



Letters to the Editor

Entering infection prevention with a master of public health

*To the Editor:*

Vassallo and Boston¹ have eloquently provided evidence for hiring public health-trained infection preventionists. A concern has always existed about infection preventionists not being “clinical.” However, as infection preventionists step from behind the data and become embedded in clinical quality improvement teams, these clinical gaps are filling quickly as they learn from physicians, pharmacists, and nurses. Only 8 of the 37 infection prevention competencies are not addressed by a traditional program. Some master of public health (MPH) candidates interested in infection prevention enroll in MPH programs, focusing on infection control. These programs use the certification in infection prevention and control competency matrix to complement the traditional MPH to cover the competencies that are not addressed by a typical MPH. These MPH candidates are undoubtedly qualified, but they can still have difficulty in gaining employment owing to the pervasive opinion that nonclinical candidates do not make good infection preventionists. As we look to the future, this article will remind us all to consider these MPH candidates because their skill set far outweighs any perceived gaps.

Reference

1. Vassallo A, Boston K. The master of public health graduate as infection preventionist: navigating the changing landscape of infection prevention. *Am J Infect Control* 2019;47:201-7.

Conflicts of interest: None to report.

Fozia Steinkuller, MPH, CIC*
 Department of Infection Prevention,
 UT Physicians, Houston, TX

* Address correspondence to Fozia Steinkuller, MPH, CIC,
 Department of Infection Prevention, UT Physicians,
 6431 Fannin St, Rm G125, Houston, TX.
 E-mail address: Fozia.Steinkuller@uth.tmc.edu (F. Steinkuller).

<https://doi.org/10.1016/j.ajic.2019.02.023>

Environmental conditions and health care–associated infections in wards for noncritical patients

*To the Editor:*

Recent reports on the seasonality of health care–associated infections (HCAIs) and pathogens have posed new challenges for infection control practitioners.¹ Indeed, “summer peaks” and association with warm periods were detected,^{2,3} and a recent study found that the likelihood of acquiring bloodstream infections caused by gram-negative bacilli increased with proximity to the equator.⁴ It is worth noting that most studies were conducted in areas with a temperate climate,¹ and they generally used weather parameters measured outside the hospital.^{1,3}

To investigate the impact of environmental parameters inside hospital units on the occurrence of HCAIs, we conducted a prospective ecological study. The study setting was the University Hospital of the Botucatu Medical School, a 450-bed facility with 5 intensive care units and 18 wards for noncritically ill patients. We were especially interested in HCAI occurrence in the wards that are not air-conditioned.

Briefly, we studied 3 admission units for adult patients: medical 1 (32 beds), medical 2 (16 beds), and dermatology (16 beds). Serial point prevalence surveys (1 every 2 weeks) were performed to identify HCAIs in the period from July 2017 through June 2018. Temperature and humidity inside one of the patient rooms (randomly chosen) in each unit were measured in the same week the prevalence survey was performed. Poisson regression models, adjusted for the admission unit, were used to identify the association of environmental parameters with the overall prevalence of HCAIs or specific infection sites.

The total number of observations (ie, patients observed during surveys) was 3,201. The aggregate value of HCAI prevalence for all surveys was 4.1%. Detailed results are presented in [Table 1](#). There was no association of temperature and humidity with overall HCAIs. However, temperature was positively associated with surgical site infections (SSIs) and inversely associated with urinary tract infections (UTIs).

Our findings are noteworthy. Even though SSIs are generally acquired inside the operating theater, hypotheses for their summer

Table 1
Results of multivariable Poisson regression models in the prevalence of HCAs in 3 admission units for noncritically ill patients

Infection site	Prevalence (%)	Temperature (°C)			Relative humidity (%)		
		PR	95% CI	P	PR	95% CI	P
Overall HCAI	4.1	0.94	0.86–1.03	.17	0.99	0.98–1.01	.66
HAP	1.1	1.00	0.84–1.20	.98	0.99	0.97–1.02	.67
CLABSI	0.4	1.32	0.95–1.85	.11	1.04	0.99–1.10	.15
CAUTI	0.6	0.75	0.58–0.94	.02	0.99	0.95–1.04	.73
SSTI	0.5	1.03	0.79–1.35	.82	0.99	0.94–1.03	.54
SSI	0.4	1.49	1.08–2.04	.01	1.03	0.97–1.09	.31
GII	1.1	0.94	0.88–1.02	.15	0.99	0.98–1.00	.15

NOTE. Models were adjusted for admission unit. Bold values are statistically significant ($P < .05$).

