The University Paradox: How Academics and Research Can Thrive in the Lean Healthcare Market

Lean Educator Conference
Orlando, FL
Sept. 29 – Oct. 1, 2014

University of Alabama in Huntsville
Office for Operational Excellence

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Agenda

- **Opportunities in the healthcare industry**
- **UAH Lean Healthcare organization**
- **Initial UAH/Huntsville Hospital partnership**
- **Commercial training and implementation**
  - **Lean Healthcare Academy**
  - **Project selection and scope**
  - **Sample projects**
- **Student Projects**
  - **Project selection**
  - **Sample projects**
- **Curriculum Enhancements**
- **Meeting the needs of the university, students, faculty and healthcare industry**
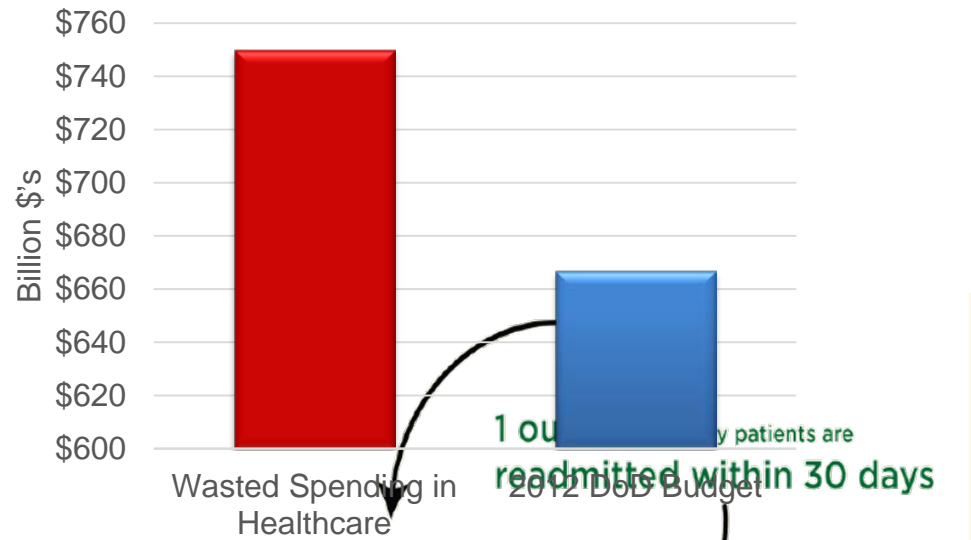
Opportunities in the Healthcare Industry

WE WASTE **$750 BILLION**
A YEAR IN HEALTH CARE SPENDING

THE SAME AMOUNT WE SPEND ON NATIONAL DEFENSE.

Source: Blue Cross Blue Shield of North Carolina

Billion $'s

Wasted Spending in Healthcare — ~$750

2012 DoD Budget — ~$667

1 out of every patients are readmitted within 30 days

Less than 50% of elderly patients are up to date on clinical preventive services

Elderly patients with co-morbities require up to **19 medication doses daily**

Every year the average elderly patient sees **7 doctors across 4 practices**

Specialists

Primary Care

Nurses

Doctors

Allied Health

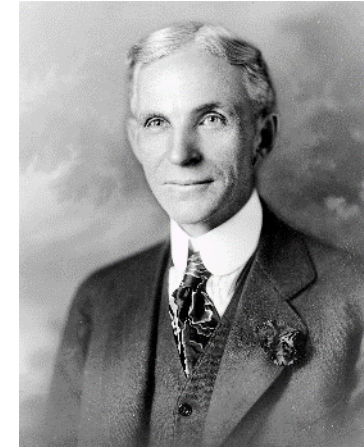Average surgery patient is seen by **27 different health care providers**

Less than half of non-surgical patients **follow-up** with their primary care provider after discharge

| Preventive | Self Management | Outpatient Care | Hospital | Follow-Up |

Source: Best Care at Lower Cost, Institute of Medicine

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Waste in the Hospital

"It is not at all certain whether hospitals as they are now managed exist for patients or for doctors…. It has been an aim of our hospitals to cut away from all of these practices and to put the interest of the patient first…. In the ordinary hospital the nurses must make **useless steps**. More of their time is spent in walking than in caring for the patient. **This hospital is designed to save steps.** Each floor is complete in itself, and just as in the factories we have tried to **eliminate the necessity for waste motion**, so we have tried to eliminate waste motion in the hospital."

