



**XIV**

Congresso Brasileiro de  
Controle de Infecção e  
Epidemiologia Hospitalar

19 A 22 DE NOVEMBRO DE 2014 | EXPO UNIVED CURITIBA | CURITIBA | PR



# Os hospitais estão preparados para prestar assistência a 35°C?

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# Não estamos preparados

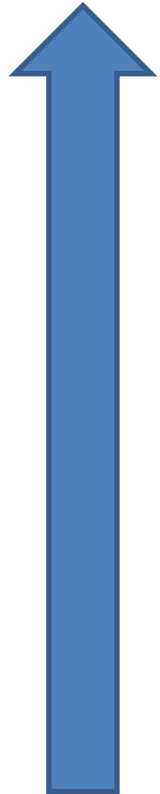


# Altas Temperaturas nos Hospitais

- Risco Infecção
- Impacto custo
- Temperatura Ideal
- Legislação
- Indicadores



# Altas temperaturas e Risco IRAS



**Número de hospitalizações**

**Bacteremias pacientes não hospitalizados**

**Pacientes Hemodiálise (HD)**

**Bacteremia pacientes hospitalizados**



# Heat, Heat Waves, and Hospital Admissions among the Elderly in the United States, 1992–2006

Carina J. Gronlund,<sup>1</sup> Antonella Zanobetti,<sup>2</sup> Joel D. Schwartz,<sup>2</sup> Gregory A. Wellenius,<sup>3</sup> and Marie S. O'Neill<sup>1,4,5</sup>

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Variable	All causes	Cardiovascular	Renal	Respiratory
Sum of the main effects of moderate heat				
Lag days 0–1	0.7 (0.5, 0.8)	−0.4 (−0.6, −0.2)	3.9 (2.9, 4.9)	1.3 (0.8, 1.8)
Lag days 0–7	0.5 (0.3, 0.7)	−1.3 (−1.6, −1.0)	4.3 (3.0, 5.6)	0.0 (−0.6, 0.7)
Sum of the main effects of extreme heat				
Lag days 0–1	1.4 (0.8, 2.0)	−1.6 (−2.7, −0.6)	9.3 (4.3, 14.5)	3.3 (1.3, 5.4)
Lag days 0–3	2.1 (1.5, 2.8)	−2.0 (−2.9, −1.0)	12.6 (8.2, 17.3)	4.8 (2.6, 6.9)
Lag days 0–5	2.9 (2.2, 3.6)	−2.0 (−3.0, −1.0)	11.3 (6.0, 16.8)	5.5 (3.2, 7.8)
Lag days 0–7	3.2 (2.4, 4.0)	−1.8 (−2.7, −0.8)	14.2 (8.5, 20.1)	4.3 (1.8, 6.9)



Contents lists available at ScienceDirect

American Journal of Infection Control

journal homepage: [www.ajicjournal.org](http://www.ajicjournal.org)



#### Major article

## Seasonal variation in health care-associated bloodstream infection: Increase in the incidence of gram-negative bacteremia in nonhospitalized patients during summer

Kylie Alcorn BSc (Biotech), MBBS<sup>a,\*</sup>, John Gerrard BSc (med), MBBS, MSc, FRACP<sup>a</sup>, Deborah Macbeth PhD<sup>a,b</sup>, Michael Steele PhD<sup>c</sup>

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<sup>b</sup>Faculty of Nursing, Griffith University, Gold Coast, Queensland, Australia

<sup>c</sup>School of Business, Bond University, Gold Coast, Queensland, Australia

- **11 anos**
- **Pacientes internados (unidades climatizadas)**
- **Não hospitalizados temperatura ambiente**

