Field measurements of the airflow distribution in close proximity to a patient in an operating room

Summary
In modern hospitals among surgical patients are surgical-site infections (SSIs) the most common hospital-acquired infections. The objective of this study is to characterize the airflow distribution in close proximity to the patient in an operating room with laminar airflow (LAF) system. Field measurements of air velocity were conducted at St. Olavs hospital, Norway. The patient was simulated by a person in supine position, while the indoor environmental conditions were set equal to those of a real surgery. The results show that the airflow above the patient is affected by the supply air from the ceiling being counteracted by the thermal plume of the patient, causing lower velocities above the patient than the surroundings. They also show that the presence of surgical lamps have a major impact.

Method
Field measurements of airflow distribution above a simulated patient with surgeons were conducted in operating room 8 at the department of orthopaedic with/without surgical lights at St. Olavs hospital.

Objective
The objective of this study was to investigate the air velocity distribution in the external microenvironment of a surgical incision during a mock-up surgery.

Measurement results

Conclusions
The laminar airflow appears to be decelerated and disturbed by the thermal plume of the patient. Surgical lamps had a major impact as they interfere with and block the airflow, and possibly by providing additional heat. Hence should the effects of both thermal plumes and obstructions be taken into account when making new guidelines and design specifications.

References