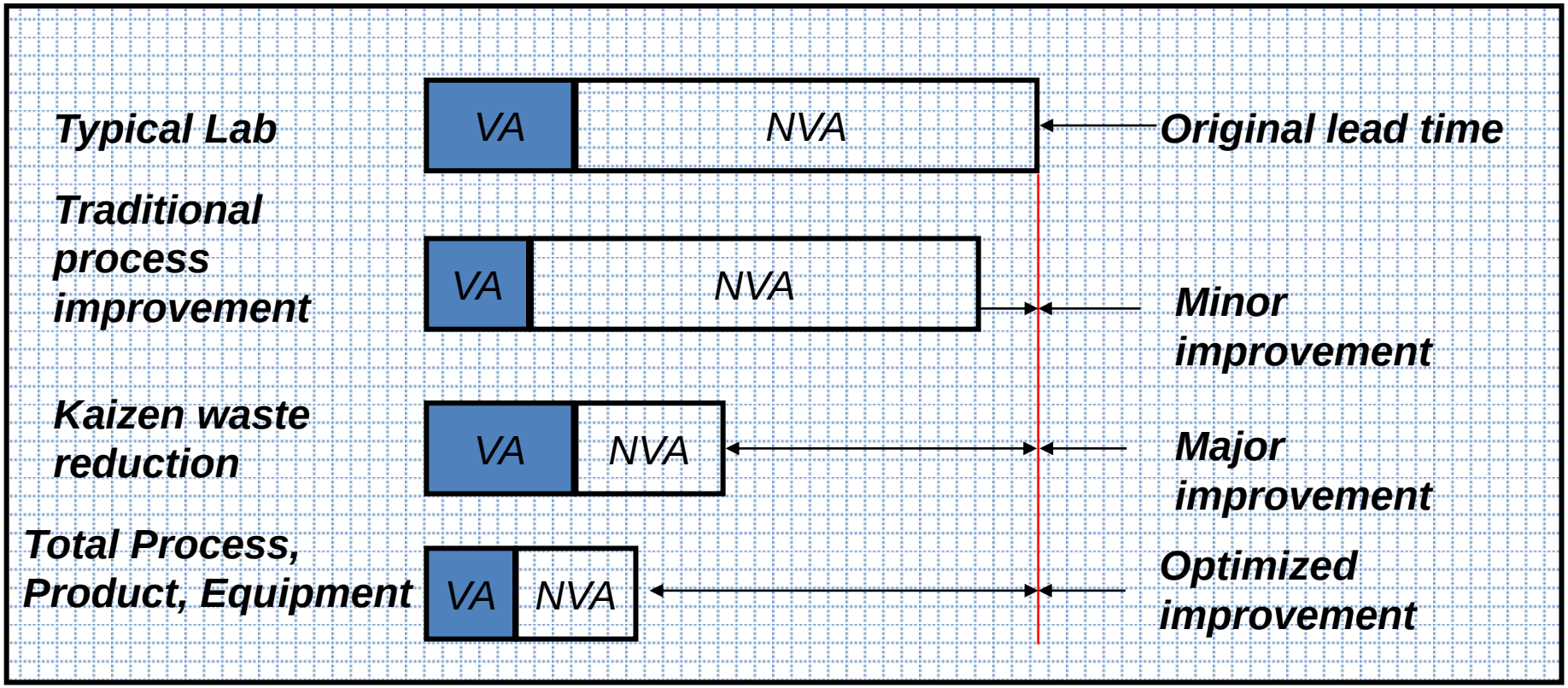
- Understand LEAN concept and tools
- Identify (project) areas to improve
  - Start small and get early success to stay motivated
  - Diverse pool of staff participation
- Implement LEAN tool(s)
  - Celebrate success and move onto next project
  - Measure when possible
- Improve laboratory efficiency

What does LEAN attempt to do?

