11. DOF. [Agreement that establishes the guidelines that shall be followed to sale and dispense antibiotics. Ministry of Health. Official Journal of the Federation. Mexico. May 27th, 2010]. Available from: http://dof.gob.mx/nota_detalle.php?codigo=5144336&fecha=27/05/2010. Accessed February 8, 2014.

Conflicts of interest: None to report.

María Carlota Garcia-G, MD, PhD
Guillermo Enrique Leo-Amador, MD, PhD
Javier Avila-Morales
Guadalupe Zaldívar-Lelo de Larrea
Laboratorio de Enfermedades Infecciosas y Microbiología Clínica
Facultad de Medicina de la Universidad Autónoma de Querétaro
Querétaro, México

José Sanchez-Corona, MD, PhD*
Centro de Investigación Biomédica de Occidente
Instituto Mexicano del Seguro Social IMSS
Guadalajara, Jalisco, México

* Address correspondence to José Sanchez Corona, MD, PhD Insituto Mexicano del Seguro Social IMSS, Centro de Investigacion Biomedica de Occidente, Guadalajara, Jalisco, Mexico.
E-mail address: jose.sanchez@imss.gob.mx (J. Sanchez-Corona) or leo@uaq.mx (G.E. Leo-Amador).

http://dx.doi.org/10.1016/j.ajic.2014.01.008

Successful outbreak investigation of *Burkholderia cepacia* complex bacteremia in intensive care patients

To the Editor:

Bulkholderia cepacia complex (Bcc) is a group of ubiquitous gram-negative aerobic bacilli found in plants, soil, and moist environments. Bcc is well described as a cause of respiratory infections in patients with cystic fibrosis and chronic granulomatous disease. Bcc bacteremia and nosocomial pneumonia have also been observed in intensive care patients as sporadic cases or during outbreaks.

Here, we describe a small outbreak of nosocomial Bcc bacteremia in the 6-bed intensive care unit (ICU) of an 850-bed university-affiliated general hospital in Jerusalem, Israel. During July 2010, a patient admitted to our ICU because of congestive heart failure and pulmonary edema developed *Burkholderia* bacteremia. She was treated according to bacterial sensitivity with no attributable consequences. Several days later, a second patient in our ICU, hospitalized with severe immune thrombocytopenia and pulmonary hemorrhage, was found to have *Burkholderia* bacteremia. Repeated blood cultures were positive, and bacteremia resolved after an appropriate antibiotic was initiated. The patients had no known risk factors for *Burkholderia* infection and no obvious source for the bacteremia was found.

After the second case an outbreak investigation was conducted. We detected 2 more patients who had bacteremia with *Burkholderia* in 2010; 1 of these was a third patient in the same ICU 3 months earlier, and the fourth was a patient in our thoracic heart surgery ICU. We concluded that we were facing an outbreak of *Burkholderia* bacteremia.

Because *Burkholderia* is a waterborne and soilborne organism that can survive for a prolonged period in a moist environment, we sampled wet and humid products that had been used during care of the 2 index cases. We cultured inhalation solutions (ie, ipratropium bromide, albuterol, and water used in the nebulizer), insulin, heparin, erythromycin, piperacillin-tazobactam, water for injection, potassium chloride solution, hygiene products (eg, povidone, hand rub gel, chlorhexidine, and superoxide solution), and patient care products (eg, mouthwash and moisturizing cream).

All items were sterile except for the moisturizing cream of both patients, which was contaminated with *Burkholderia*. Each patient in our ICU had an individual cream tube. We examined the cream tubes of 2 other patients residing in our ICU at the same time and found that their cream was also contaminated with *Burkholderia*. Subsequently, we cultured 6 new, sealed cream tubes from our ICU and other departments in our hospital, and found 3 were contaminated with the same bacteria.

All clinical and environmental isolates of *Burkholderia* were isolated and identified by 16S ribosomal DNA sequencing at the Shaare Zedek Microbiology laboratory. For further identification, the specimens were sent to the Observatoire Cepacia, Laboratoire de Bactériologie-Hygiène Hôpital Purpan, Toulouse, France. Identification of the species level was performed by means of amplified 16S ribosomal DNA restriction analysis,[1] RecA species-specific polymerase chain reaction (PCR),[2] and/or RecA sequencing.[3] Genetic relatedness was assessed using PCR ribotyping.[4]

Blood isolates were identified as *B cenocepacia* IIIB (patient 1) and *B stabilis* (patient 2) (Table 1). Twelve cream samples were found to be contaminated with *Burkholderia* species, 9 with the same strain of *B contaminans*, and 3 with the same strain of *B cenocepacia* IIIB, which harbored the same PCR ribotype as the isolate from the moisturizing cream of patient 1. The moisturizing cream was withdrawn from all hospital departments and notification was made to the manufacturer and to the Israeli Ministry of Health. No new cases occurred. The manufacturer identified lapses in the water filtration system as the cause of contamination. Two-year follow-up showed no additional *Burkholderia* bacteremia in our institution.

