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Surgical Smoke Evacuation Compliance: Barriers and Strategies Used Among Perioperative Nurses

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Surgical Smoke Evacuation Compliance: Barriers and Strategies Used Among Perioperative Nurses

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Background
- 500,000 perioperative staff members are exposed to surgical smoke each year – 100,000 of which are perioperative nurses
- Smoke contains: vapors/ particulate matter, viable/ nonviable cellular material, bacteria, viruses and toxic gases
- Plume has been likened to that of cigarettes because it contains CO, HCN and toxic amounts of unknown compounds which is comparable in terms of mutagenic, or carcinogenic, potency.
- 20 to 30 unfiltered cigarettes each day
- Perioperative nurses are 2x as likely to report respiratory issues than the general public (emphysema, asthma, chronic bronchitis, throat irritation, nasopharyngeal Lesions, and carcinoma)
- Other risks: hypoxia, eye irritation, dermatitis, anxiety, leukemia, HIV and blood borne pathogens

Purpose
- What were the possible barriers, or strategies used, to increase surgical smoke evacuation compliance among perioperative nurses.
- In order to understand this phenomenon, this study will be necessary to determine the current barriers and problematic and pose significant health risk to perioperative nurses.
- In an effort to bring these numbers at or near 100 percent, it will be necessary to determine the current barriers and strategies used to increase compliance rates among this population.

Methods
Design: This integrative literature review was guided by Kurt Lewin’s Change Theory. The purpose of this study was to examine the possible barriers and strategies used to increase adherence to surgical smoke evacuation guidelines among perioperative nurses.

Literature Search Strategies: The databases used were CINAHL, PubMed, and ProQuest. The search terms included: surgical smoke evacuation, plume, electro-surgery, laser, diathermy, adherence, compliance, guidelines, protocols, occupational standards, policy, procedure, perioperative, inter-operative, barriers, strategies, and nursing.

Literature Search Inclusion Criteria:
- Published between 2008 and 2018
- Document barriers or strategies used to increase surgical smoke evacuation compliance
- Focus on perioperative nurses

Results
Barriers (Restraining Forces): surgeon refusal, distractibility of equipment, lack of equipment
Strategies (Driving Forces): education, management support, ease of use/ easy to follow guidelines

| Table 1: Summary of Studies on Surgical Smoke Evacuation Compliance |

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<th>Study</th>
<th>Population</th>
<th>Design</th>
<th>Variables</th>
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<td>Study 1</td>
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<td>Educational intervention</td>
<td>Increased adherence to smoke evacuation guidelines</td>
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<td>Study 2</td>
<td>Perioperative nurses</td>
<td>Qualitative interview</td>
<td>Perception of smoke, barriers</td>
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<td>Study 3</td>
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Conclusion
This integrative literature review has shown that the most frequently mentioned barriers to surgical smoke evacuation compliance are surgeon refusal, distractibility of equipment and lack of equipment. These restraining forces have the power to deter even prevent change from ever occurring, as shown by the current level of compliance reported in previous literature. Although the strategies used to increase smoke evacuation compliance are still in their infancy stage of development, they are essential for successful smoke free environment implementation programs.

Discussion
Surgeon refusal was the most commonly mentioned barrier to compliance and often times was complicated with distraction and lack of equipment. Reasons for surgeon refusal included distraction, unavailability of equipment, change in body, lack of knowledge, and concern over a negative impact on the surgery. The reason that surgeon refusal seems like such a huge barrier to change could be a direct result of the strict hierarchy that is followed in the operating room where surgeons are at the top. This is similar to the chain of command found in the operating suites, which may block other surgical team members from feeling like they can initiate the necessary changes to become smoke free.

Of the three strategies gathered from the literature, both education and management support were mentioned equally as often and seem to go hand in hand in terms of fostering positive change. It is often a lack of understanding or a fear of the unknown that blocks change from occurring. By educating perioperative nurses about the hazards of surgical smoke and the proper evacuation equipment, they can become empowered agents of change that will work through both group conformity and individual resistance to change. Those in leadership or managerial positions are the role models of the unit and whether they know it or not, those who are under their supervision look to them when deciding how to conduct themselves.

Nursing Implications
Nurses must push for a national surgical smoke evacuation standard from OSHA. It is important for nurses to know that they have the right to a safe and health-work environment. AORN goes clear award. This recognition program awards hospitals for being smoke free and nurse compliant. Nurses and the hospitals that employ them should be aware of the AORNS go clear award. It helps to protect the surgical team and its patients.

Nurses need to be aware of the hazards of smoking and its effects on the surgical team. Nurses and the hospitals that employ them should be aware of the AORN go clear award. This recognition program awards hospitals for a smoke-free environment based on education, evacuation compliance and sufficient equipment. This award should be a priority for the following reasons:
- It helps to protect the surgical team and its patients
- It brings in and keeps the best clinicians due to the attractive work environment
- It increases surgical smoke evacuation compliance due to education

Figure 1. Literature Search and Results on Barriers or Strategies Used