

provinces and a total of 200 camels. Umnogovi Province has the largest, and Dundgovi Province the fifth largest, camel population in the country ( $\approx 113,000$  and  $\approx 28,000$  animals, respectively). Further studies on the epidemiology of MERS-CoV infection in dromedaries and Bactrian camels from central Asia, China, and Mongolia are warranted.

The field work for this study was supported by a research grant from The University of Hong Kong; the laboratory testing was supported by the National Institutes of Health, National Institute of Allergy and Infectious Diseases (contract N272201400006C).

## References

1. Zaki AM, van Boheemen S, Bestebroer TM, Osterhaus ADME, Fouchier RAM. Isolation of a novel coronavirus from a man with pneumonia in Saudi Arabia. *N Engl J Med*. 2012;367:1814–20. <http://dx.doi.org/10.1056/NEJMoa1211721>
2. World Health Organization. Middle East respiratory syndrome coronavirus (MERS-CoV): summary of current situation, literature update and risk assessment—as of 5 February 2015 [cited 2015 Feb 25]. [http://www.who.int/csr/disease/coronavirus\\_infections/mers-5-february-2015.pdf?ua=1](http://www.who.int/csr/disease/coronavirus_infections/mers-5-february-2015.pdf?ua=1)
3. Reusken CBEM, Haagmans BL, Müller MA, Gutierrez C, Godeke G-J, Meyer B, et al. Middle East respiratory syndrome coronavirus neutralising serum antibodies in dromedary camels: a comparative serological study. *Lancet Infect Dis*. 2013;13:859–66. [http://dx.doi.org/10.1016/S1473-3099\(13\)70164-6](http://dx.doi.org/10.1016/S1473-3099(13)70164-6)
4. Chan RWY, Hemida MG, Kayali G, Chu DKW, Poon LLM, Alnaeem A, et al. Tropism and replication of Middle East respiratory syndrome coronavirus from dromedary camels in the human respiratory tract: an in-vitro and ex-vivo study. *Lancet Respir Med*. 2014;2:813–22. [http://dx.doi.org/10.1016/S2213-2600\(14\)70158-4](http://dx.doi.org/10.1016/S2213-2600(14)70158-4)
5. Azhar EI, El-Kafrawy SA, Farraj SA, Hassan AM, Al-Saeed MS, Hashem AM, et al. Evidence for camel-to-human transmission of MERS coronavirus. *N Engl J Med*. 2014;370:2499–505. <http://dx.doi.org/10.1056/NEJMoa1401505>
6. Reusken CBEM, Messadi L, Feyisa A, Ularanu H, Godeke G-J, Danmarwa A, et al. Geographic distribution of MERS coronavirus among dromedary camels, Africa. *Emerg Infect Dis*. 2014;20:1370–4. <http://dx.doi.org/10.3201/eid2008.140590>
7. Chu DKW, Poon LLM, Gomaa MM, Shehata MM, Perera RAPM, Abu Zeid D, et al. MERS coronaviruses in dromedary camels, Egypt. *Emerg Infect Dis*. 2014;20:1049–53. <http://dx.doi.org/10.3201/eid2006.140299>
8. Hemida MG, Perera RA, Al Jassim RA, Kayali G, Siu LY, Wang P, et al. Seroepidemiology of Middle East respiratory syndrome (MERS) coronavirus in Saudi Arabia (1993) and Australia (2014) and characterisation of assay specificity. *Euro Surveill*. 2014;19: pii 20828.
9. Wang N, Shi X, Jiang L, Zhang S, Wang D, Tong P, et al. Structure of MERS-CoV spike receptor-binding domain complexed with human receptor DPP4. *Cell Res*. 2013;23:986–93. <http://dx.doi.org/10.1038/cr.2013.92>

Address for correspondence: Malik Peiris, School of Public Health, The University of Hong Kong, 21 Sassoon Rd, Pokfulam, Hong Kong Special Administrative Region, China; email: malik@hku.hk

## *Oligella ureolytica* Bacteremia in Elderly Woman, United States

Tristan Simmons, Eryn Fennelly, David Loughran

Author affiliation: Philadelphia College of Osteopathic Medicine, Philadelphia, Pennsylvania, USA

DOI: <http://dx.doi.org/10.3201/eid2107.150242>

**To the Editor:** *Oligella ureolytica* is an aerobic gram-negative coccobacillus found as a commensal organism in human urinary tracts (1). Previously referred to as CDC Group IVe, this bacterium is not commonly encountered as a source of infection and is difficult to isolate by using conventional laboratory procedures (2). The few cases of pathogenic infection with *O. ureolytica* described in the literature have occurred in patients ranging in age from newborn to 89 years and from the varied locations of India, Turkey, Canada, and the United States (3–7). We report a case of *O. ureolytica* bacteremia in a patient in whom sepsis was diagnosed and review the current literature on this emerging pathogen.

