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June 30, 2026

Eric Berg
Director, Research and Standards Unit
California Division of Occupational Safety and Health
1515 Clay St., Suite 1901
Oakland, CA 94612

**RE: Additional Comments on Cal/OSHA's April 2026 Discussion Draft –
Occupational Exposure to Plume in Health Care**

Dear Mr. Berg,

California Nurses Association/National Nurses United (CNA), representing more than 100,000 registered nurses (RNs) in California, appreciates the opportunity to provide additional comments on the discussion draft “§51XX. Occupational Exposure to Plume in Health Care” developed by the California Division of Occupational Safety and Health (Cal/OSHA, hereinafter “Division”) and posted April 24, 2026. These comments provide additional considerations to CNA’s comments submitted on June 5, 2026, responsive to our subsequent discussions with the Division.

I. CNA urges the Division to require the use of plume evacuation systems that have been shown, by the test methodology in ISO:16571(2024) Annex C, to provide 90 percent capture efficiency, as independently tested and verified by an accredited body.

Surgical plume is a serious and well-documented occupational hazard for which no exposure limit exists.^{1,2} Plume is a complex mixture of carcinogens, mutagens, irritants, and infectious materials.³ To fully protect health care workers from exposure, surgical plume evacuation systems must evacuate as much plume as possible.

As noted in our comments to the Division on June 5, 2026, a review of the scientific literature showed that **the capture efficiency of plume evacuation systems ranges broadly, from zero to 100 percent, meaning that some systems offer little to no protection.**⁴ If hospitals were allowed to purchase plume evacuation systems that only evacuated a small portion of generated

¹ National Institute for Occupational Safety and Health, (June 18, 2020). *Surgical Smoke Inhalation: Dangerous Consequences for the Surgical Team*. <https://www.cdc.gov/niosh/bulletin/2020/surgical-smoke.html>.

² Occupational Safety and Health Administration. *Surgical Suite: Smoke Plume*. <https://www.osha.gov/etools/hospitals/surgical-suite/smoke-plume> (Accessed June 23, 2026).

³ Ibid.

⁴ Attachment #2 of CNA Comments on Cal/OSHA’s April 2026 Discussion Draft- Occupational Exposure to Plume in Health Care, June 5, 2026.

plume, the standard would fail to be protective because it would leave nurses and other health care workers exposed to surgical plume and negative health impacts. This is a real and practical concern—hospitals and other health care facilities across the country increasingly operate under a “just-in-time” or lean management model wherein employers prioritize less expensive options and lean inventories of supplies and equipment to cut costs and maximize profits.^{5,6} When less expensive options function inadequately, this management model boosts profits while putting health care workers and patients at risk. Without a clear standard that hospitals must employ effective plume evacuation systems, it is likely that many employers will not prioritize high capture efficiencies in their selection process, leaving health care workers and patients exposed to plume. **CNA urges the Division to ensure the plume standard clearly requires the use of plume evacuation systems with capture efficiencies at or above 90 percent.**

As noted in our comments to the Division on June 5, 2026, **we specifically call for the Division to require plume evacuation systems that provide at least 90 percent capture efficiency because this is a level that would be most protective and is technologically feasible.** In the scientific literature, multiple plume evacuation systems were able to provide 90 percent capture efficiency under at least some conditions.⁷ Given that surgical plume includes carcinogens,⁸ and that many carcinogens can pose health risks at low levels, lower exposures are more protective.