CAUTI, catheter-associated urinary tract infection; CI, confidence interval; CLABSI, central line-associated bloodstream infection; GII, gastrointestinal infection; HAP, health care-associated pneumonia; HCAI, health care-associated infection; PR, prevalence ratio; SSTI, skin and soft tissue infection; SSI, surgical site infection.

peaks and association with temperature include excessive perspiration and changes in skin microbiota prior to the surgical procedure.⁵ These changes can occur in the wards, where patients stay before and after surgery. Also, temperature in the rooms may be a proxy of temperature in the operating theater (even though there is climate control in the latter). Recent studies from our group found that temperature, measured either outside the hospital⁶ or inside the operating theater,⁷ impacts the risk of acquiring an SSI.

In contrast, the negative association with UTIs seems counterintuitive. Studies in the community have described associations of UTIs with summer and high environmental temperature.^{8,9} However, there are conflicting data on this issue, and Rosello et al¹⁰ found increases in primary care UTI consultations in the United Kingdom from September through November. This certainly requires further investigation.

Our study has some limitations, especially related to the short period (1 year) and small number of hospital units surveyed. These aspects can hinder statistical power. Even so, we could identify the association of indoor temperature with 2 HCAI sites. Although new studies (with larger samples and time spans) are required, we conclude that the role of weather in the epidemiology of HCAs should not be neglected.

References

1. Richet H. Seasonality in gram-negative and healthcare-associated infections. *Clin Microbiol Infect* 2012;18:934–40.

2. Perencevich EN, McGregor JC, Shardell M, Furuno JP, Harris AD, Morris JG Jr, et al. Summer peaks in the incidences of gram-negative bacterial infection among hospitalized patients. *Infect Control Hosp Epidemiol* 2008;29:1124–31.
3. Fisman D, Patrozou E, Carmeli Y, Perencevich E, Tuite AR, Mermel LA, et al. Geographical variability in the likelihood of bloodstream infections due to gram-negative bacteria: correlation with proximity to the equator and health care expenditure. *PLoS One* 2014;9:e114548.
4. Eber MR, Shardell M, Schwizer L, Laxminarayan R, Perencevich EN. Seasonal and temperature-associated increases in gram-negative bacterial bloodstream infections among hospitalized patients. *PLoS One* 2011;6:e25298.
5. Manian FA. Seasonal variation of surgical site infections: why does it occur, why does it matter? *Infect Control Hosp Epidemiol* 2016;37:121–3.
6. Fortaleza CM, Silva MO, Saad Rodrigues F, Cunha AR. Impact of weather on the risk of surgical site infections in a tropical area. *Am J Infect Control* 2019;47:92–4.
7. Limaylla DC, Silva MO, Zanqueta MC, Fortaleza CM. Surgical site infections and temperature in the operating theater—challenges for infection control in developing countries. *Infect Control Hosp Epidemiol* 2019;40:120–1.
8. Falagas ME, Peppas G, Matthaiou DK, Karageorgopoulos DE, Karalis N, Theocharis G. Effect of meteorological variables on the incidence of lower urinary tract infections. *Eur J Clin Microbiol Infect Dis* 2009;28:709–12.
9. Simmering JE, Tang F, Cavanaugh JE, Polgreen LA, Polgreen PM. The increase in hospitalizations for urinary tract infections and the associated costs in the United States, 1998–2011. *Open Forum Infect Dis* 2017;4, ofw281.
10. Rosello A, Pouwels KB, Domenech de Cellès M, van Kleef E, Hayward AC, Hopkins S, et al. Seasonality of urinary tract infections in the United Kingdom in different age groups: longitudinal analysis of The Health Improvement Network (THIN). *Epidemiol Infect* 2018;146:37–45.

Conflicts of interest: None to report.

Funding/support: M.O.S. and C.M.C.B.F. received grants from the National Council for Scientific and Technological Development, Brazil. D.C.L. received a Master of Science grant from the Coordination for the Improvement of Higher Level Education Personnel, Brazil.

Dayanne Conislla Limaylla, MSc
Postgraduate Program in Collective Health
São Paulo State University
Botucatu Medical School
Botucatu, São Paulo State, Brazil

Carlos Magno Castelo Branco Fortaleza, MD, PhD*
Marina de Oliveira Silva, MD
Department of Tropical Diseases
São Paulo State University
Botucatu Medical School
Botucatu, São Paulo State, Brazil

* Address correspondence to Carlos Magno Castelo Branco Fortaleza, MD, PhD, Departamento de Doenças Tropicais, Faculdade de Medicina de Botucatu, Distrito de Rubião Júnior, S/N, 18618-970 Botucatu, São Paulo State, Brazil.

E-mail address: cmfortaleza@uol.com.br (C.M.C.B. Fortaleza).

<https://doi.org/10.1016/j.ajic.2019.01.003>