A 66-year-old woman sought treatment in our emergency department for a fever of 100.7°F, femur fracture, and a right buttock stage III decubitus ulcer. She reported having fallen 4 days earlier, after which she was unable to walk and spent 4 days laying in her own urine and feces. Blood tests revealed an elevated leukocyte count of  $24.4 \times 10^9$  cells/L (76% neutrophils, 2% bands), and urinalysis showed trace leukocyte esterase, +3 bacteria, and 5–10 leukocytes. Chest radiograph and head computed tomography images were unremarkable. Her electrocardiogram showed nonspecific ST wave changes. Samples from the patient's blood, urine, and wounds were collected while the patient was in the emergency department and were sent for culture.

Wound cultures showed growth of *Proteus mirabilis* and *Enterococcus* spp. The urine culture grew  $>100,000$  CFU *Escherichia coli*. The first set of blood cultures grew *O. ureolytica* in aerobic and anaerobic bottles, but another set drawn 30 min later showed no growth. The blood cultures were processed by using the Bact/Alert 3D (bioMérieux, Marcy l'Etoile, France) and Gram stained. Identification was from the Vitek 2 compact system (bioMérieux). The *O. ureolytica* sample was sensitive to amikacin, ampicillin/sulbactam, ceftazidime, ceftriaxone, gentamicin, imipenem, levofloxacin, nitrofurantoin, trimethoprim/sulfamethoxazole, and chloramphenicol. No resistance was found.

Because of the unique bacteremia, further diagnostics were conducted. The results of chest, abdomen, and pelvic computed tomography scans were unremarkable. HIV

**Table.** Documented cases of pathogenic *Oligella ureolytica* infection\*

Year	Patient age, y	Patient sex	Location	Culture source	Concurrent conditions	Urinary disorder	Reference†
2014	30	M	India	Blood	Metastatic lung adenocarcinoma	Urinary incontinence	(3)
2013	Newborn	F	Turkey	Blood	None	Maternal urine exposure during delivery?	(4)
2013	89	M	United States	Urine	Adenocarcinoma of prostate	High post void residual	(5)
1996	49	F	Canada	Neck lymph node	Non-Hodgkin lymphoma	None	(6)
1993	40	M	United States	Blood	AIDS, sacral ulcer, diarrhea	None	(7)

\*Some published cases that were believed to be contamination or for which the organisms did not fit the laboratory profile of *O. ureolytica* were excluded.

†Antimicrobial drug sensitivity has varied among reports; some resistant organisms have been encountered (3–8).

test results were negative. The nonspecific electrocardiogram changes prompted us to request a transesophageal echocardiogram, but the patient refused. For 10 days, the patient was given vancomycin (1 g/d), aztreonam (2 g/8 h), and metronidazole (500 mg/8 h). Cultures of blood that had been collected 5 and 8 days after the original culture were sterile. After 16 days, leukocytosis and fever had resolved, and the patient was discharged to a skilled nursing facility. Although we found no reports in the literature of endocarditis caused by *O. ureolytica*, the patient's refusal of a transesophageal echocardiogram and the presence of the uncommon bacterium led us to empirically continue aztreonam for endocarditis after her discharge.

The literature reports 5 cases of pathogenic *O. ureolytica* infection (Table). This bacterium has also been isolated from the respiratory tract of patients with cystic fibrosis (9). A 2-year study conducted in 1983 at a high-volume hospital in the United States demonstrated *O. ureolytica* growth in the urine of 72 patients (8). Of these patients, 71 had long-term urinary drainage systems and 14 had symptomatic urinary tract infections. Many of these patients were permanently disabled from spinal cord injuries (8). This study was the only one we found focused on *O. ureolytica* infection in the clinical setting. We found no cases in which a patient's death was attributed to *O. ureolytica* infection, and all reported cases resolved with antimicrobial drug treatment (3–8). The low virulence of this organism may contribute to the paucity of recognized cases.