**Austrália verão 29.4 C**



# Infecção gram-negativos verão e pacientes não Hospitalizados

	Summer	Autumn	Winter	Spring	P
GN noninpatient HCA	60 (9.93)	49 (8.24)	35 (5.53)	37 (5.56)	.030
GN inpatient HCA	62 (8.06)	68 (8.30)	67 (8.48)	62 (7.70)	.924
GP noninpatient HCA	35 (5.80)	39 (6.56)	34 (5.37)	41 (5.37)	.830
GP inpatient HCA	63 (8.19)	61 (7.45)	60 (7.59)	68 (8.47)	.896
GN noninpatient HCA infections					
Intravascular-catheter focus	25	17	15	11	.106
Urine focus	11	10	2	9	.100
<i>Klebsiella</i>	13	15	9	10	.586
<i>Pseudomonas</i>	15	12	7	9	.331
<i>Escherichia coli</i>	11	6	8	9	.675
<i>Enterobacter</i>	7	2	5	5	.443



## Catheter-related Infection and Septicemia: Impact of Seasonality and Modifiable Practices from the DOPPS

Charmaine E. Lok,\* Jyothi R. Thumma,† Keith P. McCullough,† Brenda W. Gillespie,‡ Richard J. Fluck,§ Mark R. Marshall,¶ Hideki Kawanishi,\*\* Bruce M. Robinson,†† and Ronald L. Pisoni†

\*Toronto General Hospital and the University of Toronto, Toronto, Ontario, Canada, †Arbor Research Collaborative for Health, Ann Arbor, Michigan, ‡University of Michigan, Ann Arbor, Michigan, §Derby City General Hospital, Derby, United Kingdom, ¶Faculty of Medical and Health Sciences, University of Auckland, Auckland, New Zealand, and \*\*Tsuchiya General Hospital, Hiroshima, Japan

- 12.122 pts HD
- 12 países USA, Ásia, Europa
- 973 ICS-CVC



TABLE 1. Rate of first recorded catheter-related infection and septicemia (per 1000 catheter days) by season

Season	Fall	Winter	Spring	Summer	Total
Infection rate	0.82	0.83	0.90	1.07	0.91
Septicemia rate	0.32	0.31	0.34	0.44	0.35
Infection AHR	1.00 (0.87–1.14)	1 (ref)	1.10 (0.97–1.26)	1.32 (1.16–1.50)	
Septicemia AHR	1.08 (0.86–1.34)	1 (ref)	1.13 (0.91–1.41)	1.46 (1.19–1.80)	

AHR = Adjusted hazard ratio for each season calculated using Cox time-dependent models on infection and septicemia, controlling for DOPPS phase, country, age, sex, race (Black versus non-Black), and 13 comorbid conditions.

# The Warmer the Weather, the More Gram-Negative Bacteria - Impact of Temperature on Clinical Isolates in Intensive Care Units