Henry Ford, 1922

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Lean Healthcare

- **Patient care improves**
- **Wait times decrease**
- **Errors decrease**
- **Customer satisfaction increases**
- **Profit margins increase**

> *1990, Joseph Juran wrote,* *"as the health industry undertakes…change, it is well advised to take into account the experience of other industries in order to understand what worked and what has not. … in the minds of many, the health industry is different. This is certainly true as to its history, technology and culture. However, the decisive factors in what works and what does not are the managerial processes, which are alike for all industries."*
> - Joseph Juran, forward to "Curing Health Care" Berwrick, Godfrey, Roessner, 1990

Reported Benefits in Lean Healthcare

- ✓ 85% reduction in lab result waiting
- ✓ 93% increased throughput
- ✓ $1 Million reduction in inventory costs
- ✓ 54% Reduction in discharge time
- ✓ 38% Reduction in PIC wait time
- ✓ 65% Increase in OR start times
- ✓ $180M Construction cost avoidance

Virginia Mason Chairman and CEO Gary S. Kaplan, MD, shares information on the organization's Accountability Wall
virginiamasonblog.org

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University of Alabama in Huntsville

- UAH is an autonomous campus of The University of Alabama System dedicated to excellence in teaching, research, and service.

- Founded in 1950, UAH is a key participant in one of the nation's major international centers for advanced technological research and has had a long history of working with NASA and US Army.
  Dr. Werner von Braun helped break ground for Von Braun Research Hall in 1964

- Within UAH's 18 independent research centers, researchers perform over $80 million annually in contracts and grants

- UAH offers 60 degree programs including 19 masters and 13 PhD programs.

- About 50% of UAH's 7300 students earn degrees in engineering or science.

- College of Nursing current enrollment of 800 undergraduate and 280 graduate students

Research Institute

College of Engineering

College of Business

College of Nursing

Research at The University of Alabama in Huntsville is more than the pursuit of basic knowledge - it is the application of that knowledge as we strive to enhance competitiveness by developing, applying and transferring research into the marketplace to enhance the economic development of our state and nation.

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Huntsville Hospital – UAH Partnership

