

## QUESTION 4: Should patients wear a mask and surgical cap in the operating room (OR) to reduce the risk of subsequent surgical site infections/periprosthetic joint infections (SSIs/PJIs)?

RECOMMENDATION: Unknown. The use of face masks and surgical caps by inhabitants in the OR has not been shown to impact SSI rates, but with the limited evidence available a recommendation for or against patient usage cannot be made. Surgical cap usage by patients in the OR may decrease the risk of SSIs/PJIs by decreasing microbial air contamination.

LEVEL OF EVIDENCE: Limited

DELEGATE VOTE: Agree: 93%, Disagree: 4%, Abstain: 3% (Super Majority, Strong Consensus)

### RATIONALE

Surgical face masks were originally developed to contain and filter droplets containing microorganisms expelled from the mouth and nasopharynx of healthcare workers during surgery. Likewise, head coverings such as surgical caps have been utilized to limit potential contamination by the shedding of hair and scalp.

The effectiveness of such strategies have been questioned in the literature. Even with the use of face masks, it has been shown that conversations in the OR increase microbial contamination [1] and that the barrier properties of face masks decreases with accumulation of moisture and venting along mask edges [2]. Additionally, it has been shown that wearing face masks decreases bacterial dispersal in front of the mouth [3], but has no effect on overall bacterial counts in the OR [4], suggesting that face masks simply redirect bacterial dispersal. On the other hand, omission of head coverings has been demonstrated to increase microbial air contamination by 3 to 5 times and increase bacterial sedimentation in the wound area 60-fold [5,6]. However, two studies have found no differences in environmental contamination with the use of head coverings [7,8].

Clinical studies have failed to demonstrate a difference in SSI rates with the use of surgical masks, while PJIs have not been specifically studied. A prospective randomized trial of 3,088 general surgery patients found no significant difference in the rates of SSIs when OR staff used a mask [9]. A prospective randomized trial of 811 patients that included orthopaedic procedures similarly found no differences in SSIs with the use of face masks by non-scrubbed staff [10]. Additionally, a meta-analysis of 3 trials and 2,113 patients found no significant difference in SSI with face mask use [11]. It is important to note that few of these trials included orthopaedic procedures and these trials had relatively high rates of SSI (3.5 to 11.5%), much higher than the current rates of SSI and PJI in total joint arthroplasty. Thus, interpretation of these findings must be made with caution.

Despite the lack of clinical evidence for the usage of face masks and surgical caps, a recommendation against patient use in the OR cannot be made for the following reasons:

While the evidence available shows no differences in SSIs with the use of surgical masks and caps by OR staff, no studies investigating the impact of *patients* wearing surgical masks or caps during surgery have been performed. As such, any recommendation would be extrapolation of the data from OR staff to patient usage.

The literature on SSI rates does not address the potential impact on non-enrolled patients having a subsequent surgical procedure in the OR that day. Particulates, such as shed hair and their impact on SSIs/PJIs on other patients have not been studied, but case order has been shown to impact risks of PJIs [12].

PJI has not been specifically studied as an end-point.

The literature does not address differential usage of masks in special populations, such as methicillin-resistant *Staphylococcus aureus* (MRSA) + nasal carriers. Eliminating mask or cap usage in these individuals may effect SSI/PJI rates.

Microbial contamination of air in the OR may be an underappreciated factor in the etiology of PJI [13]. Surgical cap usage in the OR may decrease the risks of SSIs/PJIs, by decreasing microbial air contamination.

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