LEAN operations in a PH laboratory

VA= value added

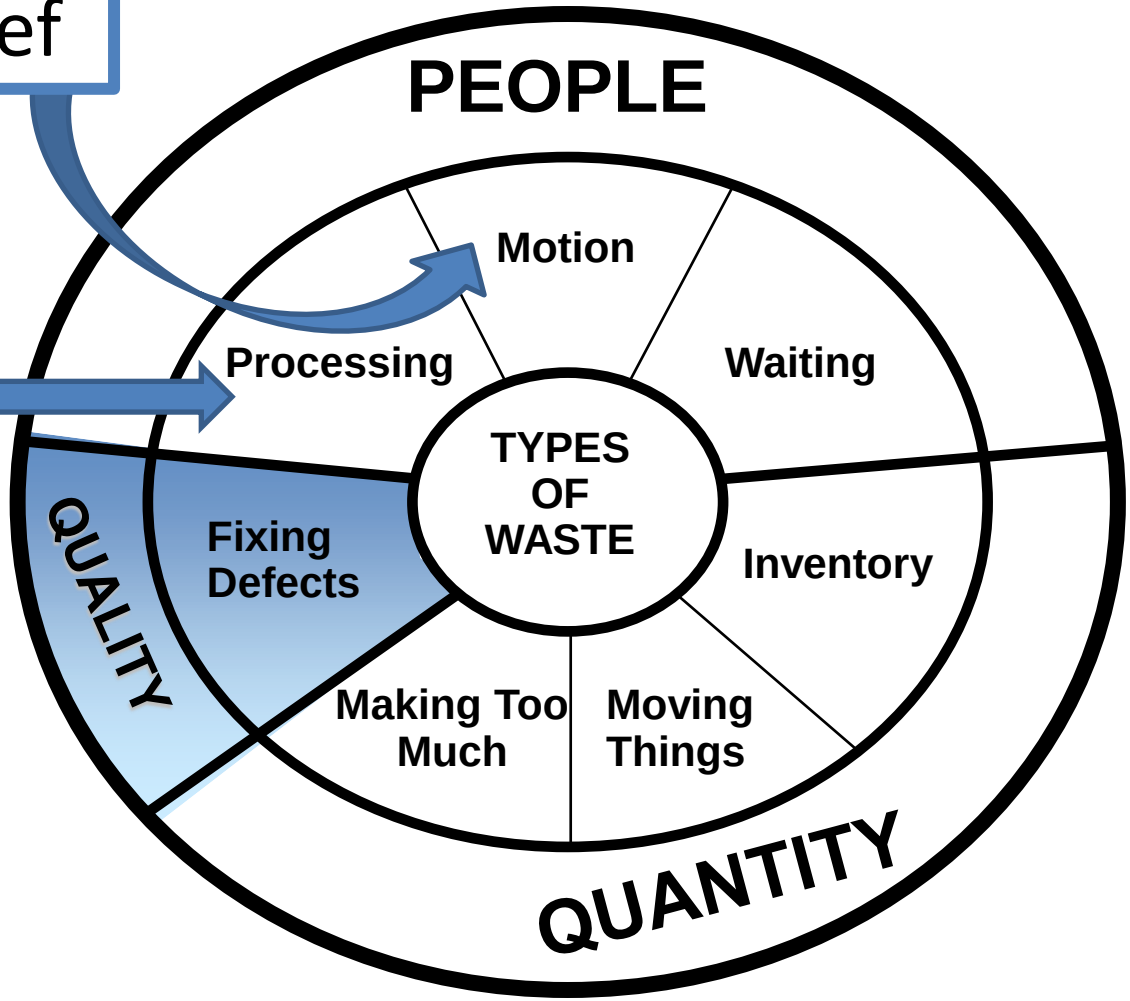
NVA= non- value added



How does LEAN benefit the Lab?

Project Iron Chef

Project Packers



Lab Efficiency Initiatives

- Laboratory Operations Manager selected as NCPHLL LEAN team member
- LEAN team visits MHDL
  - 6 members
  - 5 days intense activities
  - Learn, Teach & Assist in LEAN projects

