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Cost-Effectiveness of Universal Screening of Healthy Newborns for Nasal Methicillin-Resistant *Staphylococcus aureus* Colonization at Birth

To the Editor—Community-associated methicillin-resistant *Staphylococcus aureus* (CA-MRSA) infections are increasing in frequency and are an emerging problem among pregnant women and newborn infants.¹ The incidence of MRSA vaginal colonization among pregnant women usually ranges from 0.5% to 3.5%.^{2,3} However, in a recent study of pregnant women in Tennessee, 10.5% of genital swab specimens submitted for routine screening for Group B beta-hemolytic streptococcus also tested positive for MRSA.⁴ MRSA colo-

nization is a risk factor for nosocomial transmission and subsequent MRSA infection. The incidence and consequence of MRSA colonization among newborn infants is not well characterized.

Our institution, a 571-bed tertiary care academic institution, is a state-designated perinatal center that serves 8 regional hospitals. We have approximately 1,400 deliveries per year. Since December 2007, our institution has conducted universal surveillance of all patients for nasal MRSA colonization upon admission to the hospital. However, the cost-effectiveness of universal surveillance for MRSA colonization among healthy newborn infants is not known. We analyzed our data to determine the incidence of nasal MRSA colonization among newborn infants at birth and the cost-effectiveness of universal MRSA screening of healthy term newborns.

All newborn infants born between December 1, 2007, and August 31, 2009, were screened at birth for nasal MRSA colonization using the GeneXpert System and the Xpert MRSA real-time PCR test kit (Cepheid). The cost of MRSA screening testing was obtained from the microbiology laboratory. The transmission rate of MRSA was calculated based on published estimates by Jernigan et al⁵ of 0.14 patient-per-day rate of transmission for an unrecognized newborn who has been colonized and 0.009 for a recognized newborn who has been colonized in isolation precautions.⁵ Illinois Public Act 095-0312 mandates MRSA screening for all patients admitted to an intensive care unit (ICU) as well as patients admitted to non-ICU settings deemed to be at high risk for MRSA carriage.⁶ Therefore, only screening costs of children admitted to the newborn nursery who would not be tested under the legislative mandate were included in the cost analysis. Microbiology laboratory data were also reviewed to detect any invasive MRSA infections in newborns less than 48 hours of age.

During the study period, 2,110 children were born, and 2,031 (96%) infants underwent MRSA screening at birth. Overall, 4 of 2,031 (0.2%) infants tested positive for nasal MRSA colonization. A total of 520 babies were excluded from the cost analysis because they were admitted to the neonatal ICU, either from labor and delivery or from the newborn nursery, and thus would have been tested for MRSA colonization under our state mandate. Similarly, 2 of 4 infants who tested positive for MRSA colonization were born prematurely and required NICU care; they were not included in the cost analysis.

The total cost of screening of 1,582 newborns who were admitted to and stayed in the newborn nursery was \$79,100 at \$50 per test for our healthcare system, and for payers, the cost was \$316,400 at \$200 per test. Thus, the cost of detection of a carrier was \$39,550 for our healthcare system and \$158,200 for payers. The study period was 3,348 patient-days, with an average length of stay of 2.1 days in our nursery. The 2 newborns who had been colonized stayed for a total of 3

days in the hospital. Based on the transmission rate estimates by Jernigan et al,⁵ for unrecognized or nonisolated MRSA carriers during the 21-month study period, 0.42 days of transmission of MRSA would have occurred over the 3 patient-days not spent in isolation. It would therefore take 7,971 patient-days (3.99 years and 3,796 babies) to prevent one MRSA transmission-day, at the cost of \$189,800 for our healthcare system and \$759,200 for payers. We found no cases of MRSA bacteremia or invasive disease among term newborns less than 48 hours of age admitted to our nursery from January 1, 2006, through September 30, 2009.

Our study finds that MRSA colonization and infection of newborns at birth is extremely uncommon despite increasing incidence of CA-MRSA infections in our area. The transmission rates that we used for the newborns were derived from a study in a neonatal ICU and therefore may overestimate the MRSA transmission rate, because the characteristics of newborns in the nursery are different from those in the neonatal ICU. Our data suggest that universal screening of newborns for MRSA colonization appears unnecessary and not cost-effective for healthcare systems and payers in our geographic area at this time, on the basis of the low incidence of MRSA nasal colonization at birth, the short hospital stays of healthy newborns, and the absence of invasive MRSA infection in term newborns.

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