



THE NEXT WAVE  
IN PATIENT WARMING

# HOTDOG PATIENT WARMING

improving patient care with...

## SAFER

...patient warming



HotDog® is recommended by orthopedic surgeons during implant surgery over forced-air warming.

### The Paradox of Forced-Air Warming (FAW):

Studies show that FAW reduces soft-tissue surgical infections.

*How can FAW be linked to increased deep joint infections?*

The paradox is easy to explain: BIOFILM. A bacterium that lands on a prosthetic implant can secrete a coating of biofilm that protects it from both antibodies and antibiotics. Bacteria in soft-tissue cannot form effective biofilm coatings.

Secretion of biofilm allows a single airborne germ to cause a deep infection of a joint implant.<sup>1</sup> The increased airborne contamination from FAW vastly increases the chances of an airborne bacterium landing on the new implant<sup>2</sup> and protecting itself in a biofilm coating, then eventually becoming a catastrophic deep joint infection.

In contrast, without biofilm protection, germs in soft-tissue are susceptible to antibiotics and to an immune system activated by heat. As a result, the creation of soft-tissue surgical infections require large inoculums of more than 100,000 germs.<sup>3</sup>

This explains why soft-tissue surgical infections may not be increased by contaminated FAW air.

### CLINICALLY SUPERIOR PATIENT WARMING

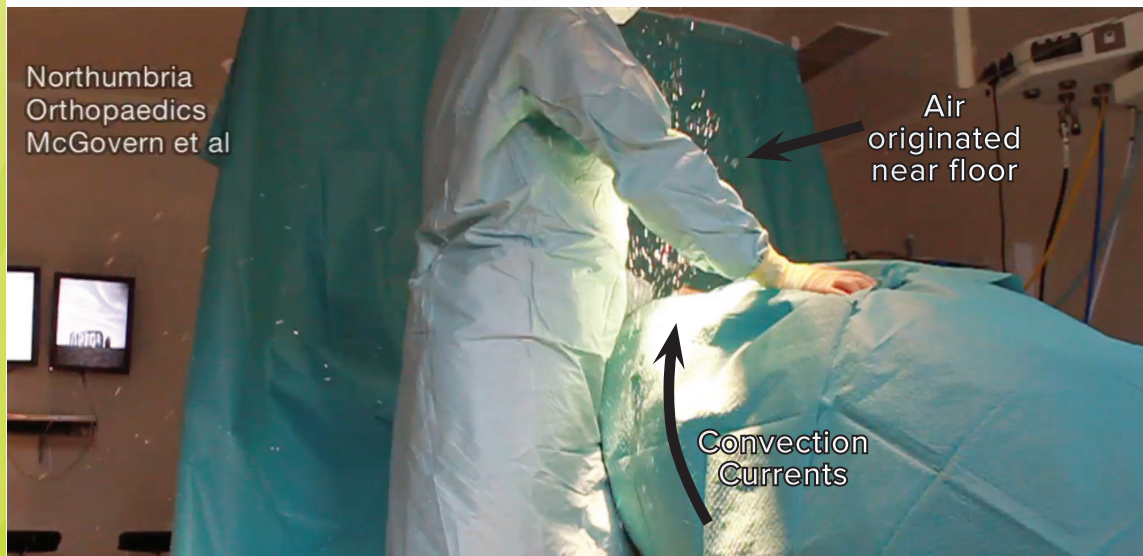


## Forced-air Warming Discontinued; Joint Infections Reduced 74%

McGovern P.D., Reed M.R., et al, Forced-air warming and ultra-clean ventilation do not mix. *J Bone Joint Surg Br.* 2011 Nov;93(11): 1537-44.

- 3.8x more implant infections in patients treated with FAW: Orthopedic surgeons maintained low infection rates with air-free HotDog patient warming (1437 patients over 2.5 yrs).
- Forced-air warming contaminates sterile field: Waste hot air convection currents transport contaminated air into the surgical site. Air-free warming has no such effect.
- Researchers concluded: "Air-free warming, therefore, is recommended over forced-air warming for orthopedic procedures."

