

TABLE 1. Distribution of Multidrug-Resistant Organisms (MDROs) in Surveillance Cultures

	Total No. of Patients	ESBL, No. (%)	AmpC, No. (%)	Carbapenemase Producer, No. (%)	VRE, No. (%)
Stool surveillance culture for MDRO	145	87 (60)	26 (18)	43 (30)	4 (2.7)
Throat swab surveillance culture for MDRO	42	17 (40)	4 (9.5)	23 (55)	1 (2.3)

NOTE. ESBL, extended-spectrum  $\beta$ -lactamase; AmpC, a type of  $\beta$ -lactamase; VRE, vancomycin-resistant enterococcus.

cultures (7 from stool, 2 from throat swabs). A total of 19 BSIs were associated with mucosal barrier injury (MBI-LCBI: mucosal barrier injury–laboratory-confirmed bloodstream infection).<sup>7</sup> Thus, 17 BSIs were associated with central-line infection, with a CLABSI rate of 1.48 per 1,000 catheter days. In addition, 7 (4%) lines were removed for various reasons (eg, exit-site infection, tip migration, fracture of the line). No CVC was removed because of CLABSI.

Despite a high rate of MDRO colonization, a low incidence of catheter-associated bacteremia was observed in patients undergoing stem cell transplant at our center. This finding suggests that in high-intensity clinical settings, despite the high prevalence of MDROs, a combination of rigorous central venous catheter care and concerted infection vigilance ensures low catheter-associated bloodstream infection rates. Coordinated team work among various multi-disciplinary teams (ie, maintenance engineering, nursing, housekeeping, infection control, SCT unit doctors and central sterile supply department, transfusion medicine department, patients and relatives) led the way to attaining a satisfactory outcome in this challenging setting.

#### ACKNOWLEDGMENTS

*Financial support:* No financial support was provided relevant to this article.

*Potential conflicts of interest:* All authors report no conflicts of interest relevant to this article.

**Mita Roychowdhury, BSc, MSc;<sup>1</sup>**

**Jeevan Kumar, MBBS, MD, DNB;<sup>2</sup>**

**Anupam Chakrapani, MD, DM;<sup>2</sup>**

**Saurabh Jayant Bhawe, MBBS, MD;<sup>2</sup>**

**Shekhar Krishnan, MBBS, MRCP, FRCPath, PhD;<sup>3</sup>**

**Robin Thambudurai, MBBS, MS;<sup>4</sup>**

**Sanjay Bhattacharya, MD, DNB, DipRCP, FRCPath;<sup>5</sup>**

**Mammen Chandy, MD, FRCPA, FRACP, FRCP<sup>2</sup>**

Affiliations: 1. Department of Nursing, Tata Medical Center, Kolkata, India; 2. Department of Clinical Hematology, Tata Medical Center, Kolkata, India; 3. Department of Pediatric Oncology, Tata Medical Center, Kolkata, India; 4. Department of Gastro-Intestinal and Hepatobiliary Surgery, Tata Medical Center, Kolkata, India; 5. Department of Microbiology, Tata Medical Center, Kolkata, India

Address correspondence to Dr. Sanjay Bhattacharya, MD, DNB, DipRCP, FRCPath, Consultant Microbiologist, Tata Medical Center, 14 Major Arterial Road (E-W), New Town, Kolkata 700 156, India (drsanjay1970@hotmail.com). *Infect Control Hosp Epidemiol* 2016;37:619–620

© 2016 by The Society for Healthcare Epidemiology of America. All rights reserved. 0899-823X/2016/3705-0024. DOI: 10.1017/ice.2016.18

