The Ultrasound Event
2026 AIUM Annual Convention

Ultrasound Users Perceptions of Manual High-Level Disinfection of Ultrasound Probes Using Chlorine Dioxide (ClO2) Foam

Kathleen McMullen, MPH, CIC, FAPIC, FSHEA
Mercy Quality and Safety Center, St. Louis, MO

Steve Kovak, MHA, CER, CRCST, CHL
Mercy Quality and Safety Center, St. Louis, MO

Contact Information:
Kathleen.mcmullen@mercy.net

ORIGINAL ABSTRACT

Objectives: Chlorine Dioxide (ClO2) foam is newly Food and Drug Administration (FDA) cleared product for manual high-level disinfection (HLD) of ultrasound probes used for semi-critical procedures. This product was implemented at 29 ultrasound locations of a midwestern healthcare system over the past year. The goal of this study is to understand perceptions of the novel ClO2 technology, including any barriers and challenges to overcome for future use in other locations.

Methods: Two electronic surveys were developed, one aimed at supervisors and leadership of the locations using ClO2, the other for users of the product a these locations. These surveys evaluated resources for implementation, competencies in the process, suitability of the physical environment to complete the HLD process, impact on existing workflows and daily work, perception of ClO2 compared to prior HLD product, perceived benefits, support for the product and impact to Infection Prevention perceptions. Respondents were also asked about potential concerns, including accreditation requirements, perceived efficacy, and risk of misuse. The surveys were distributed to 24 leaders and 175 users in September 2025.

Results: Twelve leaders and 50 users completed the survey, yielding 50% and 29% response rates. Half of leaders and 40% of users were from outpatient locations; most others cared for both inpatients and outpatients. Half the sites served over 200 patients weekly while 17% saw fewer than 50. About half had previously used vaporized hydrogen peroxide, with others using various manual HLD modalities.

All leaders agreed or strongly agreed that training resources, staff competencies, and physical environment were adequate for ClO2 use, and that workflows aligned with infection prevention goals and standards. All also agreed ClO2 was easier for caregivers to use—saving time and improving efficiency—and that they were satisfied with the product. Reported benefits included greatercost-effectivenes (90%), reduced probe out-of-service time (90%), improved patient throughput (70%), reduced potential for damage (50%) and reduced documentation burden (40%). Two leaders expressed concerns that ClO2 might not "clean thoroughly and leaves a residue from the product.

Fifty-four percent of user respondents were ultrasound techs or leads; others were RNs, LPNs, MAs, and sterile processing staff. Seventy-nine percent reported use of ClO2 on transvaginal probes, with smaller proportions for transrectal, breast, and other biopsy procedures. About 80% agreed or strongly agreed that training increased confidence with the product and was adequate. Seventy percent found ClO2 easier to use overall and easier to fit into workflows. Benefits reported were very similar to those cited by leaders. A minority raised concerns, including perceived health hazards to the user based on odor from the product, workflow challenges during the two-minute disinfection period and variation in manual application techniques and product volumes.

Conclusion: This survey yielded important information about perceptions of HLD using ClO2 foam. Based on these results, the healthcare system will adjust training processes in the future. In addition to online training/certification for all users, more robust tracking of all individuals for initial in-person checkoff with the product vendor (rather than a train the trainer model) will happen, training about the odor associated with the product and lack of health risks will be included and location-specific workflow for placement of the probe during the two-minute disinfection time will be determined. In addition, the Infection Prevention teams will increase observations in these areas (typically done every 6 months) to address perceptions of variation in manual HLD processes.

BACKGROUND

- High-level disinfection (HLD) is a critical process that requires meticulous attention to detail.
- Historically, manual HLD has required large containers with caustic chemicals, prolonged soaking time and increased ventilation needs.
- Automated HLD methods, which are less subject to variation, has been viewed as superior to manual HLD.
  - These are associated with costly capital equipment, large space requirements and ongoing maintenance.
- New Food and Drug Administration (FDA) cleared Chlorine Dioxide (ClO2) foam for HLD of ultrasound probes:
  - Simplifies manual HLD without capital costs of automated HLD.
- ClO2 was implemented in several hospitals and ambulatory care locations at Mercy healthcare system in MO, AR, KS and OK.