HUNTSVILLE HOSPITAL

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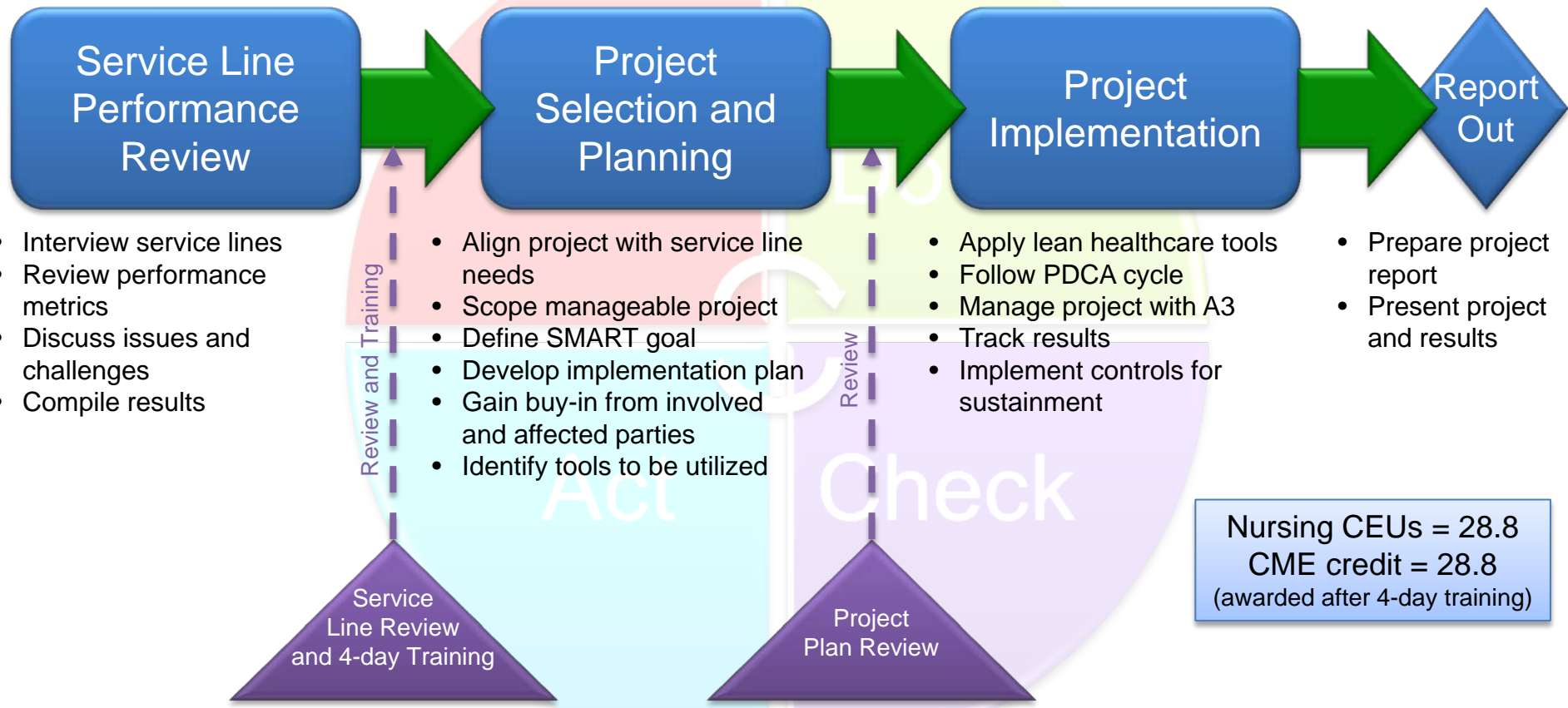
- Nursing

- Industrial Engineering

- UAH Lean Healthcare

Lean Healthcare Training and Project Implementation Process

Service Line Performance Review

- Interview service lines
- Review performance metrics
- Discuss issues and challenges
- Compile results

Review and Training

Service Line Review and 4-day Training

Project Selection and Planning

- Align project with service line needs
- Scope manageable project
- Define SMART goal
- Develop implementation plan
- Gain buy-in from involved and affected parties
- Identify tools to be utilized

Review

Project Plan Review

Project Implementation

- Apply lean healthcare tools
- Follow PDCA cycle
- Manage project with A3
- Track results
- Implement controls for sustainment

Report Out

- Prepare project report
- Present project and results

Nursing CEUs = 28.8
CME credit = 28.8
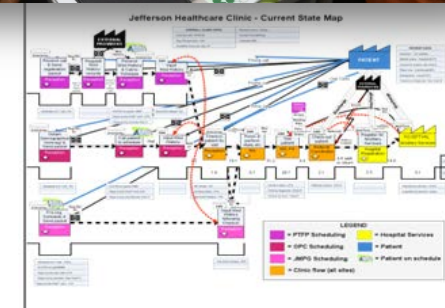(awarded after 4-day training)

UAH Lean Healthcare Services

- **Lean Healthcare Assessment**
  - Comprehensive evaluation of the current state of lean healthcare practices throughout the organization to serve as a baseline for the lean strategy. All aspects of a lean organization are evaluated with strengths and weaknesses identified. The 2-day assessment includes reviews of operational and organizational performance and interviews with key personnel across multiple departments, including operations, human resources, procurement and customer service. Results also include a recommended path forward and identification of potential quick win improvement opportunities.

- **Lean Strategy Planning**
  - Planning session with a cross-functional management team over a half-day to establish a lean strategy for the organization based on the current state of lean practices and overall organizational goals and objectives. Components of the strategy include management involvement, training plan, change management, award/incentive plan for improvements, goals and performance measurement.