Of the reported cases, all occurred as opportunistic infections in patients with a source of immunosuppression such as malignancy, HIV, or newborn status. The patient we reported in this article showed no evidence of malignancy and had no major source of immunosuppression besides malnutrition, tobacco use, and advanced age. The patient's wound had been contaminated by urine and feces, which was postulated to be the cause of bacteremia in the 1993 case.

Limitations in commonly available laboratory procedures make the identification of this bacterium difficult. The incubation period is long (4 days), and not all laboratories

incubate cultures for that long, as occurred in the 2013 urinary tract infection case (1,3,5). Also, the identification of less commonly encountered bacteria is not always pursued to the genus and species level (2). Furthermore, it is believed that *Oligella* spp. can be misidentified as phenotypically similar organisms, such as *Bordetella bronchiseptica* and *Achromobacter* spp. (4,10).

We believe that many cases of *O. ureolytica* infection have gone unrecognized or were incorrectly identified. Some cases may also have been dismissed as contamination because of laboratorians' and clinicians' lack of familiarity with this bacterium. Our review suggests that advancing laboratory techniques will lead to more recognized cases and that further studies are necessary to understand this bacterium's clinical significance.

#### Acknowledgments

Special thanks to Rani Bright and the Philadelphia College of Osteopathic Medicine library staff for their time, effort, and guidance in working on this manuscript.

#### References

- Rossau R, Kersters K, Falsen E, Jantzen E, Segers P, Union A, et al. *Oligella*, a new genus including *Oligella urethralis* comb. nov. (formerly *Moraxella urethralis*) and *Oligella ureolytica* sp. nov. (formerly CDC group IVe): relationship to *Taylorella equigenitalis* and related taxa. *Int J Syst Evol Microbiol*. 1987;37:198–210. <http://dx.doi.org/10.1099/00207713-37-3-198>
- Steinberg JP, Burd EM. Other gram-negative and gram-variable bacilli. In: Bennett J, Dolin R, Blaser M, editors. *Mandell, Douglas, and Bennett's principles and practice of infectious diseases*. 8th ed. Philadelphia: Elsevier; 2015. p. 2667–83.
- Baruah FK, Jain M, Lodha M, Grover RK. Blood stream infection by an emerging pathogen *Oligella ureolytica* in a cancer patient: case report and review of literature. *Indian J Pathol Microbiol*. 2014;57:141–3. <http://dx.doi.org/10.4103/0377-4929.130928>
- Demir T, Celenk N. Bloodstream infection with *Oligella ureolytica* in a newborn infant: a case report and review of literature. *J Infect Dev Ctries*. 2014;8:793–5. <http://dx.doi.org/10.3855/jidc.3260>
- Dabkowski J, Dodds P, Hughes K, Bush M. A persistent, symptomatic urinary tract infection with multiple “negative” urine cultures. *Conn Med*. 2013;77:27–9.
- Baqi M, Mazzulli T. *Oligella* infections: case report and review of the literature. *Can J Infect Dis*. 1996;7:377–9.

7. Manian FA. Bloodstream infection with *Oligella ureolytica*, *Candida krusei*, and *Bacteroides* species in a patient with AIDS. *Clin Infect Dis*. 1993;17:290–1. <http://dx.doi.org/10.1093/clinids/17.2.290>
8. Welch WD, Porschen RK, Luttrell B. Minimal inhibitory concentrations of 19 antimicrobial agents for 96 clinical isolates of group IVe bacteria. *Antimicrob Agents Chemother*. 1983;24:432–3. <http://dx.doi.org/10.1128/AAC.24.3.432>
9. Klinger JD, Thomassen MJ. Occurrence and antimicrobial susceptibility of gram-negative nonfermentative bacilli in cystic fibrosis patients. *Diagn Microbiol Infect Dis*. 1985;3:149–58. [http://dx.doi.org/10.1016/0732-8893\(85\)90025-2](http://dx.doi.org/10.1016/0732-8893(85)90025-2)
10. Winn WC, Allen SD, Janda WM, Koneman EW, Procop GW, Schreckenberger PC, Woods GL. The nonfermentative gram-negative bacilli. In: Koneman EW, editor. *Koneman's color atlas and textbook of diagnostic microbiology*. 6th ed. Washington (DC): Lippincott Williams & Wilkins; 2005. p. 303-91.