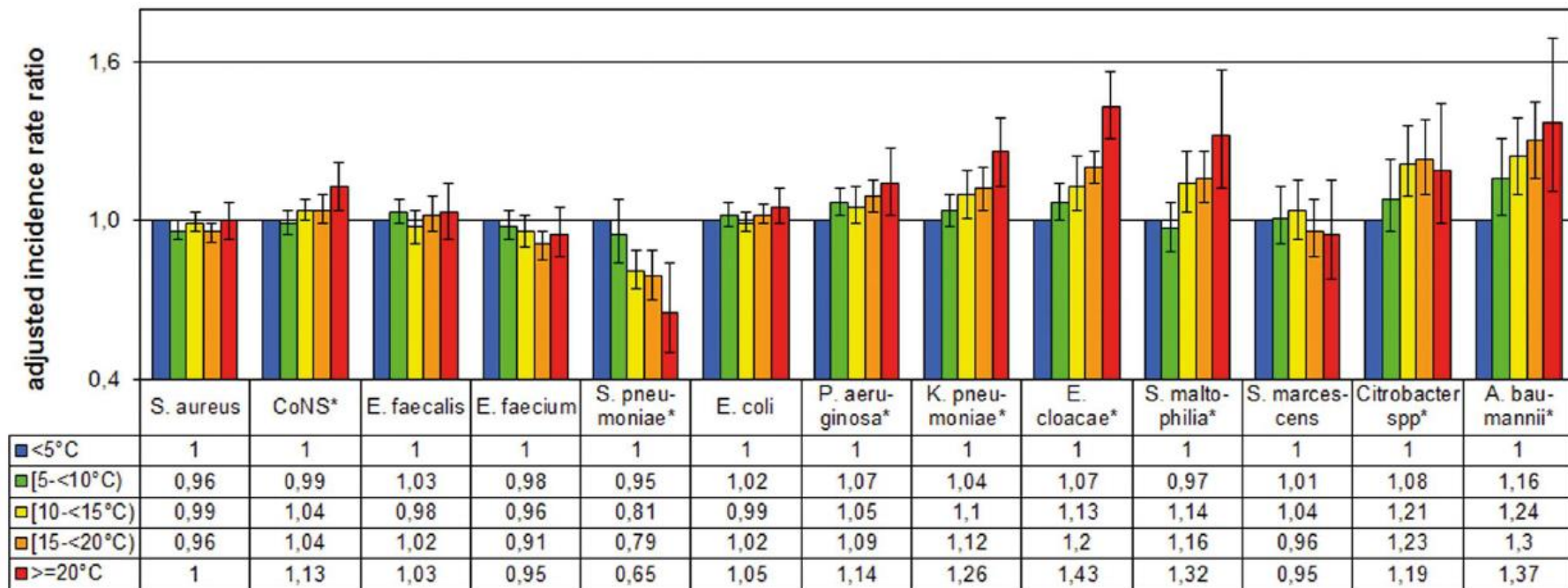
Frank Schwab<sup>1,2\*</sup>, Petra Gastmeier<sup>1,2</sup>, Elisabeth Meyer<sup>1,2</sup>

<sup>1</sup> Institute of Hygiene and Environmental Medicine, Charité - University Medicine Berlin, Berlin, Germany, <sup>2</sup> National Reference Centre for Surveillance of Nosocomial Infections, Berlin, Germany

- **73 UTIs**
- **41 Hospitais**
- **31 cidades**
- **11 anos**

$$T \geq 20\text{ C} \quad \text{x} \quad \leq 5\text{ C}$$

- IRAS Gram-negativos 15% (RR1.15 , IC 95% 1.10-1.21)



## • Temperatura > 20 c

			IRR	IC 95%
•	<i>E.cloacae</i>	43%	1.43	1.31-1.56
•	<i>A. baumannii</i>	37%	1.37	1.11-1.69
•	<i>S. maltophilia</i>	32%	1.32	1.12-1.57
•	<i>K. pneumoniae</i>	26%	1.26	1.13-1.39
•	SCN	13%	1.13	1.02-1.04

**COMO CONVENCER O ADMINISTRADOR QUE A  
TEMPERATURA IMPORTA...**

# *Temperatura ideal Hospital*

- **Centro Cirúrgico**
- **18-22 C**
- **20-23 C**



AORN, Inc; 2013:513-540.

**NORMA  
BRASILEIRA**

**ABNT NBR  
7256**

Segunda edição  
30.03.2005

Válida a partir de  
29.04.2005

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**Tratamento de ar em estabelecimentos  
assistenciais de saúde (EAS) - Requisitos  
para projeto e execução das instalações**

*Air conditioning for health care facilities - Requirements for design  
and installation*



# Legislação Brasileira

- Norma Técnica
- 21 graus

3.14 vazão de ar: Volume de ar por unidade de tempo, sempre referido ao ar na condição padrão, que corresponde ao nível do mar, temperatura de 21°C e 0 kg/kg de umidade específica e cuja densidade é de 1,204 kg/m<sup>3</sup>.