- **Improvement Event Facilitation**
  - Facilitators are provided to lead 3-5 day rapid improvement events on-site. Events are intense, focused improvement efforts consisting of 4-8 team members with specific goals and result in significant, sustainable impact at the end of the 3-5 days. Agendas typically include a short training session on the improvement topic, documenting a baseline of the current state, trying and implementing improvements, measuring the future state and implementing a sustainment plan.

- **Coaching and Support**
  - Provide on-site support to guide and facilitate the development of a continuous improvement culture, including implementation strategy, identification of improvement opportunities, ensuring sustainment and mentoring in-house facilitators and lean leaders.

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UAH Lean Healthcare Training

- **UAH Lean Healthcare Academy**
  - **4-day training series including introduction to lean healthcare and advanced concepts with hands-on simulations, as well as tools for implementing lean concepts**
    - **Day 1** Introduction to Lean Healthcare, 5S, visual controls
    - **Day 2** Flow and cellular, TPM, layout, standard work, quality, teamwork, changeover reduction
    - **Day 3** Problem solving, root cause analysis, error-proofing
    - **Day 4** Value stream mapping, pull systems, improvement planning, facilitation overview
  - **Training can be delivered as individual days or grouped into a series to accommodate the schedules and demands of personnel.**
  - **Training can be integrated with implementation support to realize the benefits of trained personnel through the immediate implementation and impact of improvements.**

- **Lean Healthcare Facilitator Training**
  - **1-day training course focused on planning, scoping and facilitating a rapid improvement event. Includes time management, working with difficult personalities, tools for measuring before and after, planning checklist, and developing and delivering event-specific training.**

Hands-On Activities

- **Simulations**
  - **OccMed** – Occupational Medicine Lab focusing on patient flow
  - **Quick Changeover** – patient room changeover
  - **Clinic** – adapted from LAI Healthcare Simulation
  - **Medi-Pult** – problem solving and root cause analysis
- **Exercises**
  - **Acme Healthcare** – value stream mapping case study
  - **Pull Systems** – medical supplies supermarket calculations
  - **Standardized Work** – standard work instructions

Team Projects

Potential Project List

Teams will select using guidelines

Potential Process Metrics

Line of Sight

Waste Observed

Lean Concepts and Tools

Some Foundational

Learn by Doing

Pilot Improvement Project Objectives

- **Objectives**
  - **Realize a meaningful impact on service line performance and customer satisfaction**
  - **Practitioners will learn by applying lean methodology and tools**
  - **Implement foundational tools / concepts**
  - **Foster team-based continuous improvement through high visibility projects and rapid success**

Project Scope

1. **Observe current process**
2. **Identify wastes and opportunities for improvement**
3. **Try-storm improvement ideas**
4. **Restart process and measure results**
5. **Standardize procedure(s)**
6. **Celebrate**
7. **30-day follow-up**

leanhealthcareexchange.com

- Cross-functional team
- Aggressive goal
- Focused event
- ~5-day event over 2 months

Example Team Projects

Custom Surgery Pack Cost Reduction

CLABSI Rate Reduction

Anesthesia Workroom Inventory Management

Patient Mis-Identification Reduction

Patient Call Reduction

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Using Continuous Improvement to Improve Patient Satisfaction: A Consultative Approach

Mary M. Hays, DSN, RN[1,2]; Sampson Gholston, PhD,[1,3]
[1]The University of Alabama in Huntsville, [2]College of Nursing, [3]Industrial & Systems Engineering

Introduction

Year-long joint effort between nursing and engineering faculty and a hospital in the southeastern United States to introduce industrial engineering students into a clinical setting to explore patient quality measures

Statement of the Problem: Engineering students lacked healthcare experience while hospital staff was unfamiliar with Lean Six Sigma (L6S) and DMAIC phases

Aim: Graduate students apply L6S from classroom to clinical projects to sustain hospital's high performer status on Joint Commission's Key Quality Measures

The Joint Commission
Quality Check

Clinical Innovation

- Nursing possesses working knowledge of clinical operations

- Industrial engineering uses data-driven process (L6S) to remove variability and eliminate –not manage– problems

