

(OR) of 1.66 (95% CI, 1.50–1.84;  $P < .001$ ). HH compliance improved across all HCW roles: (1) physician compliance improved from 55% to 67% (OR, 1.69; 95% CI, 1.42–2.01;  $P < .001$ ); (2) nurse compliance from 61% to 73% (OR, 1.68; 95% CI, 1.46–1.93;  $P < .001$ ); and (3) other HCW compliance from 52% to 62% (OR, 1.48; 95% CI, 1.10–1.99;  $P = .010$ ).

**Conclusion:** CUSP was successfully adapted by 4 diverse tertiary-care NICUs in Pune, India, and it resulted in increased HH compliance at all sites. This multimodal strategy is a promising framework for LMIC healthcare facilities to sustainably address IPC gaps and reduce HAI and mortality in neonates.

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### Presentation Type:

Distinguished Oral

### Increase in Surgical Site Infections Caused by Gram-Negative Pathogens in Warmer Weathers Data From More Than 2 Million Surgeries

Seven Johannes Sam Aghdassi, Charité-Universitätsmedizin Berlin, corporate member of Freie Universität Berlin, Humboldt-Universität zu Berlin, and Berlin Institute of Health, Institute of Hygiene and Environmental Medicine\*

Frank Schwab, Charité-Universitätsmedizin Berlin, corporate member of Freie Universität Berlin, Humboldt-Universität zu Berlin, and Berlin Institute of Health, Institute of Hygiene and Environmental Medicine; Peter Hoffmann, Potsdam Institute for Climate Impact Research, Climate Resilience; Petra Gastmeier, Charité-Universitätsmedizin Berlin

**Background:** Various studies have linked periods of warmer temperatures to an increased occurrence of surgical site infections (SSIs) and healthcare-associated infections in general. In an observational study, we sought to determine the pathogens for which this association was especially strong. **Method:** Patient- and procedure-related data of the SSI-module of the German nosocomial infection surveillance system were linked with monthly aggregated meteorological data from the German Meteorological Service for a period from 2000 to 2016. Due to high correlation with other meteorological parameters, analyses were executed focusing on the outside ambient temperature. Temperature was regarded as both a continuous variable and a categorical variable with different temperature intervals (5°C steps ranging from <5°C to ≥20°C). Through multivariable logistic regression analysis, adjusted odds ratios (OR) with 95% confidence intervals were calculated for SSI rates relating to temperature. SSIs were stratified by pathogen and depth of infiltration. **Result:** Altogether, 2,004,793 procedures, conducted in 1,455 German surgical departments and resulting in 32,118 SSIs, were included. A general association of warmer mean temperatures in the month of surgery with an increased SSI-risk was observed, particularly for SSIs caused by gram-negative pathogens. Stratification by pathogen revealed that the association was especially prominent for *Acinetobacter* spp, *Pseudomonas aeruginosa*, and certain *Enterobacteriaceae*. Per additional 1°C, we observed a 6% increase in the risk for SSIs caused by *Acinetobacter* spp (OR, 1.06; 95% CI, 1.04–1.09), and a 4% increase in the risk for SSIs caused by *Enterobacter* spp (OR, 1.04; 95% CI, 1.03–1.05). Among gram-positive pathogens, temperature-association was strongest for *Staphylococcus aureus*. Superficial SSIs showed a higher

temperature-association than deeper SSIs. The risk for superficial SSIs with *Acinetobacter* spp significantly increased >10-fold after surgeries conducted in months with a mean temperature of ≥20°C in reference to <5°C. For *Pseudomonas aeruginosa*, we observed a >2-fold statistically significant increase in the risk for superficial SSIs, when comparing the same temperature categories (≥20°C vs <5°C). **Conclusions:** Our study demonstrated that higher temperatures were associated with increased SSI-rates caused by gram-negative bacteria. As a consequence, future SSI-prevention measures should place a higher emphasis on the parameter season as part of a more tailored, personalized approach at infection prevention. For instance, it may be conceivable to seasonally adjust decolonizing regimens and certain prophylaxes. Underlying shifts in microbiome composition due to meteorological factors should be considered in further analyses. Given the expected rise of global temperatures until the end of the century, the topic gains relevance from multiple perspectives.

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### Investigation of Events Related to Laboratory-Confirmed Contamination of Pharmaceutical Products: Summary of CDC Consultation

Lina Elbadawi, Centers for Disease Control and Prevention; Nadine Shehab, Centers for Disease Control and Prevention; Jennifer N. Lind, Centers for Disease Control and Prevention; Alexander Kallen, Centers for Disease Control and Prevention; Melissa K. Schaefer, Centers for Disease Control and Prevention; Kiran Perkins, Centers for Disease Control and Prevention

**Background:** Contaminated pharmaceutical products pose serious infection risks to patients and can lead to significant morbidity and mortality. Contamination at the point of manufacturing or compounding (intrinsic contamination) has the potential to affect large numbers of patients. Public health plays a critical role in detecting and investigating such events. We identified investigations involving intrinsically contaminated pharmaceuticals to characterize the burden and scope of harm associated with these events. **Methods:** We reviewed Centers for Disease Control and Prevention records to identify US investigations between January 1, 2009, and December 31, 2018, involving laboratory-confirmed contamination of manufactured medications and pharmacy-compounded preparations (P-CPs), using relevant search terms (eg, “medication contamination”). Laboratory confirmation was defined as identification of a pathogen from a manufactured medication or P-CP. We determined the number and type of patient infections associated with these investigations, the number of states involved, pathogens identified, type of medication (sterile or nonsterile), route of administration, and how the contamination event was first identified. We excluded investigations when the mode of production was unknown. **Results:** We identified 20 investigations in at least 20 states involving laboratory-confirmed contamination of manufactured medications (n = 12) and P-CPs (n = 8). Patient infections were identified in 16 (80%) investigations (9 involving manufactured medications and 7 involving P-CPs) resulting in at least 1,183 infections and at least 73 deaths. Bloodstream infections were the most common infection type (n = 7, 44%). Waterborne pathogens (eg, *Serratia marcescens*, *Burkholderia*