Address for correspondence: Tristan Simmons, Philadelphia College of Osteopathic Medicine, 4170 City Ave, Philadelphia, PA 19131, USA; email: [tristansi@pcom.edu](mailto:tristansi@pcom.edu)

## Estimating Ebola Treatment Needs, United States

**Gabriel Rainisch,<sup>1</sup> Jason Asher,<sup>1</sup> Dylan George,<sup>1</sup> Matt Clay, Theresa L. Smith, Christine Kosmos, Manjunath Shankar, Michael L. Washington, Manoj Gambhir, Charisma Atkins, Richard Hatchett, Tim Lant,<sup>2</sup> Martin I. Meltzer<sup>2</sup>**

Author affiliations: Centers for Disease Control and Prevention, Atlanta, Georgia, USA (G. Rainisch, T.L. Smith, K. Cosmos, M. Shankar, M. Washington, C. Atkins, M.I. Meltzer); Leidos, Reston, Virginia, USA (J. Asher, M. Clay); Biomedical Advanced Research and Development Authority, Washington, DC, USA (D. George, R. Hatchett, T. Lant); Monash University, Melbourne, Victoria, Australia (M. Gambhir)

DOI: <http://dx.doi.org/10.3201/eid2107.150286>

**To the Editor:** By December 31, 2014, the Ebola epidemic in West Africa had resulted in treatment of 10 Ebola case-patients in the United States; a maximum of 4 patients received treatment at any one time (1). Four of these 10 persons became clinically ill in the United States (2 infected outside the United States and 2 infected in the United States), and 6 were clinically ill persons medically evacuated from West Africa (online Technical Appendix 1 Table 6, <http://wwwnc.cdc.gov/EID/article/21/7/15-0286-Techapp1.pdf>).

To plan for possible future cases in the United States, policy makers requested we produce a tool to estimate future numbers of Ebola case-patients needing treatment at

any one time in the United States. Gomes et al. previously estimated the potential size of outbreaks in the United States and other countries for 2 different dates in September 2014 (2). Another study considered the overall risk for exportation of Ebola from West Africa but did not estimate the number of potential cases in the United States at any one time (3).

We provide for practicing public health officials a spreadsheet-based tool, Beds for Ebola Disease (BED) (online Technical Appendix 2, <http://wwwnc.cdc.gov/EID/article/21/7/15-0286-Techapp2.xlsx>) that can be used to estimate the number of Ebola patients expected to be treated simultaneously in the United States at any point in time. Users of BED can update estimates for changing conditions and improved quality of input data, such as incidence of disease. The BED tool extends the work of prior studies by dividing persons arriving from Liberia, Sierra Leone, and Guinea into the following 3 categories: 1) travelers who are not health care workers (HCWs), 2) HCWs, and 3) medical evacuees. This categorization helps public health officials assess the potential risk for Ebola virus infection in individual travelers and the subsequent need for post-arrival monitoring (4).

We used the BED tool to calculate the estimated number of Ebola cases at any one time in the United States by multiplying the rate of new infections in the United States by length of stay (LOS) in hospital (Table). The rate of new infections is the sum of the rate of infected persons in the 3 listed categories who enter the United States from Liberia, Sierra Leone, or Guinea. For the first 2 categories of travelers, low and high estimates of Ebola-infected persons arriving in the United States are calculated by using low and high estimates of both the incidence of disease in the 3 countries and the number of arrivals per month (Table). Calculating the incidence among arriving HCWs required estimating the number of HCWs treating Ebola patients in West Africa (online Technical Appendix 1, Tables 2–4). For medical evacuations of persons already ill from Ebola, we calculated low and high estimates using unpublished data of such evacuations through the end of December 2014.

Although only 1 Ebola case has caused additional cases in the United States (7), we included the possibility that each Ebola case-patient who traveled into the United States would cause either 0 secondary cases (low estimate) or 2 secondary cases (high estimate) (Table). Such transmission might occur before a clinically ill traveler is hospitalized or between a patient and HCWs treating the patient (7). To account for the possibility that infected travelers may arrive in clusters, we assumed that persons requiring treatment would be distributed according to a Poisson probability distribution. Using this distribution enables us to calculate, using the BED tool, 95% CIs

<sup>1</sup>These first authors contributed equally to this article.

<sup>2</sup>These senior authors contributed equally to this article.