In order to require a minimum capture efficiency in the standard, the Division must establish requirements for a standardized testing methodology. Without a standardized methodology, manufacturers of plume evacuation systems and health care employers could utilize test methods that inaccurately overestimate the true capture efficiency, which would leave workers dangerously unprotected but with a false sense of protection. As noted in our comments to the Division on June 5, 2026, the International Organization for Standardization (ISO) consensus standard, *Systems for evacuation of plume generated by medical devices* (ISO 16571,

⁵ National Nurses United. (2021). *Protecting Our Front Line Ending the Shortage of Good Nursing Jobs and the Industry-created Unsafe Staffing Crisis*. https://www.nationalnursesunited.org/sites/default/files/nnu/documents/1121_StaffingCrisis_ProtectingOurFrontLine_Report_FINAL.pdf

⁶ National Nurses United. (2020). *Deadly Shame: Redressing the Devaluation of Registered Nurse Labor Through Pandemic Equity*. <https://www.nationalnursesunited.org/campaign/deadly-shame-report>

⁷ Carr et al. (2020) “Effect of Electrocautery Settings on Particulate Concentrations in Surgical Plume during Tonsillectomy.” *Otolaryngol Head Neck Surg*, 162(6): 867-72. <https://doi.org/10.1177/0194599820914275>.

Cheng et al. (2021) “A study to quantify surgical plume and survey the efficiency of different local exhaust ventilations.” *Scientific Reports*, 11: 14096. <https://doi.org/10.1038/s41598-021-92859-9>.

Gioutsos et al. (2022) “Surgical smoke: modern mobile smoke evacuation systems improve occupational safety in the operating theatre.” *Interact Cardiovasc Thorac Surg*, 34(5): 775-82. <https://doi.org/10.1093/icvts/ivac024>.

Liu et al. (2020) “The utility of local smoke evacuation in reducing surgical smoke exposure in spine surgery: a prospective self-controlled study.” *The Spine Journal*, 20(2): 166-73. <https://doi.org/10.1016/j.spinee.2019.09.014>.

O’Brien et al. (2020) “Surgical Team Exposure to Cautery Smoke and Its Mitigation during Tonsillectomy.” *Otolaryngol Head Neck Surg*, 163(3): 508-16. <https://doi.org/10.1177/0194599820917394>.

Seipp et al. (2018) “Efficiencies and noise levels of portable surgical smoke evacuation systems.” *J Occup Environ Hygiene*, 15(11): 773-81. <https://doi.org/10.1080/15459624.2018.1513134>.

⁸ National Institute for Occupational Safety and Health, (June 18, 2020). *Surgical Smoke Inhalation: Dangerous Consequences for the Surgical Team*. <https://www.cdc.gov/niosh/bulletin/2020/surgical-smoke.html>.

updated 2024) in Annex C, provides a clear and standardized methodology that would be most protective and is technologically feasible.

Additionally, testing should be performed only by accredited laboratories with the experience and expertise to perform this type of testing. Individual manufacturers, especially smaller operations, may not have the laboratory space or expertise to perform their own testing, but could easily contract with an accredited laboratory to perform the required testing. **To this end, CNA urges the Division to require only the use of plume evacuation systems that have been shown by the test methodology in ISO:16571(2024) Annex C to provide 90 percent capture efficiency and to require that testing be performed by independent, accredited laboratories.**

Specifically, CNA proposes adding the following language to subsection (d)(1) (also, see Attachment #1):⁹

(d)(1)(A)[...] Plume evacuation systems shall:

1. Provide at least 90 percent reduction in plume, when operated in accordance with manufacturer's instructions, as tested utilizing the methodology in Annex C of ISO Standard 16571 (2024) by one of the following:
 - a) A Nationally Recognized Testing Laboratory (NRTL);
 - b) An ISO 17025 accredited testing laboratory; or
 - c) Any other testing laboratory accredited by an organization approved by the International Laboratory Accreditation Cooperation (ILAC)

II. CNA urges the Division to include requirements for employers to track all incidents where employees are exposed to surgical plume.