- Clinical staff inundated with continual stream of hourly, daily, and monthly data

Technology Hall

Nursing Building

Procedure

- Use Schein's process consultation to intervene:
  - Focus on communication and interpersonal processes
  - Differentiate content from process and structure
  - Facilitate clients to help themselves

- Identify projects jointly:
  - Emergency Dept: Admission, triage, & discharge timelines
  - Operating Room: Terminal cleaning
  - Medical/Surgical Units: Hourly bedside rounding
  - Safety Events: Data analysis prior 3 years

- Match students (4) per study program and/or L6S certification

- Incorporate L6S's DMAIC process
  - **Define**
  - **Measure**
  - **Analyze**
  - **Improve**
  - **Control**

1. Identify Value
2. Map the Value Stream
3. Create Flow
4. Establish Pull
5. Seek Perfection

Table 1. *The Foci of Observation and Intervention*
Schein, 1987, p. 40

	Task	Interpersonal
Content	Formal agenda, goals	Who is doing what to whom
Process	How the task is done	How members relate to each other, communicate, etc.
Structure	Recurrent processes— "standard operating procedures?	Recurrent interpersonal relationships, roles

Results

- Need weekly meetings to support outcome monitoring and to communicate results to departments

- Execution dependent on attending to clinical and corporate needs

- Staff more interactive in clarifying and proposing improvements with increased student visibility

Conclusions

- Consultative approach stimulated process application to clinical environment

- DMAIC framework with quantitative tools can reduce errors and improve patient satisfaction in selected areas

- Use format to initiate interdisciplinary courses with applications-oriented approach

- Limiting factor is that consultation is a temporary relationship and consultee is responsible for implementing quality measures

Future

- Use focus groups to incorporate clinicians into defining phase

- Implement Baldrige Quality criteria

- Develop formal curriculum for healthcare professionals

- Integrate concepts into engineering and nursing coursework

References

Arthur, J. (2011). *Lean Six Sigma for hospitals*. New York, NY: McGraw Hill.

Chowdhury, S. (2001). *The power of Six Sigma*. Chicago, IL: Dearborn Trade.

Schein, E. H. (1987). *Process consultation Volume II: Lessons for managers and consultants*. Reading, MA: Addison-Wesley.

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Poster presented at:

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Selecting Student Projects

- **Students are selected to participate in projects from Nursing and Engineering**
  - **Undergraduate and Graduate Industrial and Systems Engineering**
  - **Nursing Honors Program**
- **Current hospital areas for student projects are:**
  - **ED**
  - **Logistics**
- **Projects are chosen by:**
  - **Application of tools (VSM, 5S, cell design, etc.)**
  - **Metric-driven organization opportunities**

Example Student Projects

Industrial Engineering — Queuing - Monitor arrival rate; Monitor staffing levels and adjust accordingly

Industrial Engineering — Time in system – Monitor LOS

Industrial Engineering — LWBS – Monitor LWBS

Industrial Engineering — Admits – Track hospital capacity

Industrial Engineering — Seen in 30 minutes – Monitor % seen in 30 minutes

Nursing (DNP) — Communication Expectations of Patients

- **One-month study in the ER**
- **Interviewed 35 patients**
- **Top 3 expectations were:**
  - **Physician to sit/discuss illness/treatment**
  - **Informed of wait time for treatment**
  - **Staff to directly face; look at them; listen when they speak**