Project Iron Chef- 1

Chemistry Lab: Main Sink Area

Using 5S tools to keep laboratory areas clean and organized

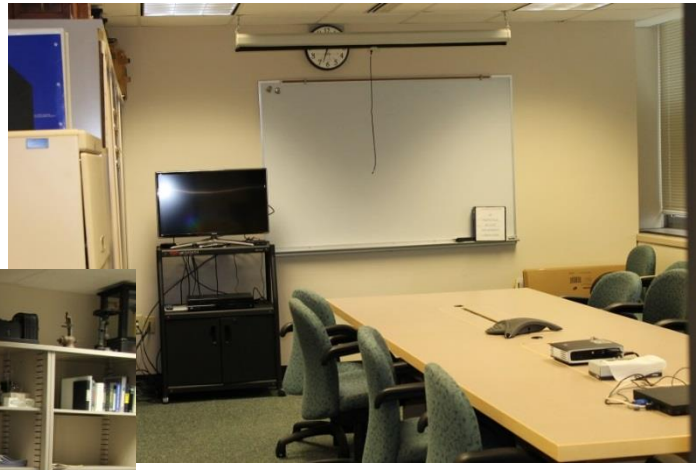
Ownership and Empowering staff

Before

After

Project Iron Chef- 2

Organizing Lab Conference Room



In Progress

Before

After

Project Iron Chef- 3

Panther Accessioning Area

In Progress

Before

After

Project Packers

Value Stream Map (VSM)

A LEAN manufacturing technique used to analyze and design the flow of materials and information required to bring a product or service to a consumer