#### REFERENCES

- Bhattacharya S, Goel G, Mukherjee S, Bhaumik J, Chandy M. Epidemiology of antimicrobial resistance in an oncology center in eastern India. *Infect Control Hosp Epidemiol* 2015;36:864–866.
- Bhattacharya S, Das D, Bhalchandra R, Goel G. Patient isolation in the high-prevalence setting: challenges with regard to multidrug-resistant Gram-negative bacilli. *Infect Control Hosp Epidemiol* 2013;34:650–651.
- Bhalchandra R, Bhattacharya S, Ratnam Soundaranayagam J, Garai S, Chandy M. Importance of air particle counts in hospital infection control: insights from a cancer center in eastern India. *Infect Control Hosp Epidemiol* 2015;36:1115–1117.
- Bhalchandra R, Chandy M, Ramanan VR, Mahajan A, Soundaranayagam JR, Garai S, Bhattacharya S. Role of water quality assessments in hospital infection control: experience from a new oncology center in eastern India. *Indian J Pathol Microbiol* 2014;57:435–438.
- Goel G, Das D, Mukherjee S, Bose S, Das K, Mahato R, Bhattacharya S. A method for early detection of antibiotic resistance in positive blood cultures: experience from an oncology centre in eastern India. *Indian J Med Microbiol* 2015; 33(Suppl):53–58.
- Landman D, Salvani JK, Bratu S, Quale J. Evaluation of techniques for detection of carbapenem-resistant *Klebsiella pneumoniae* in stool surveillance cultures. *J Clin Microbiol* 2005;43:5639–5641.
- Metzger KE, Rucker Y, Callaghan M, Churchill M, Jovanovic BD, Zembower TR, Bolon MK. The burden of mucosal barrier injury laboratory-confirmed bloodstream infection among hematology, oncology, and stem cell transplant patients. *Infect Control Hosp Epidemiol* 2015;36:119–124.

## Lost in Transition: Discontinuity of Care During Patient Transfer

*To the Editor*—On my weekly device rounds at a long-term acute care hospital (LTACH), I asked my patient 5 days into his stay for treatment of osteomyelitis: “Sir, why do you have this urinary catheter?” He shrugged his shoulders while walking in the corridor and said, “I don’t know. They put it in about 10 days ago while I was in the hospital.”

Much like “Lost in Translation,” when a translation omits information pertinent to understanding its meaning, we continue to face a “Lost in Transition,” when a transition omits information pertinent to treating the patient. The National Transition of Care Coalition defines transition of care as a patient leaving one care setting and moving to another.<sup>1</sup> Errors in transition include communication errors, medication reconciliation issues, failure to clarify patient goals, lost or missing paperwork, and difficulty accessing records between facilities. These mistakes often have far-reaching effects and may lead to adverse events, even resulting in death.<sup>1,2</sup> LTACHs frequently work with patients with complex problems, sometimes on mechanical ventilators, and often arriving with central lines and catheters in place, with the expectation of a prolonged recovery. In addition, laboratory and imaging results may be pending when the patient is transferred and the results are not forwarded. These factors put these patients in a most vulnerable position or “Lost in Transition.”

The concept of long-term acute care arose from the tuberculosis sanatoria<sup>3</sup> and polio hospitals<sup>4</sup> of days gone by. A need for long-term acute care of other ventilator-dependent patients led to an expansion of this patient base and with an increase of skilled employees and equipment in the 1990s, these hospitals were now able to take on long-term intensive care unit patients; the modern LTACH was born. The Centers for Medicare and Medicaid Services defines the LTACH as “certified as acute-care hospitals, but focusing on patients who, on average, stay more than 25 days.” Most patients arrive from hospital intensive care units and cardiac care units, likely with more than one problem, but may improve with time. From 1998 to 2006, the number of post-acute care patients using LTACHs increased from almost 14,000 to more than 40,000.<sup>5</sup>

While LTACHs are increasing in number and utilization, from an infectious disease standpoint, LTACHs are lagging in antibiotic stewardship and infection control. Ten years ago, Gould et al<sup>6</sup> showed that the prevalence of many resistant microorganisms in LTACHs was greater than the 90th percentile compared with medical intensive care units. Her team recommended that further studies and optimal infection control practices be implemented in the LTACH setting, but little has been done in that regard during the past decade. Although individual LTACH companies claim to have implemented stewardship and multidisciplinary approaches to the problem, government oversight trails behind. The data do not put blame necessarily on the LTACH for the level of resistance; in fact, much of the resistance originates with colonized patients upon admission. What is known, is that the risk of horizontal transmission will be greater in LTACHs with a higher population of patients infected with antibiotic-resistant organisms.<sup>7</sup>

A 2008 point-prevalence study of one Baltimore LTACH by Furuno et al<sup>8</sup> found a 28% incidence of methicillin-resistant *Staphylococcus aureus* and 30% for *Acinetobacter baumannii*.

