

**Francesco Romano, Jan Gustén, Stefano De Antonellis and Cesare M. Joppolo. Electrosurgical Smoke: Ultrafine Particle Measurements and Work Environment Quality in Different Operating Theatres. *International Journal of Environmental Research and Public Health*.**

**Article Published: 30 January 2017**

Link - <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5334691/>

**Abstract:** Air cleanliness in operating theatres (OTs) is an important factor for preserving the health of both the patient and the medical staff. Particle contamination in OTs depends mainly on the surgery process, ventilation principle, personnel clothing systems and working routines. In many open surgical operations, electrosurgical tools (ESTs) are used for tissue cauterization. ESTs generate a significant airborne contamination, as surgical smoke. Surgical smoke is a work environment quality problem. Ordinary surgical masks and OT ventilation systems are inadequate to control this problem.

This research work is based on numerous monitoring campaigns of ultrafine particle concentrations in OTs, equipped with upward displacement ventilation or with a downward unidirectional airflow system. Measurements performed during ten real surgeries highlight that the use of ESTs generates a quite sharp and relevant increase of particle concentration in the surgical area as well within the entire OT area. The measured contamination level in the OTs are linked to surgical operation, ventilation principle, and ESTs used. A better knowledge of airborne contamination is crucial for limiting the personnel's exposure to surgical smoke. Research results highlight that downward unidirectional OTs can give better conditions for adequate ventilation and contaminant removal performances than OTs equipped with upward displacement ventilation systems.