# Evaluation and Implementation of an Evidence-Based Loaned Surgical Instrumentation Management Program Utilizing the Plan, Do, Study, Act Cycle

*Gaston Baza, MSN, RN, MAJ, AN and J. Michael Hartmann, BSN, RN, MAJ, AN*

*Daniel K. Inouye Graduate School of Nursing, Uniformed Services University of the Health Sciences, Bethesda, MD*

## Significance of the Problem

- Loaned Surgical Instrumentation (LSI) is a common cost effective solution used for surgeries in healthcare facilities around the world
  - LSI is a borrowed instrument or instrument set that is shared between hospitals
- Surgeries that commonly utilize LSI are
  - Total knee and hip replacement, spinal fusions, neurosurgery
- Pros: The hospital's most expensive procedures **rely** on LSI
  - Implant delivery systems are costly and continually evolving, preventing hospitals from frequently purchasing these systems
  - LSI enables surgeons to use the most advanced technology without the hospital continually purchasing and maintaining new surgical delivery systems
- Cons: Complex design + time constraints + lengthy instructions = **potential for failure**
  - Patient safety is put at risk if appropriate decontamination processes and manufacturer Instructions For Use (IFU) are not followed correctly
- No regulations require healthcare organizations to evaluate the management of LSI
- Fort Belvoir Community Hospital (FBCH) processes on average 100 LSI sets monthly
  - Missing essential elements of a highly reliable LSI management program
    - Training, policies, documentation, point of use cleaning, and reprocessing

Computer generated image as to avoid unintentional endorsement

**Did you know?**

- LSI are transported in a representative's vehicle
- Transport occurs between multiple hospitals
- Instruments often arrive morning of procedure
- No documentation on how the LSI were treated after previous use
- "Just in time arrival" is the culture of LSI
- No environmental monitoring during transport
  - From the trunk of a car and into your body!

## Purpose

At FBCH, does an evaluation of an evidence-based Loaned Surgical Instrument Management (LSIM) program, compared to current practice, achieve FBCH's goals of providing Ready Reliable Care (RRC)?

## Project Design

- This is a quality improvement project with the implementation of an evidence based Loaned Surgical Instrumentation Management (LSIM) program with evaluation utilizing
  - Plan, Do, Study, Act (PDSA) Cycle across four audit and feedback iterations
  - Feedback to stakeholders after each PDSA cycle
  - Longitudinal synthesis of compliance percentage to evidence-based checklist
  - Assess for achievement of Defense Health Agency's (DHA) RRC outcomes of quality, safety, and continuous process improvement (QSCPI)
  - Use the Centers for Disease Control's (CDC) framework for program evaluation to guide the audits of LSIM at FBCH
  - 59 element audit checklist across nine phases of LSIM processing developed from review of literature and professional organizations' guidelines and recommendations
  - Audit Quality Loop (AQL) to guide data analysis and evaluation of improvements
- Implementation of an evidenced-based practice bundle with a multidisciplinary team
  - **Stakeholders: Sterile Processing Department, Operating Room, Post Anesthesia Care Unit, Logistics, Anesthesia, & Nursing Bed Manager**
- Evidence based checklist developed to measure compliance percentage of LSIM
- All LSI utilized at FBCH will be included for the evaluation of LSI management

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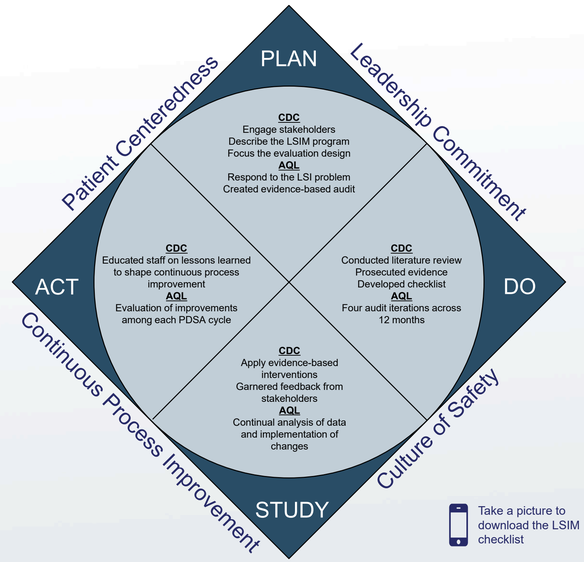
## Organizing Framework

