



- Title** Ventilation in Operating Theatres
- Agency** SMM, The Norwegian Centre for Health Technology Assessment  
SINTEF Unimed, P.O Box 124 Blindern, N-0314 Oslo, Norway; tel: +47 22 06 78 07,  
fax:+47 22 06 79 79, [smm@unimed.sintef.no](mailto:smm@unimed.sintef.no), [www.sintef.no/smm](http://www.sintef.no/smm)
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## Aim

SMM's expert group has now completed the second part of a technology assessment dealing with hygienic initiatives aimed at preventing post-operative surgical site infections. This new assessment is a systematic literature review of all identified relevant clinical trials of conventional versus ultraclean ventilation.

## Methods

From over 4000 abstracts reviewed in this assessment, 183 scientific articles were collected and 11 were included in the final report. The main bulk of literature was assembled through Medline (1966–2001), Embase (1974–2000), DARE, NHS EED, and HTA database. NZHTA Information Specialist Susan Bidwell assisted in the literature search. In addition to some smaller databases, library catalogues and websites were checked, and a handsearch was conducted. The literature search was completed in June 2000 with an update of Medline by January 2001.

## Conclusions and Results

The rationale for keeping the bioburden (the number of microorganisms) in the air of operating theatres as low as possible is that microorganisms are a necessary, but not sufficient condition, for the development of surgical site infections. In general, ventilation with ultraclean air will provide a lower concentration of microorganisms in the air ("bacterial air counts") than conventional positive-pressure ventilation. However, the increased and directed airflow may in some instances lead to increased bacterial wound contamination.

- The association between the number of microorganisms in the air during surgery and the frequency of surgical site infections is not well documented.
- There is no documentation for the claim that ventilation with ultraclean air (less than 10 colony forming units per m<sup>3</sup>) yields lower rates of surgical site infections than conventional positive-pressure ventilation.
- The recommended maximum limits for bacterial air contamination proposed by The Norwegian National Board of Health are not supported by scientific documentation.
- Whether ventilation with ultraclean air is cost-effective depends on several uncertain factors. If the risk of surgical site infection is high with traditional ventilation, and if ultraclean air is effective in reducing this risk, the net cost of ultraclean air may be negative (ie, cost savings).

Sufficient documentation has not been found to support the contention that ultraclean ventilation results in infection rates that are lower than with conventional ventilation.

## Further research / reviews required

Large and well-designed studies are needed to establish the effectiveness of various ventilation measures in reducing the incidence of surgical site in