We suspect the cause of the outbreak was moisturizing cream contaminated with at least 2-3 different *B cepacia* genomovars that had most probably occurred during manufacturing. Moisturizing cream was described once before as a cause of *Burkholderia* infections in an ICU.[5]

The strain in the first patient with *Burkholderia* bacteremia was identified as *B stabilis* by amplified 16S ribosomal DNA restriction analysis and RecA gene methods. Although this genomovar was not found in the moisturizing creams, we believe this case was also caused by using contaminated cream because of polygenomovar contamination of the cream boxes.

Although cosmetic products such as moisturizing cream are not required to be sterile if they are used solely topically, manufacturers are obligated to maintain high standards of control and are regulated by the Scientific Committee on Cosmetic Products and Non Food Products[6] (available online at http://ec.europa.eu/health/ph_risk/committees/sccp/documents/out242_en.pdf), and other national regulations. In the face of the numerous publications citing *Burkholderia* as a cause of outbreaks amongst vulnerable hospitalized patients, we believe that national and international regulations should require the absence of any *Burkholderia* species in products used for these patients. We also suggest avoiding the use of nonsterile cosmetics products in special populations, such as ICU patients and immune-compromised patients, while hospitalized.

Table 1
Microbiology test results of patients' and moisturizing creams' samples with growth of *Burkholderia*

Date	Sample	16S rDNA identification	ARDRA identification	RecA gene identification	Ribotyping identification
July 28, 2010	Blood – patient 1	*B cepacia*	*B stabilis/pyrrocinia*	*B stabilis*	ND
August 3, 2010	Blood – patient 2	*B cepacia*	*B cepacia/cenocepacia*	*B cenocepacia* IIIB	J1
August 8, 2010	Patient 1's cream	ND	*B cepacia/cenocepacia*	*B cepacia* complex	J2
August 12, 2010	Patient 2's cream	ND	*B cepacia/cenocepacia*	*B cenocepacia* IIIB	J1
August 12, 2010	Patient 3's cream	ND	*B cepacia/cenocepacia*	*B cenocepacia* IIIA	J2
August 12, 2010	Patient 4's cream	ND	*B cepacia/cenocepacia*	*B cepacia* complex	J2
August 12, 2010	Sealed cream - ICU	ND	*B cepacia/cenocepacia*	*B cenocepacia* IIIB	J1
August 15, 2010	Sealed cream - ICU	ND	ND	*B cepacia* complex	J2
August 15, 2010	Sealed cream - orthopedic department	ND	*B cepacia/cenocepacia*	*B cepacia* complex	J2
August 15, 2010	Sealed cream - internal medicine A department	ND	*B cepacia/cenocepacia*	*B cepacia* complex	J2
August 15, 2010	Sealed cream - internal medicine B department	ND	*B cepacia/cenocepacia*	*B cepacia* complex	J2
August 16, 2010	Sealed cream - oncology department	ND	ND	*B cenocepacia* IIIB	J1
August 16, 2010	Sealed cream - internal medicine A department	ND	ND	*B cepacia* complex	J2
August 16, 2010	Sealed cream - pharmacy	ND	ND	ND	J2

ARDRA, amplified 16S rDNA restriction analysis; *ICU*, intensive care unit; *ND*, not done; rDNA, ribosomal DNA.