- FAQ – Sistema de Perguntas e Respostas – Arquitetura e Engenharia – Qualidade de Ar Interior . In:

[www.anvisa.gov.br](http://www.anvisa.gov.br)





**PREFEITURA DO MUNICÍPIO DE SÃO PAULO  
SECRETARIA MUNICIPAL DA SAÚDE  
COORDENAÇÃO DE VIGILÂNCIA EM SAÚDE - COVISA  
GERÊNCIA DO CENTRO DE CONTROLE E PREVENÇÃO DE DOENÇAS - CCD  
NÚCLEO MUNICIPAL DE CONTROLE DE INFECÇÃO HOSPITALAR - NMCIH**



**São Paulo, 02 de março de 2012.**

**VENTILADORES EM ESTABELECIMENTOS DE ASSISTÊNCIA À SAÚDE**

- A RDC-50, de 21.02.2002, incluindo as alterações contidas nas Resoluções RDC 307 de 14.11.02 e RDC 189 de 18.07.2003 estabelece que:

O uso de ventiladores causa a dispersão do ar, o que deve ser evitado em estabelecimentos de assistência à saúde.

Em condições excepcionais, em algumas áreas não assistenciais e não críticas, a CCIH e Serviço de Engenharia e Manutenção do hospital podem optar por essa alternativa, respeitadas as condições de segurança de profissionais e de pacientes e de prevenção e controle de infecção.

**IMPACTO CUSTO**

# Impacto Custo

- Infecção gram-negativo
- Infecção corrente sanguínea
- Tempo internação
- Custo tratamento
- Coleta de hemocultura



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CRITICAL CARE

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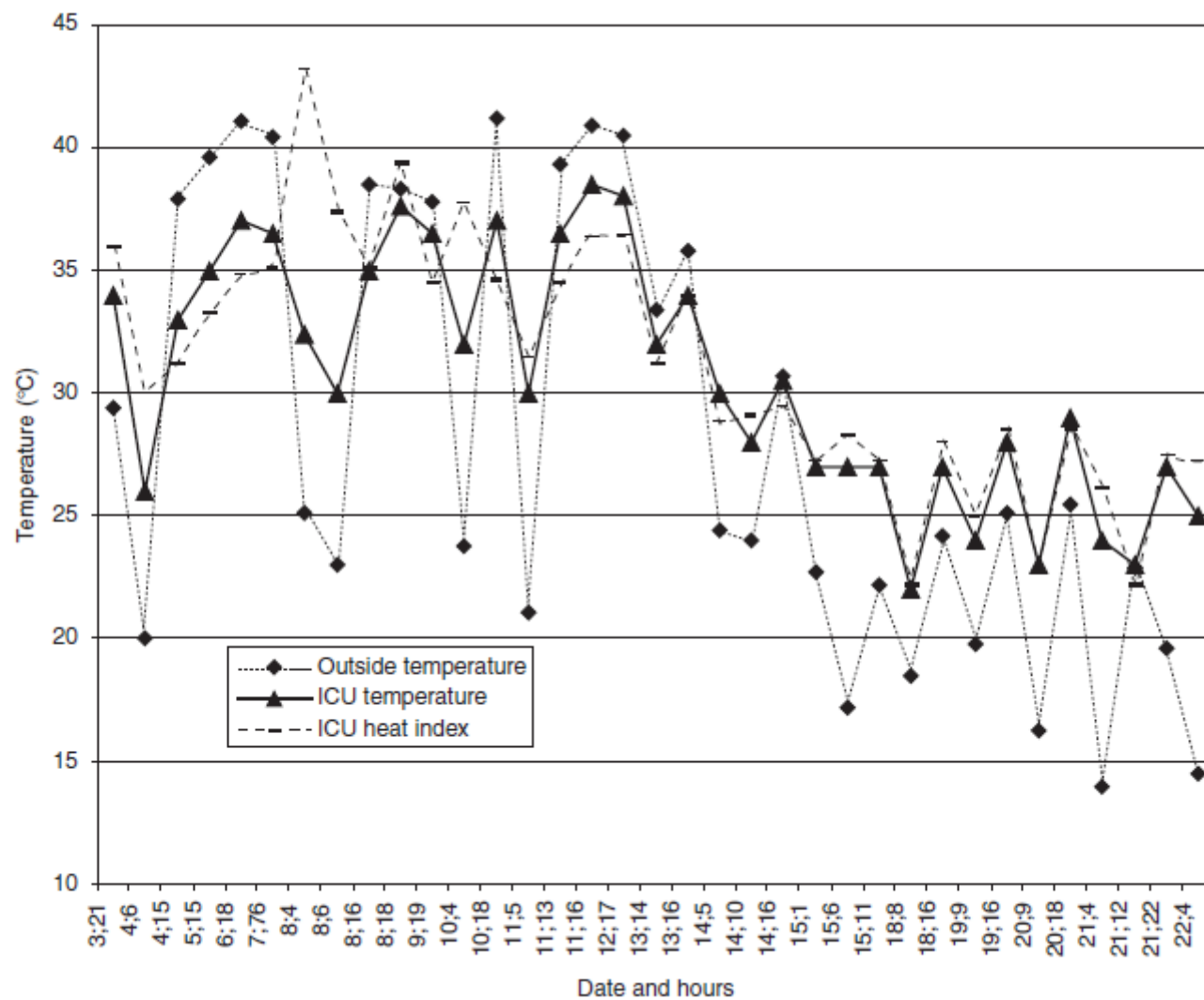
**Effect of excessive environmental heat on core temperature  
in critically ill patients. An observational study during  
the 2003 European heat wave**