In one month, Goldstein et al<sup>9</sup> found that 13% of patients admitted to one LTACH arrived positive for *Clostridium difficile* toxin and another 14% acquired *C. difficile* infection during that month.

The sweeping Patient Protection and Affordable Care Act of 2010 aimed to improve quality of care in the LTACH setting. In 2013 catheter-associated urinary tract infections, central line-associated bloodstream infections, and new or worsening pressure ulcers were to be reported to the National Healthcare Safety Network in order to receive full payment from Medicare. In 2014, healthcare professionals and patients were to be assessed for influenza vaccinations and this data also recorded by the National Healthcare Safety Network, with an eventual financial penalty for nonreporting. Finally, this year, LTACHs were required to begin reporting methicillin-resistant *S. aureus* as well as *C. difficile* to the National Healthcare Safety Network. The next few years will bring other Affordable Care Act-mandated reforms, including reporting of ventilator-associated illnesses (2016), falls resulting in injury (2016), and change in mobility of ventilator-dependent patients (2016), and calculating all-cause readmission rates (2017). There is no argument that these changes are important. What strikes us as shortsighted is that with all of these mandates, none include incentives to decrease infection or readmission rates. Nor do these changes include suggestions, systems, or oversight of appropriate antibiotic and medical device usage in the LTACH setting.<sup>10</sup>

Currently there are nearly 16,000 skilled nursing facilities and 428 long-term acute care facilities in the United States, serving an estimated 15 million residents every year.<sup>11,12</sup> Amidst the aging baby boomers, the demand for these facilities is projected to further expand, calling for a more serious infection control and stewardship effort. This demand is coupled with a paucity of infectious diseases physicians in practice (currently at a low number of 7,149 nationally<sup>13</sup>); it is uncertain who will guide this huge growing network of LTACHs toward implementing federal policies for an effective and persistent stewardship program.

On the basis of the rapid growth of the LTACH system, persistent lack of oversight, and failure to implement effective, across-the-board antibiotic stewardship programs, we seriously question the safety of care in LTACHs. For the time being, it may be safer for our patients to remain in acute care hospitals until ready to be discharged to home or to a skilled nursing facility. If LTACHs are serious about improving patient health and decreasing the number of infections, especially antibiotic-resistant infections, then there needs to be improved communication, especially at the time of transition to or from the LTACH. A comprehensive plan for infection management and antibiotic stewardship following Centers for Disease Control and Prevention recommendations should be the standard at all LTACHs. Prospective studies demonstrating proven measures to reduce infection and prevent LTACHs from remaining a reservoir of infection are urgently needed.

## ACKNOWLEDGMENTS

*Financial support:* None reported.

*Potential conflicts of interest:* All authors report no conflicts of interest relevant to this article.

**Teena Chopra, MD, MPH;<sup>1</sup>**  
**David Bavers, MS;<sup>1</sup>**  
**Suganya Chandramohan, MD;<sup>1</sup>**  
**Glenn Tillotson, PhD<sup>2</sup>**

Affiliations: 1. Division of Infectious Diseases, Wayne State University, Detroit, Michigan; 2. GST Micro, Downingtown, Pennsylvania.

Address correspondence to Teena Chopra, MD, MPH, Division of Infectious Diseases, Wayne State University, 3990 John R St, Detroit, MI 48201 (tchopra@med.wayne.edu).

*Infect Control Hosp Epidemiol* 2016;37:620–622

© 2016 by The Society for Healthcare Epidemiology of America. All rights reserved. 0899-823X/2016/3705-0025. DOI: 10.1017/ice.2016.25