### Waste Heat From Forced-Air Warming Documented in Video Research



Northumbria  
Orthopaedics  
McGovern et al

Air  
originated  
near floor

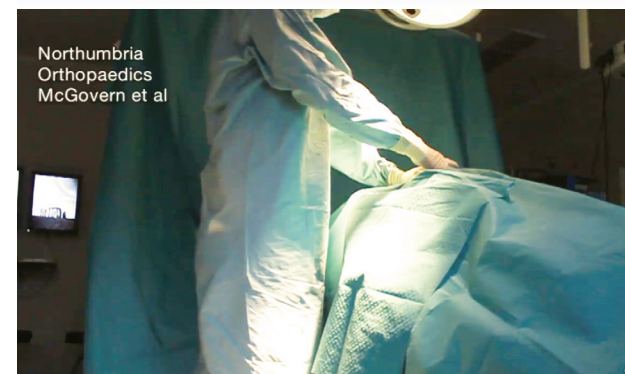
Convection  
Currents

### Side-by-Side Comparison

Researchers use neutral buoyancy bubbles to visualize airflow. **Top:** a lower body FAW blanket generates waste heat, forming convection currents that transport contaminated floor-level air to the surgical site.

**Right:** a HotDog warming blanket generates no waste heat, so bubbles introduced at the floor are swept away by the ceiling ventilation.

### HotDog Generates No Waste Heat



Northumbria  
Orthopaedics  
McGovern et al



Videos of research available on YouTube (search "Airborne Contamination")  
Learn more about the science at [www.heat-rises.blogspot.com](http://www.heat-rises.blogspot.com)

improving patient care with...

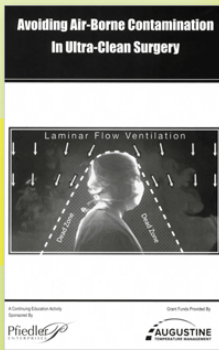
## SAFER

...patient warming



THE NEXT WAVE  
IN PATIENT WARMING

**“Avoiding Air-borne Contamination in Ultra Clean Surgery”**  
CEU course  
available for nurses



Call to schedule the FREE course

### ThermAssure®: Safe and Effective Conductive Fabric Warming

- HotDog conductive fabric patient warming generates safe, uniform heat.
- Several features ensure maximum safety for patients and clinicians.
- The blankets and mattresses have microprocessor-controlled temperatures at patient contact points.
- If a blanket is cut or punctured during use, the isolated, low voltage, floating current presents no risk of shock or spark to the patient or the clinician.
- Learn more about the safety at [www.hotdog-usa.com/technology](http://www.hotdog-usa.com/technology)

### Air-free HotDog patient warming does not produce waste heat.

In contrast, the waste heat from forced-air warming (FAW) disrupts the operating room ventilation by mobilizing contaminated air from the floor and causing it to rise into the ventilation airflow, ending up in the sterile surgical field on top of the operating table. Currently, **four published studies have proven this:**

Excerpts from **McGovern P.D.**, et al, *JBJSBr*, Nov 2011

“The risks of developing deep joint infections were significantly greater for patients...treated with forced-air versus conductive fabric warming [3.1% vs 0.8%].”

“Disruption [by Bair Hugger®] in the ventilation of the surgical site was associated with significantly higher risks of joint sepsis...”

“Excess heat from forced-air warming resulted in [hot air convection currents] that transported floor-level air upwards and into the surgical site. In contrast, conductive fabric warming did not release sufficient excess heat to establish these convection currents.”

**“Air-free warming, therefore, is recommended over forced-air warming for orthopedic procedures.”**

**Legg, A.J.**, et al,  
*JBJSBr*, Feb 2012

“Forced-air warming resulted in a significant mean increase in the temperature and number of particles over the surgical site when compared with [HotDog®] warming, which raises concern as bacteria are known to require particles for transport.”

**Dasari, K.B.**, et al,  
*Anaesthesia*, March 2012

“We conclude that forced-air warming generates convection current activity in the vicinity of the surgical site. The clinical concern is that these currents may disrupt ventilation airflows intended to clear airborne contaminants from the surgical site.”

**Belani**, et al,  
*A&A*, Accepted July 2012

“The direct mass-flow exhaust from forced-air warming generated hot-air convection currents that mobilized ‘bubbles’ over the anesthesia drape and into the surgical site.”



### WHAT ARE USERS SAYING?

“Our unit has had a significant reduction in joint replacement infection since changing to an alternative patient warming system.”

-M.R. Reed, MD, Orthopedic Surgeon, Letters to the Editor, *JBJSb* Feb 2011

Reference citations available on our website.

