

## ABSTRACT

# Forced-air patient warming blankets disrupt unidirectional airflow

Legg, A.J., and A.J. Hamer: *Bone and Joint Journal*, March 2013 vol. 95-B no. 3 407-410

### Summary:

**2,000 times more contaminant particles were found in the air over the wound with Bair Hugger warming than with air-free HotDog conductive warming.**

### Methods:

The researchers visualized the airflow in the operating theatre using neutral-buoyancy helium bubbles over a simulated total knee replacement. They also detected changes in particle counts by using a Rocket PS23 smoke machine positioned below the operating table, a potential area of contamination. Three different warming techniques were studied: Bair Hugger® forced-air warming, HotDog® conductive fabric warming, and no warming (control).

### Results:

The waste heat from forced-air warming torso blankets radiated through the surgical drape increasing the temperature near the surgical site  $>5^{\circ}\text{C}$ . That created convection currents that mixed with the downward ventilation to form tornado-like vortexes of rapidly spinning air near the surgical site. The vortexes sucked contaminated air from the operating room floor and deposited it over the surgical wound.

2,000 times more contaminant particles were found in the air over the wound with Bair Hugger warming than with air-free HotDog conductive warming (2,174,000 particles/m<sup>3</sup> for forced-air warming vs 1,000 particles/m<sup>3</sup> for conductive warming and 2,000 particles/m<sup>3</sup> for the control). That's an increase of 217,300%

### Conclusion:

Waste heat from FAW can “significantly disrupt unidirectional airflow and draw particles from the potentially contaminated area below the sterile surgical field... Therefore, a warming device that disperses heat away from the patient should not be used.”

This study was completely independent of Augustine Temperature Management. Orthopedic surgeons from Northern General Hospital, Sheffield, UK, conducted the research.