## REFERENCES

- National Transitions of Care Coalition (NTOCC). Improving transitions of care. NTOCC website. <http://www.ntocc.org/Portals/0/PDF/Resources/PolicyPaper.pdf>. Published 2008. Accessed 2015.
- Coleman EA. Falling through the cracks: challenges and opportunities for improving transitional care for persons with continuous complex care needs. *J Am Geriatr Soc* 2003;51:549–555.
- Liu K, Baseggio C, Wissoker D, et al. Long-term care hospitals under Medicare: facility-level characteristics. *Health Care Financ Rev* 2001;23:1–18.
- Stevens RD, Hart N, Herridge MS, eds. *Textbook of Post-ICU Medicine: The Legacy of Critical Care*. New York: Oxford University Press, 2014.
- Kahn JM, Benson NM, Appleby D, et al. Long-term acute care hospital utilization after critical illness. *JAMA* 2010;303:2253–2259.
- Gould CV, Rothenberg R, Steinberg JP. Antibiotic resistance in long-term acute care hospitals: the perfect storm. *Infect Control Hosp Epidemiol* 2006;27:920–925.
- Austin DJ, Bonten MJ, Weinstein RA, et al. Vancomycin-resistant enterococci in intensive-care hospital settings: transmission dynamics, persistence, and the impact of infection control programs. *Proc Natl Acad Sci* 1999;96:6908–6913.
- Furuno JP, Hebden JN, Standiford HC, et al. Prevalence of methicillin-resistant *Staphylococcus aureus* and *Acinetobacter baumannii* in a long-term acute care facility. *Am J Infect Control* 2008;36:468–471.
- Goldstein EJ, Polonsky J, Touzani MH, Citron DM. *Clostridium difficile* infection (CDI) in a long-term acute care facility (LTAC). *Anaerobe* 2009;15:241–243.
- Medicare Payment Advisory Commission (MEDPAC). Report to the Congress: Medicare payment policy. Pages 261–282. MEDPAC website. [http://www.medpac.gov/documents/reports/mar2015\\_entirereport\\_revised.pdf?sfvrsn=0](http://www.medpac.gov/documents/reports/mar2015_entirereport_revised.pdf?sfvrsn=0). Published 2015.
- Harris-Kojetin L, Sengupta M, Park-Lee E, Valverde R. Long-term care services in the United States: 2013 overview. National Center for Health Statistics. Vital Health Stat 3. CDC website. [http://www.cdc.gov/nchs/data/nsltcp/long\\_term\\_care\\_services\\_2013.pdf](http://www.cdc.gov/nchs/data/nsltcp/long_term_care_services_2013.pdf). Published 2013.
- Long-term and post-acute care (LTPAC) health information technology (HIT) collaborative. <http://ltpachealthit.org>. Accessed December 2015.
- Association of American Medical Colleges (AAMC). The 2012 physician specialty data book. AAMC website. <https://www.aamc.org/download/313228/data/2012physicianspecialtydatabook.pdf>. Accessed December 2015.

## Benchtop Whole-Genome Sequencing for Identification of Nosocomial Outbreaks in Tanzania

*To the Editor*—Rapid and reliable identification, characterization, and comparison of microorganisms from clinical samples are essential means for guiding clinical treatment as well as for detecting and controlling disease outbreaks. Developments in benchtop whole-genome sequencing (WGS) hold great promise for enhancing microbial diagnostics and thus for improving public health.<sup>1–6</sup> The great value of WGS in studying bacterial evolution, disease outbreaks, and transmission has been demonstrated in recent studies,<sup>5,6</sup> and the technology is increasingly being implemented in routine clinical diagnostics in developed countries. There is huge potential for WGS to improve clinical diagnostics and infection control in developing countries where clinical laboratories do not have access to different routine typing methods and where the burden of infectious diseases is highest.

To test the feasibility of integrating WGS into the routine diagnostics workflow, in February 2015, a total of 18 bacterial genomes were sequenced on a benchtop sequencer (MiSeq; Illumina) at the Kilimanjaro Christian Medical Centre, the second largest referral hospital in northeastern Tanzania. Sequence data were immediately analyzed using open access web-based tools (<http://cge.cbs.dtu.dk/services>).

Two *Enterococcus faecalis* from different patients were identified, both having sequence type 415. A similar *E. faecalis* with sequence type 415 had been found in poultry and humans in Vietnam.<sup>7</sup> Single-nucleotide polymorphism analysis<sup>6,8</sup> revealed complete similarity between these isolates and both had resistance gene *lsa(A)* encoding lincosamide and streptogramin A resistance.<sup>9</sup>

Patient records revealed that the 2 patients were hospitalized in the same room and both were receiving ceftriaxone medication. Patient 1 had been hospitalized for 1 month when a swab sample was collected from a diabetic wound. Patient 2 had undergone emergency surgery for an abdominal gunshot wound, a week after which a swab sample was collected from the surgical wound. The exact match in sequence type strongly