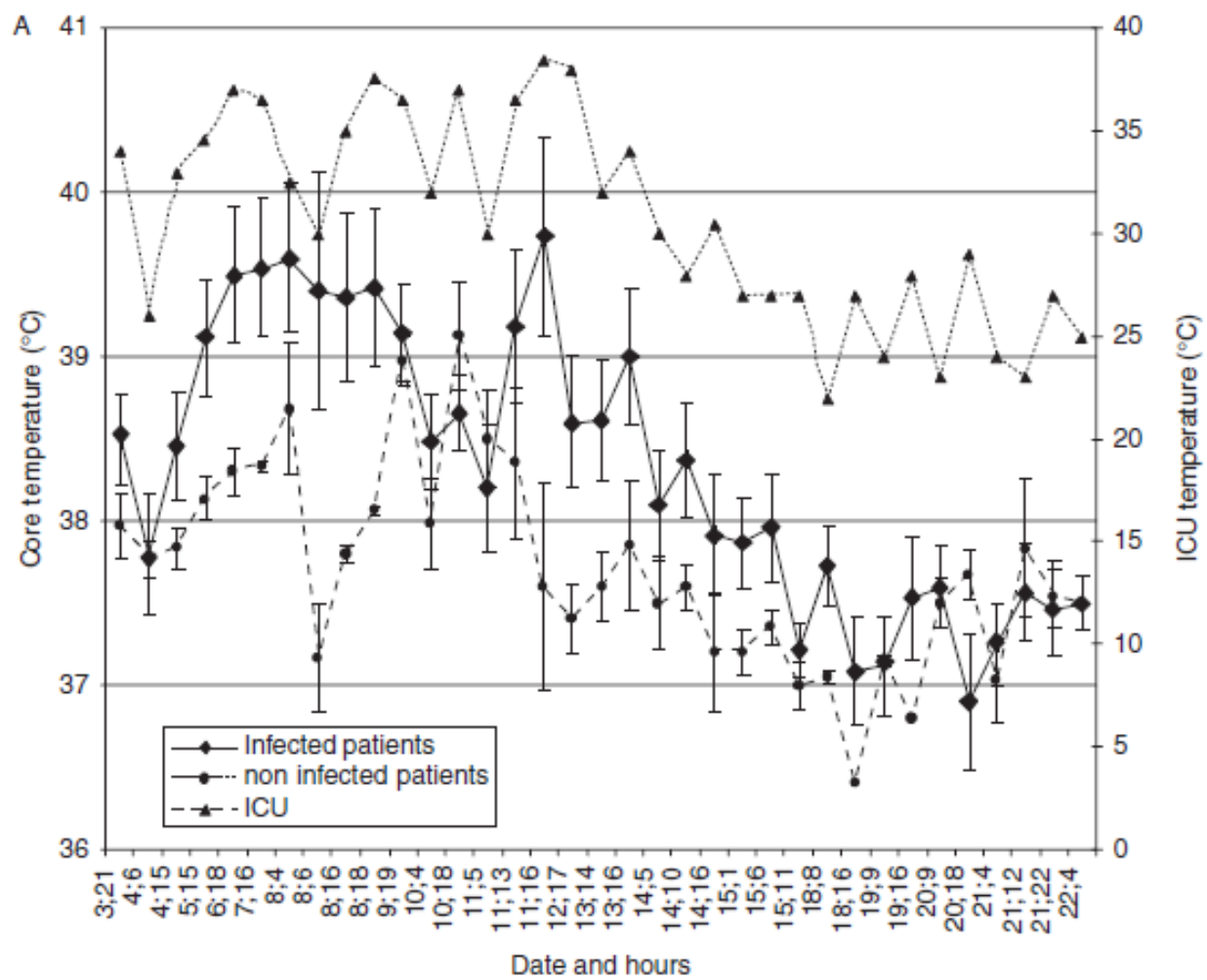
**F. Stéphan<sup>1\*</sup>, S. Ghiglione<sup>1</sup>, F. Decailliot<sup>1</sup>, L. Yakhou<sup>1</sup>, P. Duvaldestin<sup>1</sup> and P. Legrand<sup>2</sup>**