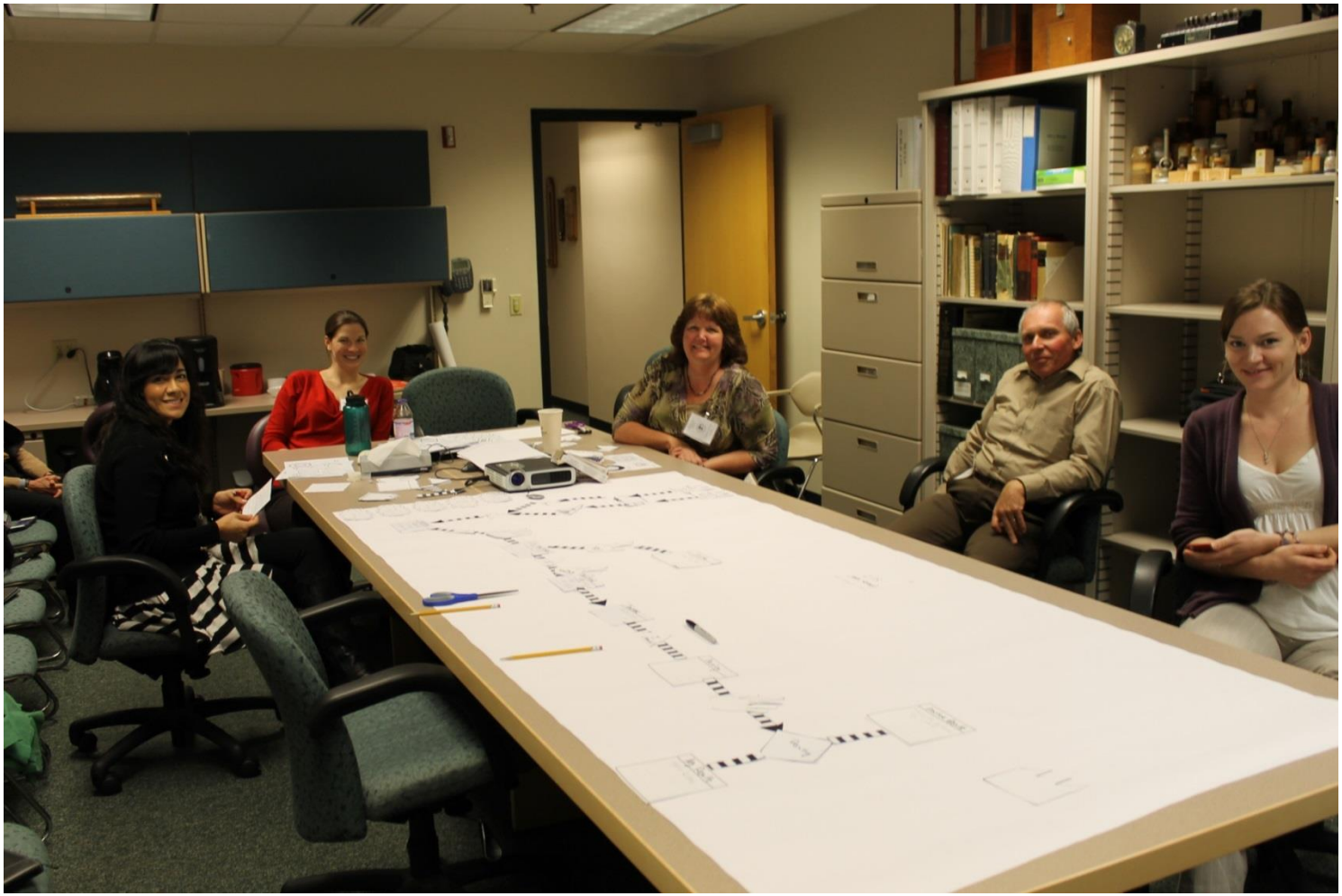
Project Packers- Outline

- Use of LEAN tools (5S, Spaghetti chart, and VSM) to identify opportunities for cost savings in the pre-analytical phase of CT/NG testing of Standard Operating Procedure (SOP)

- Use of a “Modular Kaizen” method to implement small changes to the testing SOP, and reduce annual indirect cost of testing

APHL LEAN Team on Project Packers

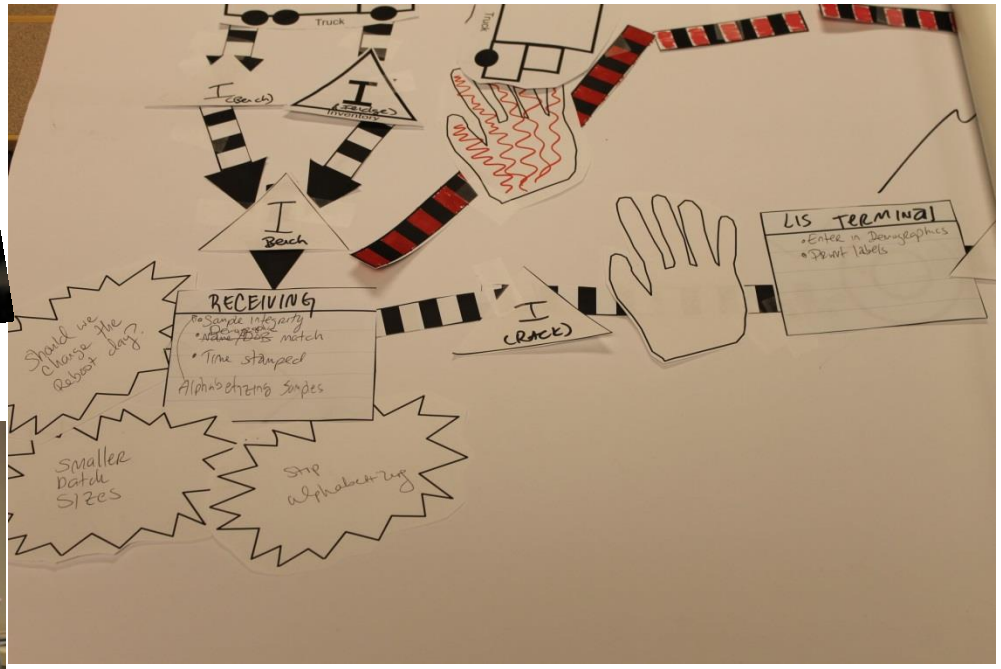
Value Stream Mapping in progress



Gonorrhea- Chlamydia NAAT Testing

- High-volume CT/NG NAAT testing is performed using Aptima Combo-2 on the Panther System
- A fully automated system, still opportunities exist to lower indirect costs of testing for lab efficiency and sustainability
- Use LEAN process improvement tools to streamline the process and lower the cost of performing high-volume laboratory testing

Project Packers- *In Progress*



.....next steps

Project Packers- Outcomes

- A spaghetti chart revealed that the location of CT/NG testing reagents and devices were not optimized for “ease of use”
  - Used 5S methodology to decrease movement (by 41,563 feet/year) and search waste (by 157 min/year)
  - 63% decrease in the staff time to complete pre-analytical testing phase
- A VSM identified numerous opportunities for process improvement
  - “Modular Kaizens” reduced the number of steps in the SOP, and fully utilized the random access capabilities of the Panther
  - Reduced specimen batch sizes and eliminate testing lag time

