OR head covering and the risk of SSI

• **1991:** wearing any type of head gear in the operating room did not decrease bacterial counts
  – Proper ventilation likely counteracted any bacterial shedding

• **Ten years later:** 2- to 5-fold increase in bacterial contamination throughout the room when headgear was not worn, and a 60-fold increase in contamination in the wound bed

• **2016:** Association of peri Operative Registered Nurses
  – All operating room personnel wear disposable bouffant type hats
  – More bacteria could be found in the ears of surgical staff as compared with the forehead

The Boston Globe published an article citing discord between nurses and surgeons  
*Markel J Am Col Surg 2017*
OR head covering and the risk of SSI

- Quasi-experimental, before & after study at a single hospital
- Compared surgical site infection rates for all Class I surgical procedures during two 13-month time periods
  - Period 1: Surgeon’s cap or bouffant cap allowed
  - Period 2: Bouffant cap only; surgeon’s cap banned
- 16,000 procedures performed during the study

**Before**

- Surgeon’s cap allowed
- 0.77%

**After**

- Bouffant cap only
- 0.84%

**Surgical site infection rates**

\[ P = 0.629 \]

**The Bottom Line:**

No difference in infection rates based on the type of head coverings worn by OR personnel

Shallwani Neurosurgery 2017

http://haicontroversies.blogspot.fr/2017/05/the-skullcap-feud-part-2.html
OR head covering and the risk of SSI

**Objective:** to investigate the degree of airborne contaminants with different head covers in an operating room environment

**Hypothesis:** bouffant style hats = cloth skull caps

- Similar permeability, particle penetration, and porosity

**Method:** 2 OR in 2 different hospitals

- High Efficiency Particulate Air Filter air supplies
- 5 people: surg, micro, ingeneers, scrube nurse, med student
- 1-hour-long mock surgical experimental procedures
  - Clean scrubs, masks, and shoe covers
  - Each hat evaluated twice at each institution
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• Environmental quality indicators
  – Air velocity measurements
  – Particle contamination: 0.3, 0.5, 1.0, and 5.0 microns
  – Microbial contamination: active and passive
  – Hat permeability, penetration, porosity, thickness, and fiber imaging
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• Results
  – Particle shedding
    • 0.5 and 1 µm > for disposable bouffant hats vs cloth hats
    • No difference skull vs cloth hat
    • No difference bouffant hats vs skull cap
  – Microbial shedding
    • No difference between any type of hat
    • Microbes detected at the back instrument table > the sterile field
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• Results
  – Permeability, penetration, and thickness, porosity
    • Bouffant hats and the disposable skull cap crowns had significantly higher permeability
    • Penetration of particulate matter was higher for bouffant hats
    • Cloth hats were significantly thicker than bouffants or the crowns and sides of disposable skull caps
    • No statistical difference between hats in minimum pore size
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Figure 7. Electron microscopy. (A) Bouffant hats were visually identified with electron microscopy as having fairly porous material. (B) The crown of disposable skull caps also was made of a visually porous material. (C) The sides of the skull caps were visually less porous, as were (D) the cloth skull caps.
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- Bouffant hats compared with certain types of skull caps
  - More permeable,
  - Higher penetration of particles through the material,
  - Maintain a larger maximum pore size,
  - Allow greater particle and microbial shed

- Large variability in particle assessment throughout this study
  - Electrocautery during the experiment

- No impact on active assessment of airborne microbes
  - But positive on passive = 1h long

- Both bouffant hats and cloth hats had transmission numbers greater than 100%
  - Fiber material actually added particles
OR head covering and the risk of SSI

• Disposable bouffant hats are not superior to disposable skull caps in terms of limiting airborne contamination

• Cloth skull caps vs disposable skull caps
  – No differences in terms of microbial or particulate shed
  – Cloth skull caps had a lower permeability
  – cloth skull caps had a higher transmission of particles through the material

• Cloth skull caps vs disposable bouffant hat
  – Cloth skull caps had lower particulate shed, and lower settle plate shed
  – Cloth skull caps had a lower permeability, lower average and maximum pore sizes, and similar penetration
Naked Surgeons? The Debate About What to Wear in the Operating Room

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There has been recent controversy regarding recommendations and regulations concerning operating room attire. We performed a nonsystematic literature search regarding operating room attire and surgical site infection (SSI) risk. Much of the literature relies on air sampling and culture of operating room equipment but does not present evidence regarding effect on SSI risk. There is no evidence regarding SSI risk related to operating room attire except for sterile gowns and the use of gloves. Naked surgeons shed fewer bacteria into the operating room environment than ones wearing scrub suits.

Keywords. operating room; surgical site infection; attire; contamination; head gear.