results are shown in Figure 1 of our article.[2] Notably, of the MRSA-associated hospital discharges identified in UHC data, the percentage that did not include a MRSA infection decreased from 28% in 2004–2005 to 21% in 2006 and 19% in 2007. Thus, we did not see at our center an increase in the number of false-positive UHC-coded MRSA hospital discharges during 2004–2007, suggesting that the increase that we detected in the burden of MRSA-associated hospital discharges was not due to an increase in miscoding of asymptomatically colonized inpatients as having had MRSA infections, as Lewis and colleagues posit.

Thus, if one accounts for all clinical MRSA infections—both invasive and noninvasive—among hospitalized patients at US academic medical centers during 2003–2008, an increase in the number per 1,000 hospital discharges did occur. Further research is needed to determine changes in this trend after 2008.

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 0899-823X/2013/3401-0020$15.00. DOI: 10.1086/668798

REFERENCES

1. Lewis SS, Moehring RW, Anderson DJ, Sexton DJ, Chen LF. Increasing rates of methicillin-resistant *Staphylococcus aureus* in academic hospitals: a result of active surveillance? *Infect Control Hosp Epidemiol* 2013;34(1):105–106 (in this issue).
2. David MZ, Medvedev S, Hohmann SF, Ewigman B, Daum RS. Increasing burden of methicillin-resistant *Staphylococcus aureus* hospitalizations at US academic medical centers, 2003–2008. *Infect Control Hosp Epidemiol* 2012;33(8):782–789.
3. Jhung MA, Banerjee SN. Administrative coding data and health care–associated infections. *Clin Infect Dis* 2009;49(6):949–955.
4. Kallen AJ, Mu Y, Bulens S, et al. Health care–associated invasive MRSA infections, 2005–2008. *JAMA* 2010;304(6):641–648.

A Longitudinal Index of Multidrug-Resistant Organisms at an Academic Medical Center Reveals True Declines in Incidence

To the Editor—Pressure continues to mount on hospitals to report reductions in the incidence of multidrug-resistant organisms (MDROs). The National Safety Healthcare Network is voluntarily collecting data, and various state laws mandate public reporting of the performance of individual institutions. One can only assume that the coming years will see an increase in publicly reported "scorecards" of hospital performance with regard to MDROs, with a strengthening link to reimbursement. The pressure being exerted at the local level will certainly drive down rates; the question we will be left to debate is to what degree the declines represent real improvements, as opposed to underreporting. As we have discussed before,[1] this will be more problematic for the reporting of infections such as ventilator-associated pneumonia or surgical site infections, where imprecise definitions allow some flexibility and the hospital personnel responsible for collecting the data are the same ones responsible for achieving rate reductions and defending their outcomes.

Laboratory-based surveillance, with all its challenges, eliminates layers of human processing of surveillance data and holds the promise of eliminating some forms of bias. We have previously described a longitudinal database of 6 common MDROs at an academic medical center.[2] Since 2000 we have tracked the monthly laboratory-based occurrence of hospital-onset methicillin-resistant *Staphylococcus aureus* (MRSA), vancomycin-resistant *Enterococcus* (VRE), *Clostridium difficile*, ceftazidime-resistant gram-negative bacilli (CRGN), fluoroquinolone-resistant *Pseudomonas aeruginosa*, and *Stenotrophomonas maltophilia*. The reports are based on clinical results from the medical, surgical, and pediatric intensive care units (ICUs) as well as 7 medical-surgical wards and include those that represent infection as well as colonization. The number of reports occurring more than 48 hours after admission and prior to discharge are divided by the number of patient-days to generate a "resistance index." These data are not subject to any complex definitions and are not collected by infection prevention practitioners or quality improvement specialists. They are not externally reported.

Data collected since the origin of this index in the second half of 2000 through the first half of 2012 are graphically displayed in 6-month intervals in Figure 1. The index represents the occurrence of the 6 organisms divided by the number of patient-days times 1,000 for all 10 hospital locations. It is apparent that the index was relatively flat until the second half of 2007 and then began a precipitous decline over the next 4 years to one-half the previous rate (from 4.2 to 2.0 per 1,000 patient-days). The overall trend is therefore

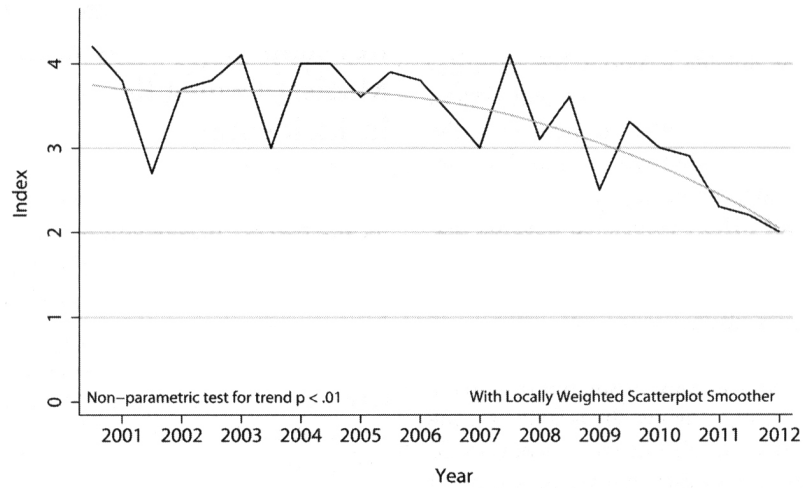

FIGURE 1. Resistance index by 6-month intervals (July 2000–June 2012).

not linear, as demonstrated by the smoothed curve, but the nonparametric trend is statistically significant ($P < .01$). Indeed, there were statistically significant reductions seen for 4 of the 6 individual organisms (MRSA, *C. difficile*, CRGN, and *Stenotrophomonas*).

We believe that these data demonstrate true reductions in the occurrence of several MDROs over a long period of time at an academic medical center. The index used is crude but free of the bias that can accompany traditional surveillance. The explanation for the dramatic reduction is uncertain and may be related to improvements in alcohol-based hand hygiene; contact isolation with gowns and gloves for MRSA, VRE, and *C. difficile*; enhanced disinfection of rooms and equipment; bundled processes; antimicrobial stewardship; training cohorts of nurses in infection prevention; administrative commitment to supporting prevention efforts; active surveillance for MRSA in the ICUs and for selected surgical patients; more rapid diagnostics for MRSA and *C. difficile* (Xpert, Cepheid); or some combination of them all. While this reflects only the experience of a single center, we believe it supports the important contribution that laboratory-based reporting can make and highlights the insight provided by longitudinal databases rather than snapshots. For this index of 6 MDROs, we have witnessed a real, meaningful reduction. Which interventions have contributed most to this observation need to be identified and expanded in the name of patient safety.

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REFERENCES

1. Alston WK. Pitfalls of public reporting. *Infect Control Hosp Epidemiol* 2010;31:985–986.
2. Ahern JW, Alston WK. Use of longitudinal surveillance data to assess the effectiveness of infection control in critical care. *Infect Control Hosp Epidemiol* 2009;30:1109–1112.