*<sup>1</sup>Réanimation chirurgicale et traumatologique, Service d'Anesthésie-Réanimation, AP-HP Hôpital Henri Mondor and Université Paris XII, 51 Avenue du Maréchal de Lattre de Tassigny, 94010 Créteil Cedex, France and <sup>2</sup>Laboratoire de Bactériologie, AP-HP Hôpital Henri Mondor and Université Paris XII, 51 Avenue du Maréchal de Lattre de Tassigny, 94010 Créteil, France*

- UTI cirúrgica sem ar condicionado
  - Temperatura timpânica pts
  - Temperatura da UTI 2x/dia
  - Controle Profissional de Saúde
  - Estudo observacional
  - Desfechos
    - Temperatura
    - Coleta de culturas







## Onda calor



Microbiological tests ordered	Year 2003, August		Year 2002, August		P-value	P-value
	3 to 15 (1st period)	16 to 22 (2nd period)	3 to 15 (1st period)	16 to 22 (2nd period)	2003 vs 2002 (1st period)	2003 vs 2002 (2nd period)
Blood cultures					0.0006	0.83
<i>n</i>	63	16	21	12		
Per 1000 patient-days	4.80	2.10 <sup>a</sup>	2.47	2.26 <sup>d</sup>		
Protected telescopic catheters					0.39	0.57
<i>n</i>	10	4	4	5		
Per 1000 patient-days	0.76	0.52 <sup>b</sup>	0.47	0.94 <sup>e</sup>		
Urine cultures					0.90	0.28
<i>n</i>	13	8	8	2		
Per 1000 patient-days	0.99	1.05 <sup>c</sup>	0.94	0.37 <sup>f</sup>		

# Air Quality Monitoring of the Post-Operative Recovery Room and Locations Surrounding Operating Theaters in a Medical Center in Taiwan

