

Catherine Yows, MSN, RN, CGRN, CRCST, Michelle L. Meyer, Ph.D., Lynn Carosella, MSN, RN, CIC, Marcy Williams, MBA, RN, Ruthie R. Mangino, DNP, APRN, ACNS-BC, NP-C, Dirk Yanong, BSN, RN, CNOR

BACKGROUND

Prostate cancer accounts for 15% of all cancers and is the most common non-cutaneous malignancy in men. Across the United States over 1 million prostate biopsies are performed annually. With the aging population, it is anticipated the incidence of prostate cancer will increase to 2.9 million new cases by 2040 (James, et. al., 2024).

Innovative advances for prostate cancer drive demand for surgical equipment to enhance visualization through imaging for accurate biopsy of lesions. Transperineal biopsies of prostate lesions are frequently performed with the use of ultrasound guided imagery, for early diagnosis and improved clinical pathways for treatment.

Mayo Clinic in Arizona is an academic medical center that uses high-resolution biplane endocavity transducers to perform prostate biopsies. Per the manufacturer's instructions for use (IFU), there are several options for high-level disinfection (HLD), or low-temperature sterilization (LTS) required for semi-critical device reprocessing.

The Urology surgical practice performs magnetic resonance imaging (MRI) fusion and ultrasound guided transperineal prostate biopsies in the outpatient surgical center. On average, there are 16 to 20 procedures performed per day in two operating rooms.

ASSESSMENT

A small team was assembled to review the Pros & Cons of HLD and LTS methods identified in the manufacturer's IFU. With an anticipated volume of 20 procedures in a ten-hour time frame, the number of probes needed was based on the reprocessing turn-around time.

Initially, we implemented HLD by liquid disinfection of the probes. There were six probes that had fluid invasion that required repair of the probes within 60 days. Surgical cases were delayed due to probe availability.

FIGURE 1: Pros & Cons for Sterilization vs. High-level Disinfection

Low-Temperature Sterilization		
Method	Pros	Cons
Sterrad™	Automated Process	Cost Turn-around time (24-48 min.) Size HVAC & Electrical Preventative Maintenance
V-Pro™	Automated Process	Cost Turn-around time (19-28 min.) Size HVAC & Electrical Preventative Maintenance
High-Level Disinfection		
Liquid Disinfectant	Cost	Manual Process Turn-around time (12-16 min.)
Medivators™ Advantage Plus™	Automated Process	Cost Turn-around time (35 min.) Size HVAC & Electrical Preventative Maintenance
Astra VR®	Automated Process	Cost Turn-around time (12-16 min.) Size HVAC & Electrical Preventative Maintenance
Tristel ULT™	Cost Turn-around time (2 min.)	Manual Process

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OUTCOME

- Staff education and competency of use of HLD foam was successfully completed.
- All probes were entered into our electronic instrument tracking system for staff accountability and patient traceability.
- A certified engineering company, completed indoor air quality analysis to determine the time-weighted average of potential occupational Chlorine Dioxide gas exposure prior to implementation. All readings were below OSHA limits for exposure.
- 189 probes were reprocessed by 11 staff members during the 90-day trial.
- There was no damage to the probes that required repair.
- No reported Surgical Site Infections during the trial.
- There were no delays in surgery due to probe availability.



Photo Courtesy of Tristel

TABLE 1: Air Monitoring Analysis (20 probes in 4 hours)

Location/ Sample ID	Substance	OSHA	Actual	Result
1 – Wipe Processing Station	Chlorine dioxide (8-hr TWA)	0.1 ppm (PEL)	0.003 ppm	Satisfactory
2 – Over the trash	Chlorine dioxide (8-hr TWA)	0.1 ppm (PEL)	0.005 ppm	Satisfactory
3 – Adjacent work bench	Chlorine dioxide (8-hr TWA)	0.1 ppm (PEL)	Non-detectable	Satisfactory

TEAM

RN Resource Specialists: Kari Nechville, MSN, RN & Catherine Yows, MSN, RN, CGRN, CRCST
 Infection Prevention: Michelle Meyer, Ph.D. & Lynn Carosella, MSN, RN, CIC
 Central Sterile Leadership: Marcy Williams, MBA, RN, Rachal Brunet, CRCST, & James Mayfield, CRCST
 Clinical Nurse Specialist: Ruthie Mangino, DNP, APRN, ACNS-BC, NP-C
 Operating Room Leadership: Dirk Yanong, BSN, RN, CNOR & Bridget McGarrity RN
 Health and Safety Specialist: Richard Valencia, BS, ChE
 Urologist: Daniel M. Frendl, MD, Ph.D.

IMPLICATION FOR PERIOPERATIVE NURSING

- The new method of HLD foam is an effective and efficient method for high-level disinfection of ultrasound probes with minimal reprocessing turn-around time.
- The HLD foam is safe, easy to use, and cost effective.
- Reduced reprocessing time required with the new HLD foam minimizes the number of ultrasound probes needed.
- The HLD foam reduces damage to the ultrasound probes compared to other methods that caused fluid invasion or heat associated problems.

DISCUSSION

Lessons learned

- Effective change management is integral to acceptance of the new HLD process.
- Indoor air quality analysis should include the maximum number of probes allowed per the IFU to determine staffing.
- Anticipate the potential for staff members to have mild symptoms related to Chlorine Dioxide fumes.

REFERENCES

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