References

1. Segonds C, Heulin T, Marty N, Chabanon G. Differentiation of *Burkholderia* species by PCR-restriction fragment length polymorphism analysis of the 16S rRNA gene and application to cystic fibrosis isolates. J Clin Microbiol 1999;37:2201-8.
2. Mahenthiralingam E, Bischof J, Byrne S, Radomski C, Davies J, Av-Gay Y, et al. DNA-Based diagnostic approaches for identification of *Burkholderia cepacia* complex, *Burkholderia vietnamiensis, Burkholderia multivorans, Burkholderia stabilis*, and *Burkholderia cepacia* genomovars I and III. J Clin Microbiol 2000;38:3165-73.
3. Baldwin A, Mahenthiralingam E, Thickett KM, Honeybourne D, Maiden MC, Govan JR, et al. Multilocus sequence typing scheme that provides both species and strain differentiation for the *Burkholderia cepacia* complex. J Clin Microbiol 2005;43:4665-73.
4. Dasen SE, LiPuma JJ, Kostman JR, Stull TL. Characterization of PCR-ribotyping for *Burkholderia (Pseudomonas) cepacia*. J Clin Microbiol 1994;32:2422-4.
5. Alvarez-Lerma F, Maull E, Terradas R, Segura C, Planells I, Coll P, et al. Moisturizing body milk as a reservoir of *Burkholderia cepacia*: outbreak of nosocomial infection in a multidisciplinary intensive care unit. Crit Care 2008;12:R10.
6. Scientific Committee on Cosmetic Products and Non Food Products' notes of guidance for the testing of cosmetic ingredients and their safety evaluation, 5th revision, 2003, SCCNFP/0690/03 final. http://ec.europa.eu/health/ph_risk/committees/sccp/documents/out242_en.pdf. Accessed January 13, 2014.

Yonit Wiener-Well, MD*
Infectious Disease Unit, Shaare Zedek Medical Center affiliated with the Hadassah-Hebrew University Medical School Jerusalem, Israel

Christine Segonds, PharmD
Laboratoire de Bactériologie-Hygiène Institut Fédératif de Biologie Hôpital Purpan, Toulouse, France

Betty Mazuz, RN
Infectious Disease Unit, Shaare Zedek Medical Center affiliated with the Hadassah-Hebrew University Medical School Jerusalem, Israel

Puah Kopuit, MA, RN
Infectious Disease Unit, Shaare Zedek Medical Center affiliated with the Hadassah-Hebrew University Medical School Jerusalem, Israel

Marc V. Assous, MD, PhD
Clinical Microbiology Laboratory, Shaare Zedek Medical Center affiliated with the Hadassah-Hebrew University Medical School Jerusalem, Israel

* Address correspondence to Yonit Wiener-Well, MD, Infectious Disease Unit, Shaare Zedek Medical Center, PO Box 3235, Jerusalem 91301, Israel.
E-mail address: yonitw@zahav.net.il (Y. Wiener-Well).

http://dx.doi.org/10.1016/j.ajic.2013.12.015

Compliance with central line insertion bundles in an intensive care unit

To the Editor:

We read with great interest the article by Khalid et al,[1] who demonstrated that a rate of no incidence of central line-associated bloodstream infection (CLABSI) is achievable in 1 developing country in Asia.[1] CLABSI is associated with high morbidity and mortality and becomes a life-threatening issue in intensive care units (ICUs).[2,3] Our ICU, which is located in southern Taiwan—another Asian country—is no exception.[4] Although the incidence of CLABSI declined from 4.5 per 1,000 catheter-days in 2009 to 2.16 per 1,000 catheter-days in 2010 in our intensive care unit,[4] we are still eager to improve the situation to achieve the goal of "Zero CLABSI." Since March 2013, 2 major central line care bundles, including insertion bundles for reducing the risk of infection during the insertion of central venous catheters (CVCs) and maintenance bundles for minimizing the risk of infection while caring for a CVC during use, were implemented in our ICU to prevent CLABSI. Because studies about CVC insertion bundle compliance in ICUs is scarce, our study was conducted to investigate the adherence to a CVC insertion bundle during an improving quality-of-care process in our ICU.

Our study was carried out at a regional teaching hospital. Our ICU has 23 beds and 3 intensivists, and most of the admissions are attributed to medical conditions, including shock, acute respiratory failure, cancer, and sepsis. The insertion of a CVC is preferably performed by an intensivist; however, it is rarely performed by nonintensivists such as cardiologists, surgeons, and trained resident physicians. Since March 2013, a CVC insertion bundle, including 4 components—hand hygiene, ensuring maximal sterile barriers upon insertion, use of chlorhexidine gluconate (CHG) for skin preparation, and avoidance of the femoral vein as an access site—were implemented in our ICU. Compliance to the bundle was defined as the frequency of the number of performed actions to the number of CVC insertions.

During March-October 2013, a total of 205 CVC insertions were observed and 202 (98.5%) insertions were done by intensivists (the other insertions were performed 1 each by a cardiologist, surgeon, and trained resident physician). The overall compliance with all 4 components of the bundle was 70.7%. The compliance with each component was 100% for hand hygiene, 82.9% for ensuring maximal sterile barrier, 100.0% for the use of CHG, and 83.4% for optimal site selection (Fig 1). No case of CLABSI developed during this 8-month period.