Chin-Sheng Tang<sup>1</sup>, Gwo-Hwa Wan<sup>2\*</sup>

Air quality indices	Locations surrounding operating theaters					Operating theaters			
	POR	IR	SWR	DR	Restaurant	Office	KTR	TR	LTR
Temperature, °C	21.1±1.5 <sup>*†‡</sup>	20.6±1.5 <sup>*†</sup>	22.3±1.7 <sup>*†‡</sup>	21.9±2.6 <sup>*†‡</sup>	20.9±1.4 <sup>*†</sup>	20.0±1.3	18.9±1.4	19.7±1.4	19.1±1.1
RH, %	66.2±3.7	63.8±5.5 <sup>*†‡</sup>	63.6±5.0 <sup>*†‡</sup>	69.9±6.8	70.7±4.7	65.8±3.7 <sup>*</sup>	70.0±3.8	68.3±3.1	68.6±5.4
CO <sub>2</sub> , ppm	651.0±97.7 <sup>*†‡</sup>	529.4±84.7	517.1±74.2	406.1±65.3 <sup>*†‡</sup>	521.0±78.3	580.0±90.2 <sup>†‡</sup>	545.5±80.4	480.4±71.7	498.2±80.0
PM <sub>10</sub> , µg/m <sup>3</sup>	19.7±8.2	13.3±8.7	40.1±18.6 <sup>*†‡</sup>	40.2±26.1 <sup>*†‡</sup>	35.7±26.3 <sup>*†‡</sup>	31.8±19.4	12.9±8.4	20.7±11.4	15.2±8.2
PM <sub>2.5</sub> , µg/m <sup>3</sup>	3.5±2.0	1.2±1.0	6.5±4.8	16.5±15.4 <sup>*†‡</sup>	9.1±9.2 <sup>*†‡</sup>	1.4±0.8	1.1±0.6	1.7±1.4	1.0±0.5
Bacteria, CFU/m <sup>3</sup>	383.5 (2.1) <sup>*†‡</sup>	106.9 (2.0) <sup>†‡</sup>	373.7 (1.6) <sup>*†‡</sup>	141.5 (2.2) <sup>*†</sup>	270.8 (1.8) <sup>*†‡</sup>	182.2 (1.8) <sup>*†</sup>	92.0 (2.3)	144.5 (2.0)	87.19 (1.9)
number of people in a space, n	19±6 <sup>*†‡</sup>	3±1 <sup>*</sup>	4±2 <sup>*</sup>	1±1 <sup>*†‡</sup>	6±5	2±2 <sup>*†</sup>	6±2	4±2	5±2

# **INDICADORES QUALIDADE TEMPERATURA UNIDADES HOSPITAL**

# Questionnaire-based survey on structural quality of hospitals and nursing homes for the elderly, their staffing with infection control personal, and implementation of infection control measures in Germany

Fragebogenerhebung zur Ausstattung von Krankenhäusern sowie Einrichtungen der stationären und ambulanten Kranken- und Altenpflege mit Hygienefachpersonal und zur Umsetzung ausgewählter Hygienemaßnahmen in Deutschland

- 1.860 Hospitais
- 300 clinicas
- 310 Nursing homes
- 229 responderam questionário



Item	Guideline or SOP		
	yes	no	unknown
Implementation of the KRINKO recommendations and AWMF guidelines in in-house guidelines	74%	9%	17%
Hand Hygiene	99%	1%	0%
MRSA screening	94%	6%	0%
Prevention of nosocomial infections associated with vascular catheters	86%	6%	8%
Prudent use of antibiotics	62%	27%	10%
Hygiene plan for surgical departments	85%	12%	3%
Surveillance of HAI	87%	11%	2%
Outbreak management	85%	8%	7%
Surgical scrub clothing regulations	89%	10%	1%
Control of air-conditioning installations	85%	4%	11%
Waste disposal	84%	6%	10%

# Dados Brasileiros de Estrutura Hospitalar???

- Verão
- 40 C

- 2 estudos brasileiros
- IRAS gram-negative e sazonalidade



*Ramos GP, Int J Infect Dis. 2013;17(9):e757-61.*

*Fortaleza CM, Infect Control Hosp Epidemiol. 2014;35(1):85-8.*

**ESTAMOS MEDINDO CORRETAMENTE  
AS TEMPERATURAS DAS UNIDADES?**

# Hospitais públicos x Privados

- Centro cirurgico
- UTIs
- PS
- Hospitais ventilação natural
- Ventiladores
- Indicadores diários
- Engenharia
- Manutenção verão



# Para levar para Casa

- Altas temperaturas Bacteremia
- Aumentam custo
- Legislação Brasileira
- Medir Temperatura
- Manutenção