METHODS

- Two electronic surveys (one to 24 supervisors/leadership, one to 175 users of the product) were distributed in September 2025
- Questions allowed response on a 5-point Likert-scale, with some open-ended comments allowed
- Survey was locally developed and non-validated
- Descriptive analysis was completed to summarize
- Evaluated resources for implementation, perceptions of ClO2 and the new processes, and potential concerns

RESULTS

Survey respondents:

- **Leaders:** 12 respondents (50%) including supervisory and managerial staff in radiology and imaging services, practice management, central supply, sonography, and operations
- **Users:** 50 respondents (29%) including clinical and technical personnel across nursing, medical assisting, sterile processing, and technical/support roles

Survey respondents:

- **Location of work:** 50% of leaders, 40% of users from outpatient locations; most others cared for both in- and outpatients.
- **Location size:** 50% served over 200 patients weekly while 17% saw fewer than 50.
- **Previous HLD modality:** ~50% vaporized hydrogen peroxide, smaller amounts of various other manual HLD modalities

FIGURE 1:
Leader Perceptions of ClO2 High Level Disinfectant

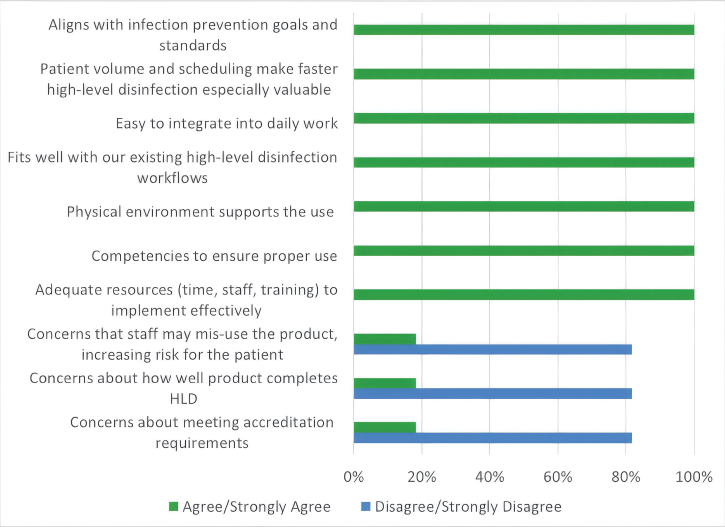

FIGURE 2:
User Perceptions of ClO2 High Level Disinfectant

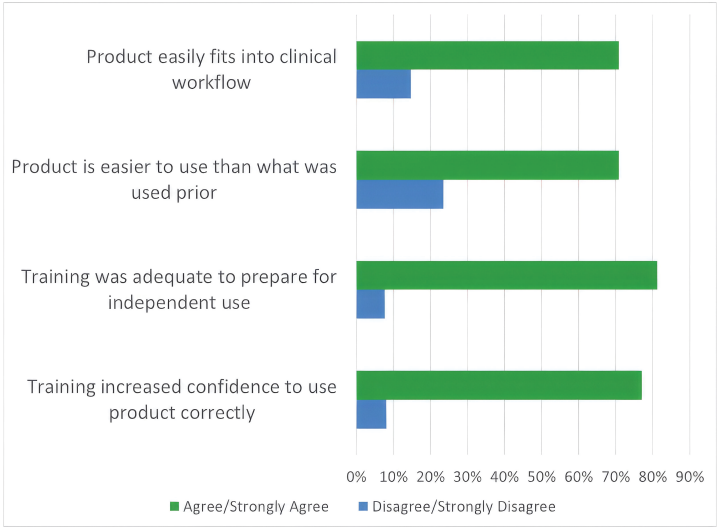

TABLE 1:
Survey Agreement with Perceived Benefits (By Role)

	Leaders	Users
User time savings / efficiency improvements	91%	N/A*
Improved clinical workflow	82%	N/A*
Reduced probe downtime	82%	63%
Improved patient throughput	64%	35%
Cost savings compared to prior high-level disinfection method	64%	N/A*
Less opportunity for equipment damage	45%	44%
Reduced caregiver exposure to hazardous disinfection chemicals	45%	N/A*
Reduced burden of required documentation	36%	31%

* Not assessed on the user survey

CONCLUSIONS

- Perceptions of HLD using ClO2 foam were overall positive
- Future training processes will be adjusted to address some concerns
  - All individuals receive initial in-person checkoff with the product vendor (rather than a train the trainer model)
  - Training about the odor associated with the product and lack of health risks will be included
  - Location-specific workflow for placement of the probe during the two-minute disinfection time will be determined
- Infection Prevention teams increased observations of ClO2 to address perceptions of variation in manual HLD processes