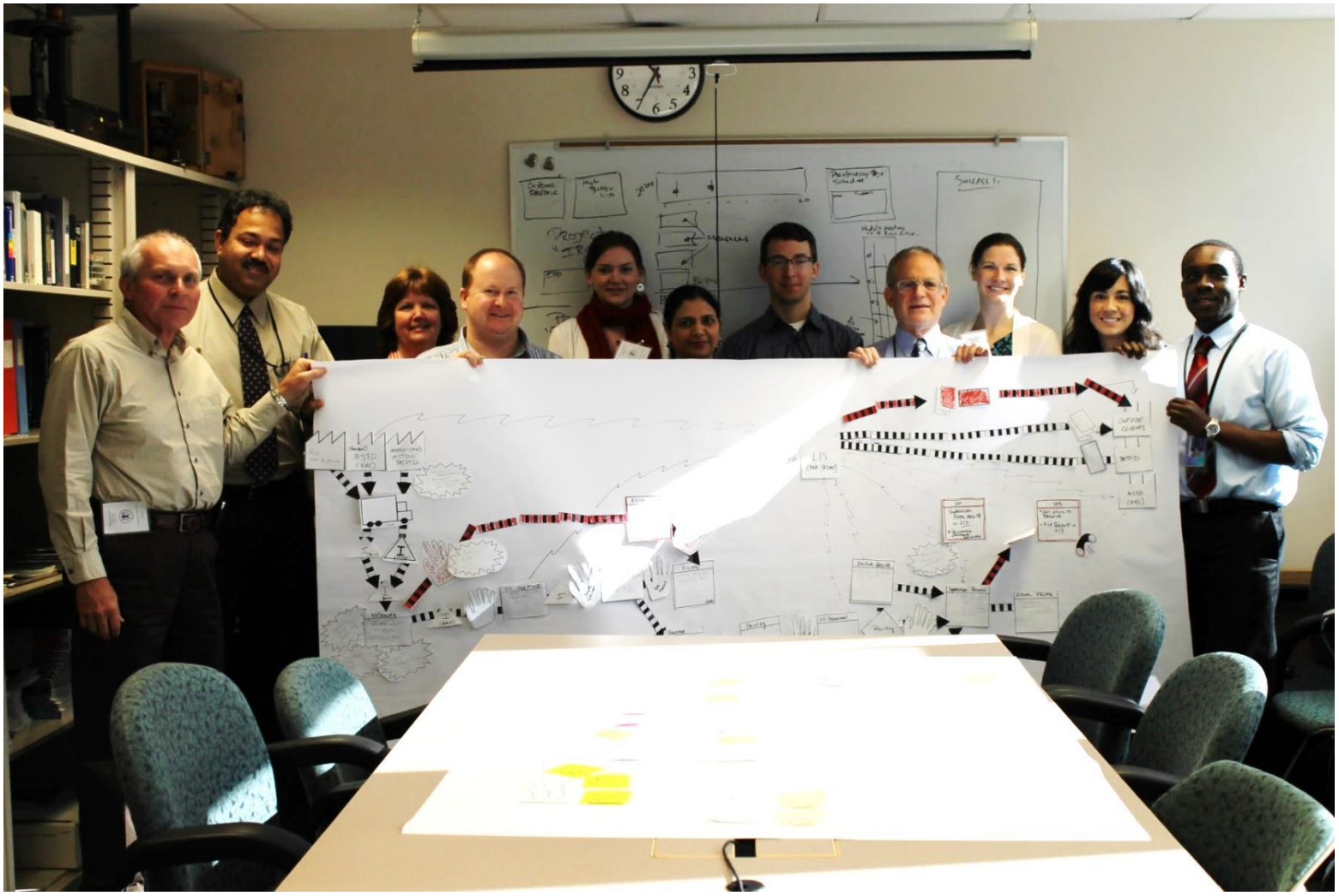
- Collectively, removed 97% (2657 min/year) of the waste in the pre-analytical phase of testing, and corresponded with a $2,515 (personnel cost/year) decrease in the indirect annual cost of testing at MHDL

Conclusions

Utilizing LEAN tools in a “Modular Kaizen” methodology is recommended to identify, implement, and measure the cost effectiveness of changes to an SOP as identified at MHDL

