



Abstract Title: Application of local exhaust ventilation to control occupational exposures to isoflurane gas used as anesthesia in veterinary practice.

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Isoflurane is a halogenated anesthetic agent commonly used during veterinary surgeries. Successful application of local exhaust ventilation reduced occupational exposures to isoflurane in veterinary applications where traditional waste anesthetic gas scavenging was inadequate. Adjustable local exhaust ventilation arms were installed at four surgical tables. In addition, exhaust ventilation was installed to exhaust 70% of the air circulating in a biosafety cabinet, which previously operated with recirculation only. Although 100% exhaust would have been preferred, that would have required a new biosafety cabinet, and mathematical modeling indicated the 70% exhaust option would achieve the desired results.

The three tasks of greatest concern for exposure prior to installation of the ventilation arms were: (1) surgery on large animals anesthetized via a mask, (2) surgery on small animals inside the recirculating biosafety cabinet, and (3) surgery prep for large animals. Exposures during surgery on large animals anesthetized via a mask were reduced from a geometric mean of 2.7 ppm (maximum concentration 5.0 ppm) to 1.4 ppm (maximum concentration less than 1.8 ppm). At the biosafety cabinet, exposures were reduced from 17 ppm (maximum concentration 20 ppm) to 0.27 ppm (maximum concentration 0.94 ppm). Exposures during surgery prep for large animals were not significantly reduced. Two causes were identified: the local exhaust ventilation in this area was not properly balanced, and the nature of large animal surgery prep made it difficult to position the arm close to the anesthesia mask. It is believed that increased ventilation, proper positioning of the ventilation arm, and other work practice modifications will allow for exposures to be maintained below 1.0 ppm.