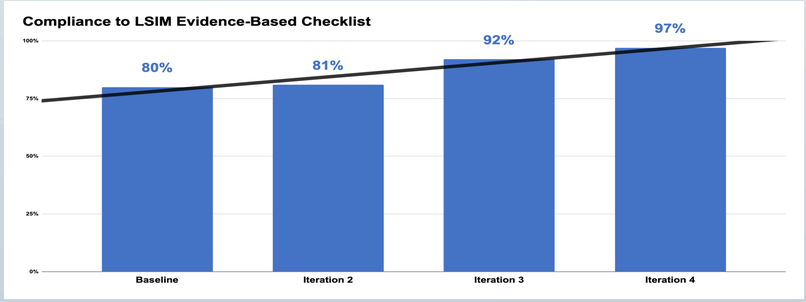



Take a picture to download the LSIM checklist

Ready Reliable Care "Domains of Change" by Defense Health Agency (2021), "Systematic review of the application of the plan-do-study-act method to improve quality" by Taylor et al., 2014, BMJ Journals, 23:290-298, p. 292, A Framework for Program Evaluation. From "Program Performance and Evaluation" by the CDC, 2017b, "Clinical audit, a valuable tool to improve quality of care: General methodology and applications in nephrology" by Esposito, P., and Canton A., 2014, World Journal of Nephrology, 3(4), p. 250.

## Project Results

| Nine LSIM Phases | Baseline Compliance | End Result |
|---|---|---|
| Pre-request Evaluation | 33% | 100% |
| Loan Request | 100% | 100% |
| Loan Drop Off | 40% | 100% |
| Decontamination | 100% | 100% |
| Assembly & Packing | 80% | 100% |
| Sterilization | 93% | 100% |
| Sterile Storage | 91% | 100% |
| Point of Use | 71% | 86% |
| Decontamination and Return | 100% | 100% |




- This quality improvement project **resulted in an overall 17% improvement** in LSIM compliance across four iterations every three months
- Audit and feedback given to **multidisciplinary team and stakeholders** supporting achievement of quality, safety, and continuous process improvement

## Analysis of Results

**Prior to program implementation**

Training Policies Documentation Point of use cleaning

- Baseline audit found that staff members were **not** trained on the proper decontamination of an LSI, **no** policy in place to objectively verify cleanliness of surgical instruments after decontamination, **no** policy in place for the reporting of bioburden in the operating room, and **inconsistent** use of sterile water on the surgical field

**After program implementation**

Training Policies Documentation Point of use cleaning

- Four iterative audits across 12 months identified areas for improvement and feedback was provided to **multidisciplinary team and stakeholders** to create
  - Five new policies improving practice among 144 staff members across six departments
  - Annual training and feedback provided to 144 staff members and 28 clinics resulting in standardization of evidence based LSI practice
  - Instrument defect tool for every instrument set
    - Impacting the quality assurance of 60K instrument sets
  - Average readmission cost is ~$20,000
  - 139 contaminated sets identified through inspection and adenosine triphosphate tests
    - Achieving $2,780,000 in readmission cost avoidance

## Organizational Impact

| Ready Reliable Care | Outcome(s) |
|---|---|
| Leadership Commitment | Perioperative daily safety huddle brief addressing LSI<br>Staff empowerment to speak up when identifying proper equipment to process LSI |
| Culture of Safety | Revision of time-out audit form verifying that sterile water is on the surgical field<br>>95% reporting of surgical debriefs to help identify issues with LSI |
| Continuous Process Improvement | 100% testing for the presence of adenosine triphosphate (ATP) on surgical instrumentation after decontamination<br>Implemented of computer-based tracking of surgical instruments |
| Patient Centeredness | Zero reported incidents of bioburden identified in the operating room |

## Future Directions for Research and Practice

- Collaborate with DHA Surgical Services Clinical Community (S2C2) leadership and Nurse Corps Chiefs (Army, Air Force, Navy, Public Health Service) to:
  - **Better Care**: Develop a standardized approach for LSIM for widespread dissemination
  - **Better Health**: Develop an Evidence-Based Practice educational and training program focused on proper processing of LSI to reduce patient safety risk
  - **Lower Cost**: Develop a means to identify cost-effective solutions to maximize the facility's efficiency without compromising quality and safety despite the involvement of complex and difficult to clean LSI
  - **Increased Readiness**: Mitigate overall risk and perform within the facility's scope to achieve the elements of Ready Reliable Care to all beneficiaries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