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Multidrug-Resistant *Acinetobacter baumannii* in New York City—10 Years Into the Epidemic

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In the late 1990s, outbreaks of *Acinetobacter baumannii* infection, centered in intensive care units (ICUs), were reported in 12 New York City hospitals. The outbreaks lasted from 1 month to 3 years.¹ Cohorting, active surveillance, and environmental disinfection were used for infection control, on the basis of previous success in controlling epidemic *A. baumannii* infection.^{2,3} After these outbreaks, surveys of hospitals from the New York City borough of Brooklyn concluded that multidrug-resistant (MDR) species had become endemic in reporting hospitals.^{4,5} We surveyed major New York City hospitals to determine the rate of *A. baumannii* isolation and the infection control measures adopted by New York City hospitals 10 years after initial outbreaks.

Hospital epidemiologists from 11 institutions, located in every New York City borough except Staten Island, were contacted and asked to answer 8 questions regarding their infection control policy for MDR pathogens, as well as 3 questions regarding their hospital's rate of isolation of MDR *Acinetobacter*. The institutions were New York–Presbyterian Hospital (Columbia University Medical Center and Weill Cornell Medical Center), New York Hospital Queens, Memorial Sloan-Kettering Cancer Center, Bellevue Hospital Center, Tisch Hospital of the New York University Medical Center, Mount Sinai Hospital, St. Luke's–Roosevelt Hospital Center, Westchester Medical Center, Montefiore Medical Center, and the State University of New York Downstate Medical Center. One institution did not provide information regarding its ICU rate but rather its hospital-wide rate, and this institution was included only regarding its hospital infection control practices. The absolute number of unique ICU patients with MDR *A. baumannii* isolates, according to infection control surveillance records, was reported, along with the number of ICU beds at each hospital.

An isolate of *A. baumannii* was considered MDR on the basis of the hospital's definition. Most hospitals defined MDR as resistant to carbapenems. However, 3 hospitals (identified as hospitals 1, 10, and 11) had available only records regarding isolates of *A. baumannii* that

were susceptible to 2 or fewer antibiotics, not including tigecycline or polymyxins; and 1 hospital (hospital 5) considered that ceftazidime-resistant *A. baumannii* was multidrug resistant, because 80% of such isolates were carbapenem resistant. Each case involved a unique patient with at least 1 isolate positive for *A. baumannii*. Statistical analysis was performed using linear regression and the *t* test on GraphPad Prism 4 (GraphPad Software). The 10 hospitals that provided ICU-specific rates accounted for a total of 576 ICU beds and 183,035 ICU bed-days in 2006.

Two hospitals used contact precautions for all ICU patients. Another 6 hospitals instituted contact precautions after the isolation of MDR *A. baumannii*, and the remaining 3 hospitals did not place patients with MDR *A. baumannii* isolates on contact precautions unless a pathogen exit portal was present. Four hospitals performed active surveillance for MDR *A. baumannii* at admission and at least weekly for ICU patients (Table). No hospitals used specific beds or units for patients with MDR *A. baumannii* colonization or infection. Molecular typing of *A. baumannii* was available at 5 institutions (no information regarding clonality of isolates was elicited). Only 1 hospital reported an outbreak of MDR *A. baumannii* infection in 2006.

The pooled mean rate of MDR *A. baumannii* isolation for all participating institutions was 1.84 cases per 1,000 ICU bed-days (range, 0.51–4.9 isolates per 1,000 ICU bed-days). By linear regression analysis, a large number of ICU beds was associated with a lower rate of isolation of MDR *A. baumannii* ($r^2 = 0.37$; $P = .06$).

The rates of MDR *A. baumannii* isolation in ICUs that used contact precautions for patients with isolates of MDR *A. baumannii* were not significantly different than the rates of isolation in ICUs that did not use full contact precautions (mean rate, 2.50 vs 2.35 isolates recovered per 1,000 ICU bed-days; $P = .45$). Institutions with active surveillance programs did not have higher rates of MDR *A. baumannii* isolation, compared with institutions without active surveillance programs (mean rate, 3.54 vs 2.00 isolates recovered per 1,000 ICU bed-days; $P = .10$).

MDR *A. baumannii* infection has become endemic in New York City ICUs; all of the hospitals that we surveyed reported cases in 2006. Although only 1 hospital reported an outbreak in 2006, other hospitals had rates of isolation that were equal to or higher than that hospital's rate, without an outbreak. Hospitals with the largest numbers of ICU beds reported the lowest rates of isolation of MDR *A. baumannii*. There was significant variation between hospitals in the definition of and the infection control methods for MDR *A. baumannii*.

Our study is limited by being a survey, with no information regarding patient-specific variables, antibiotic use, infection control adherence, laboratory techniques, or clonality of isolates.

The most notable finding of our study was the lack of a standard definition of MDR *A. baumannii* and the wide variety of infection control practices, including variations in the application and specific aspects of contact precautions, the use of active surveillance, and the role of molecular typing of strains. Standard definitions are important for better communication and comparison between institutions. A guideline that standardizes definitions, approaches to surveillance, and control practices would be an important next step toward controlling this emerging pathogen.

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TABLE

Data on Multidrug-Resistant (MDR) *Acinetobacter baumannii* Isolates Recovered From Patients in Intensive Care Units (ICUs) and on Infection Control Procedures Used at 11 Hospitals in New York City

Hospital identifier	No. of isolates	Rate of isolation ^a	Size of ICU	Use of contact precautions	Use of active surveillance	Samples obtained for surveillance	Use of molecular typing
1	NA	NA	NA	Yes	Yes	Perirectal and sputum	Yes
2	18	1.80	Small	No ^b	No	...	No
3	12	4.30 ^c	Small	Yes	Yes	Sputum	Yes
4	17	4.90	Small	Yes	Yes	Perirectal	No
5	25	1.30 ^d	Medium	Yes ^e	No	...	No
6	35	1.41	Medium	Yes ^e	Yes	Perirectal and sputum	No
7	62	3.80	Medium	Yes	No	...	Yes
8	69	4.30	Medium	No ^b	No	...	No
9	15	0.51	Large	Yes	No	...	Yes
10	35	0.96 ^f	Large	No ^b	No	...	Yes
11	49	1.42 ^f	Large	Yes	No	...	No

^aNo. of isolates per 1,000 ICU bed-days.

^bUnless a pathogen exit portal was present.

^cOutbreak in 2006.

^dMDR defined as resistant to ceftazidime.

^eUniversal contact precautions.

^fMDR defined as susceptible to 2 standard antibiotics.