Project Packers

Team celebrates the success

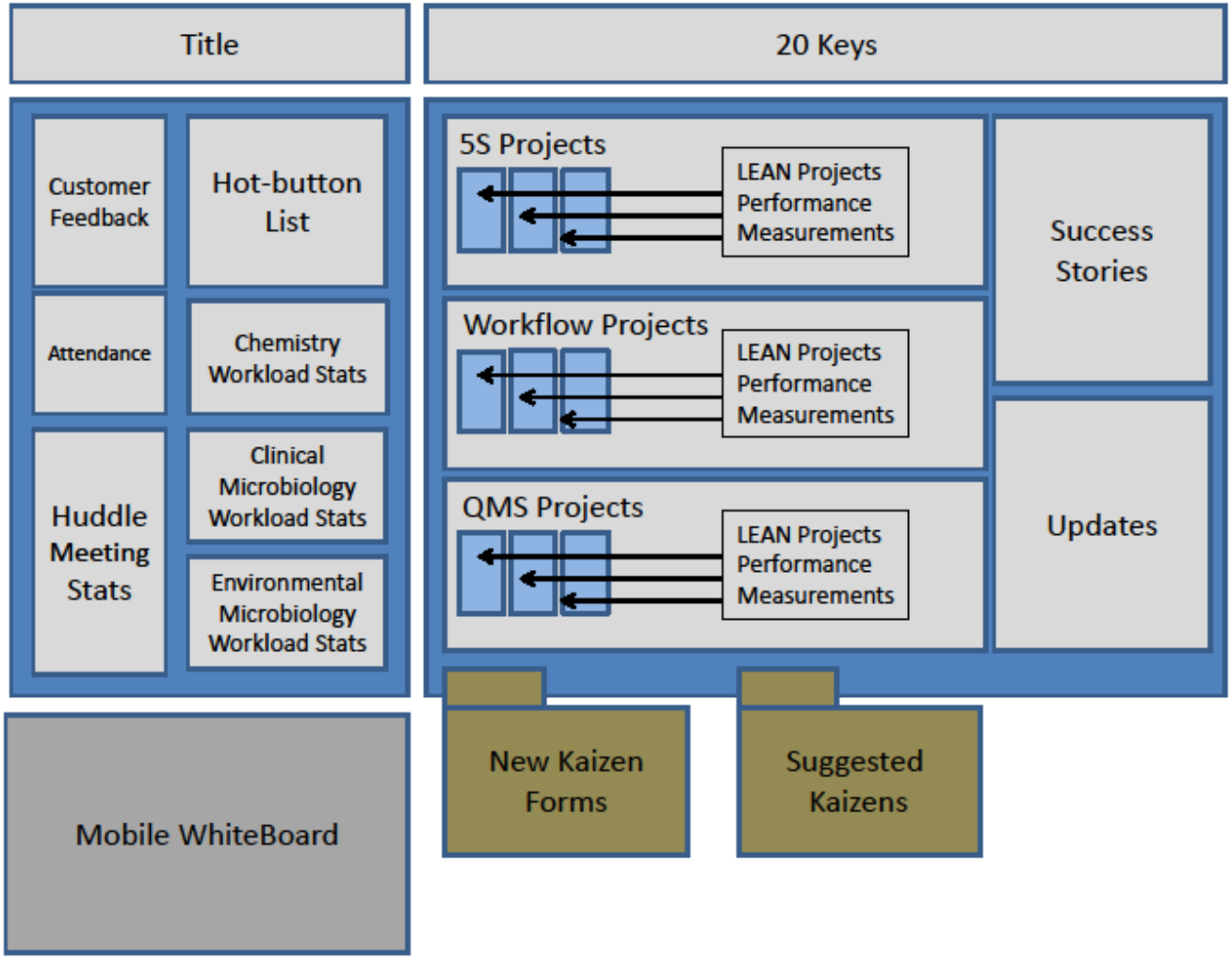


MHDL LEAN Leadership Practices

- Daily Huddles (different leaders)
- Multiple 5S projects (self-generated)
- System in place to identify problems
  - Executing projects to address issues w small teams
- Executive LEAN committee oversight
  - Monthly/bi-monthly review progress