Lean Healthcare in the Classroom

Lean Healthcare concepts are being incorporated into the curriculum:
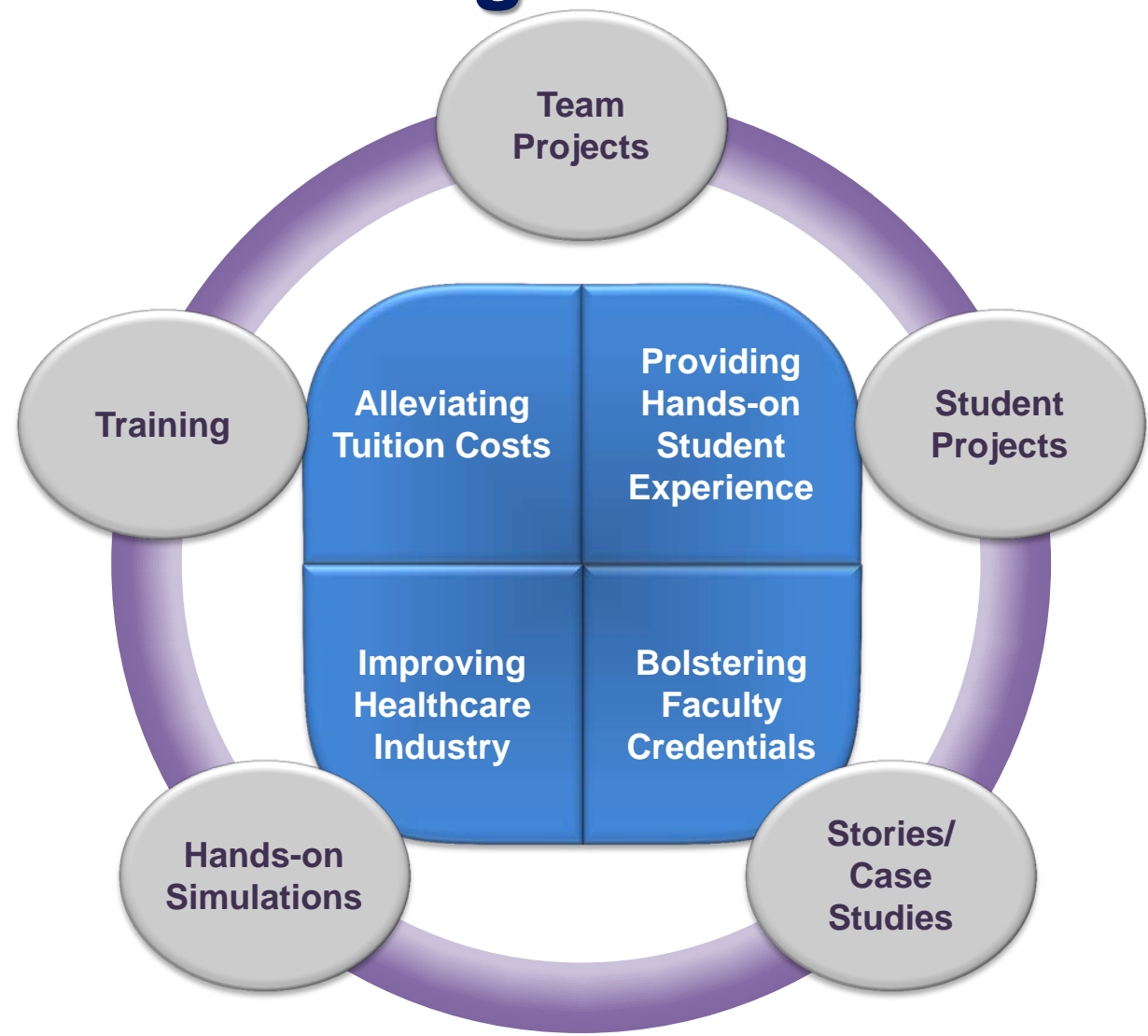
Nursing

- Clinical courses
- Pathophysiology
- DNP faculty advisement

Engineering

- Undergraduate
  - ISE 324 – Work Design
  - ISE 423 – Introduction to Statistical Quality Control
  - ISE 428/429 – Senior Design I and II
  - ISE 497 – Industrial Engineering Internship
  - ISE 439 – Special Topics
- Graduate
  - ISE 523 – Introduction to Statistical Quality Control
  - ISE 641 – Advanced Quality Control
  - ISE 539 – Special Topics

Meeting the Needs

Team Projects

Training

Student Projects

Alleviating Tuition Costs

Providing Hands-on Student Experience

Improving Healthcare Industry

Bolstering Faculty Credentials

Hands-on Simulations

Stories/ Case Studies

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Questions?

UAH Lean Healthcare Team

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