The Division's current draft addresses many of CNA's concerns, but it does not yet require any recordkeeping related to tracking employees' exposure to surgical plume. Operating room nurses experience higher rates of chronic health impacts, such as chronic obstructive lung disease (COPD) and asthma, compared to non-OR nurses and administrative staff.^{10,11} **Without clear exposure records, it is difficult for nurses to investigate and determine the work-relatedness of these health conditions, which can be especially important to gain access to benefits like workers compensation coverage.**

The Division has required health care and other employers to track employee exposures related to inadequate use of engineering controls in other Title 8 standards. Specifically,

⁹ See Attachment #A.

¹⁰ Xie, et al. (2021) "Association of Occupational Exposure to Inhaled Agents in Operating Rooms With Incidence of Chronic Obstructive Pulmonary Disease Among US Female Nurses." JAMA Network Open, 4(9): e2125749. <https://jamanetwork.com/journals/jamanetworkopen/fullarticle/2784340>

¹¹ Le Moual, et al. (2013) "Are Operating Room Nurses at Higher Risk of Severe Persistent Asthma? The Nurses' Health Study." J Occup and Environ Med, 55(8): 973-77. https://journals.lww.com/joem/abstract/2013/08000/are_operating_room_nurses_at_higher_risk_of_severe.19.aspx

looking at Section 5193, the Bloodborne Pathogens Standard and requirements related to Sharps Injury Logs provides a framework that could be transferred to plume.¹² In the Bloodborne Pathogens Standard, the Division requires employers to establish and maintain Sharps Injury Logs to record each exposure incident involving a sharp. Investigations into the exposure incidents must evaluate whether required engineering and other controls were used, such as engineered sharps injury protection.

Building on this model, **CNA urges the Division to require hospitals and ambulatory surgical centers to record employee exposures to surgical plume by (see Attachment #1):**

- **Adding a definition of “exposure incident.”**

The definition of “exposure incident” from the Bloodborne Pathogens Standard can be slightly modified to address surgical plume:

Exposure incident means a specific eye, mouth, other mucous membrane, and/or respiratory contact with surgical plume that results from the performance of an employee’s duties.

- **Adding a requirement for employers to create and maintain a Plume Exposure Log.**

The Sharps Injury Log in the Bloodborne Pathogens Standard provides a clear model for tracking similar exposures. The information recorded in the Plume Exposure Log should provide enough information for employees to establish an exposure history and for the employer to identify any breakdowns in the exposure control plan. We propose the following language, modified from the Bloodborne Pathogens Standard to address surgical plume:

(f)(3)(C) The employer shall establish and maintain a Plume Exposure Log, which is a record of each exposure incident involving plume. The information recorded shall include the following information, at minimum:

1. The date, time, length, and location of the exposure
2. The type of energy-based device, electrosurgical device, electrocautery device, mechanical tool, and/or high-speed powered instrument involved in the exposure incident.
3. The type of surgical, diagnostic, or therapeutic procedure being performed during the exposure incident, including the type of tissue involved.
3. A description of the exposure incident, which shall include the:
 - A. The name(s) of exposed employee(s);
 - B. Job classification(s) of exposed employee(s);
 - C. Department and specific work area where the exposure incident occurred;

¹² Title 8 Calif. Code Regs. §5193(c)(2).

D. Procedure the exposed employee was performing at the time of the incident;

E. How the incident occurred; and

F. Employee(s)'s opinion about whether any engineering, administrative or work practice control could have prevented the injury.

4. Each exposure incident shall be recorded on the Sharps Injury Log within 14 working days of the date the incident is reported to the employer.

5. Such logs shall be maintained in accordance with Section 3204.

III. Conclusion

CNA has long championed the need for regulatory action and enforcement to protect workers and patients from surgical plume. We urge the Division to proceed expediently to comply with AB 1007's deadline of December 1, 2026.

Sincerely,

A handwritten signature in black ink, appearing to read 'Carmen Comsti', with a stylized flourish at the end.

Carmen Comsti, Director of Government Relations
California Nurses Association/National Nurses United

Attachment #1: CNA's Line-by-line Proposed Edits to the Division's Surgical Plume Discussion Draft, Updated July 1, 2026