Documentation and Project Management

Schematic- Visual Display Board



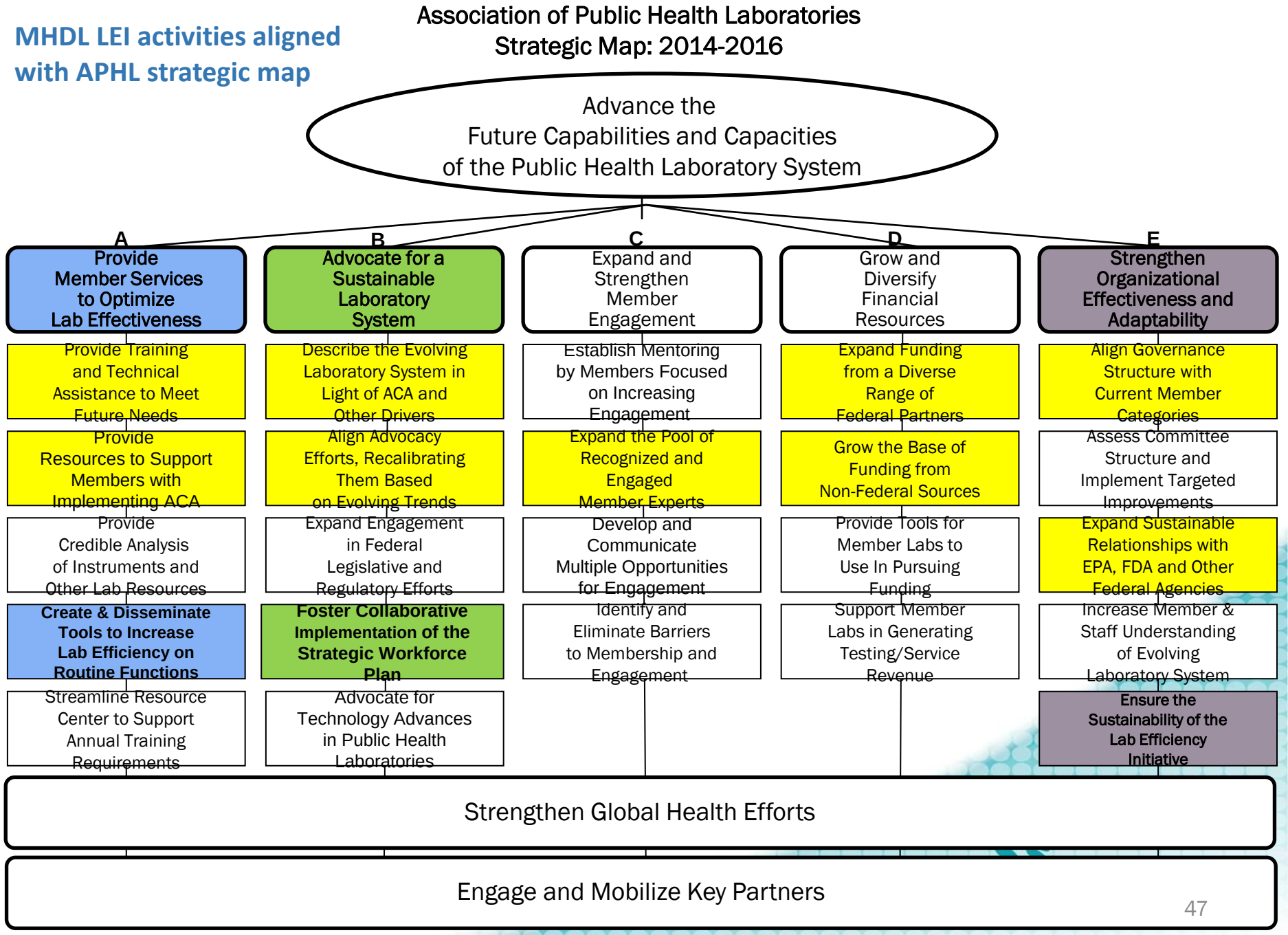
Documentation and Project Management

Visual Display Board in Use

The Bigger Picture
for LAB QI Initiatives

1. MHDL strategic planning
2. Departmental Accreditation
3. Academic Health Department
4. Adoption by non-lab sections

MHDL LEI activities aligned with APHL strategic map



Kai Zen

改善

Change Good

MHD Laboratory
http://city.milwaukee.gov/healthlab