



## A Position Statement on Air Quality and Occupational Hazard Exposure Prevention

The American Society of PeriAnesthesia Nurses (ASPAN) has the responsibility for identifying perianesthesia occupational exposure hazards. A review of current literature indicates that exposure to waste anesthetic gases (WAGs), and certain infectious diseases, poses a hazard to healthcare workers (HCWs) as well as potential cross contamination to patients in perianesthesia care environments. ASPAN has an obligation to protect perianesthesia patients, visitors, and HCWs. ASPAN has an interest in collaborating with other professionals to support research, clinical inquiry, develop health policies, and promote interventions which address prevention and elimination of environmental hazards in the perianesthesia environment.

### **Background**

In 1995, ASPAN's Environmental Health Task Force coordinated a comprehensive process to review and research the relationship between HCWs and patient exposure hazards from waste anesthetic gases and infectious diseases. Recently, ASPAN members have expressed increasing concern related to workplace exposure. A small strategic work team was assigned to review the 1995 Position Statement on Air Safety.<sup>1</sup> Although previously retired, the work team recommended reviving the former position statement.

The National Institute for Occupational Safety and Health (NIOSH) recommends minimizing exposure to waste anesthetic gases (WAGs).<sup>2</sup> Sessler and Badgewell conducted a study in 1998 and found that postoperative nurses were frequently exposed to exhaled anesthetic gas concentrations exceeding the NIOSH Recommended Exposure Limit (REL).<sup>3</sup> Unfortunately, further studies are needed to identify any actual health and behavioral effects related to both short term and long term exposure to WAGs.<sup>4</sup>

In addition to identifying occupational exposures to WAGs, new research findings have identified potential cross contamination with other perianesthesia patients.<sup>5-7</sup> Additionally, current research has identified a correlation between postoperative cognitive disorders (POCD) in the elderly following general anesthesia as well as general anesthesia effects on the developing brains of children.<sup>8-12</sup> Scavenging WAGs is recommended by professional organizations and government agencies involved with anesthesia services to reduce occupational exposure.<sup>13</sup>

The postanesthesia care unit (PACU) has not traditionally been equipped with gas scavenging systems. One reason is a lack of awareness of WAGs among HCWs, or that levels may exceed the NIOSH recommendations. Furthermore, we lacked the technology to keep WAGs to the lowest possible



level. ASPAN represents the dedicated nurses who care for postoperative patients after general anesthesia. Because perianesthesia registered nurses deliver much of this care in direct contact and within the breathing zone of these patients, they are exposed to the waste anesthetic gases and other pathogens patients expel while coughing or exhaling.<sup>14</sup> ASPAN is concerned that HCWs are at risk for developing health issues due to both cumulative, long term exposure and immediate risks to HCWs of child-bearing age. HCWs may have been exposed long term to levels above the NIOSH REL and could be at risk for future neurocognitive changes and other health issues. Education and training, plus the adoption of procedures to minimize the risk of exposure to WAGs and other exhaled pathogens, are important steps for employers to take to protect HCWs. Research reveals WAG exposure may be more easily managed through the use of a scavenging system to better control occupational exposures to WAGs among PACU personnel.<sup>5,15</sup> Increasing the HCW's awareness of the issue has not been made a priority.<sup>16</sup>

Generally, the PACU design is a large, open room with high volume and fast turnover. Many perianesthesia registered nurses are unaware that standards exist which address the number of air exchanges in the PACU. The standard for air exchanges in the PACU is to provide, as a proposed minimum, a total of six air exchanges per hour with a minimum of two air changes of outdoor air per hour.<sup>17,18</sup> These exchanges are recommended to adequately dilute WAGs. Many current architectural and engineering designs for airflow and ventilation systems do not adequately dilute the WAGs in the breathing zone of the nurse and the patient nor address cross contamination between patients and HCWs.<sup>5,18-19</sup> The high risk of transmission of droplet-spread and respiratory pathogens and WAGs among patients and HCWs remain a concern.<sup>19</sup>

The following issues pertinent to perianesthesia occupational hazard exposure prevention were identified:

1. Waste anesthetic gases
  - a. Exposure to WAGs above NIOSH REL exhaled by patients in the breathing zone of nurses providing care at the bedside and cross contamination to other PACU patients including immune suppressed patients
  - b. Lack of sufficient monitoring within the breathing zone of the PACU patients following general anesthesia
  - c. Lack of engineering control interventions to reduce the level of WAGs exposure to HCWs and other patients
2. Respiratory pathogens
  - a. Open architectural designs including lack of air exchanges of perianesthesia care areas increase the risks of transmission of respiratory pathogens among patients and between patients and HCWs
  - b. Increased risk of exposure to droplet and airborne infectious diseases

## Position

It is, therefore, ASPAN's position that necessary, appropriate, and evidence-based protective engineering controls, technologies, work practices, and appropriate personal protective equipment be utilized in the perianesthesia environment.

ASPAN advocates for a perianesthesia environment that promotes patient health and safety.

ASPAN recommends that occupational exposure to waste anesthetic gases, as well as respiratory pathogens, be controlled by adherence to regulations and guidelines set forth by nationally recognized agencies (e.g., National Institute for Occupational Safety and Health [NIOSH], Centers for Disease Control and Prevention [CDC], Occupational Safety and Health Administration [OSHA]) to establish a hierarchy of controls based on principles of good industrial hygiene.

ASPAN further recommends adherence to identified regulations and guidelines that protect HCWs and patients at risk in the perianesthesia environment.

ASPAN supports the development of healthcare policies addressing improved air quality and reduction of occupational exposure hazards.

ASPAN supports additional research studies and encourages collaboration with other professionals to improve air quality and safety related to occupational hazards exposure to patients and HCWs.

## Expected Outcomes

Members will acquaint themselves with perianesthesia occupational hazard exposure safety issues by obtaining and reviewing the reference documentation developed by ASPAN in support of this position.

Based upon this data, perianesthesia registered nurses will seek opportunities to inform and educate others involved in decision-making processes related to the perianesthesia care environment.

ASPAN, as the voice of perianesthesia nursing practice, will externalize this information by sharing this position statement with organizations and stakeholders involved in the planning and provision of quality, safe patient care in the perianesthesia environment and advocate for a safe work environment for HCWs. ASPAN will collaborate interprofessionally with experts in identifying, preventing, and eliminating environmental hazards in the perianesthesia care environment.

## Approval of Statement

This statement was endorsed by a vote of the ASPAN Directors on April 9, 2016, in Philadelphia, Pennsylvania, and approved by a vote of the ASPAN Representative Assembly on May 15, 2016.

This position statement was updated and revised at the October 2019 meeting of the Standards and Guidelines Strategic Work Team in Dallas, Texas.



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## ADDITIONAL READING

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