

Stopping short the spread of methicillin-resistant *Staphylococcus aureus*

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See related article page 21

As described by Andrew Simor and colleagues¹ elsewhere in this issue (page 21), Canadian hospitals, like many hospitals elsewhere, have recently witnessed an increase in the proportion of *Staphylococcus aureus* isolates that are resistant to methicillin (known as methicillin-resistant *S. aureus* or MRSA). The rate has risen from 1% of all isolates in 1995 to 6% in 1999.¹ Despite the increase, Canada's rate of MRSA is much lower than those of many other countries, such as the United States (where 40% of strains are resistant), Japan (80%) and European countries such as Italy, Greece, France, Belgium and Spain (all of which have rates higher than those in Canada).² The Canadian rate is similar to those observed in Switzerland and the Scandinavian countries, but it is 5 times higher than in the Netherlands.³ It is surprising that despite frequent cross-border traffic between the United States and Canada and between Canada and many European countries, there are still such great differences in rates of MRSA strains among these countries. The cause of such substantial differences between countries and between hospitals must relate to local differences in antibiotic policies and infection control measures.

In the Canadian study¹ more than half of the isolates could be linked to an index case, and molecular techniques showed that 81% of the isolates were identical with 1 of only 4 epidemic strains. These findings suggest that even in a country as geographically vast as Canada, infection control measures can and should be centrally organized in the battle against MRSA. As discussed by Simor and colleagues,¹ there is an urgent need to implement better infection prevention and control measures to limit the spread of MRSA in the hospital setting.

In the Netherlands both colonization and infection with MRSA occur in less than 1% of patients. This low rate can be attributed to hospitals' enforcement of the stringent infection control measures that were established by the Dutch Working Party on Infection Prevention almost 10 years ago.⁴ The basis of those guidelines is a "search-and-destroy" strategy. For example, all patients transferred to our hospital (a 1042-bed teaching hospital that encompasses all major disciplines) from hospitals outside the Netherlands are kept in quarantine for at least 48 hours. During that time they receive medical care, and screening

cultures are taken from the skin and mucous membranes of the nose. At 1-hour intervals over a period of 5 hours, swabs are taken from the patient's nose, throat, perineum, sputum, urine and, if present, wounds. Only if the results of all of these sets of cultures are negative is the patient transferred to an open ward. If a patient is found to carry MRSA, he or she is transferred to an isolation room, and his or her former roommates and all personnel are screened. The former roommates of the patient are nursed in cohort isolation until culture results are negative for MRSA. If 1 or more patients or at least 1 health care worker is found to be carrying the same MRSA strain as the index case, the ward is closed to new admissions. If MRSA is identified in an intensive care unit, the unit is immediately closed to new admissions. Once a ward or an intensive care unit has been closed, all other patients and personnel in the ward or unit are screened, and the ward or unit is not reopened to new admissions until all MRSA-positive patients have been isolated in a separate room and all MRSA-positive personnel have been sent home.

Managing MRSA in this way is expensive. We have calculated that it can cost as much as US\$250 000 for our hospital to bring an outbreak of MRSA (in which 3 to 5 patients are infected) under control; these costs relate to isolating patients transferred from other hospitals, closing intensive care units, postponing surgery, obtaining and analyzing surveillance cultures, and other measures.⁵ Yet one might wonder whether these measures are cost effective.⁵ It is likely that if we and other hospitals in the Netherlands did not enforce this antibiotic policy and infection control program, the endemic level of MRSA in our country would increase substantially. There is evidence that when no control measures are taken, a rapid increase in the rate of MRSA (to as high as 40% of all *S. aureus* isolates) can be expected.⁶ This increase in the rate of MRSA can lead to greater use of vancomycin or teicoplanin, which may hasten the emergence of vancomycin-resistant enterococci and subsequently vancomycin-resistant *S. aureus*.

It is also possible that when the percentage of MRSA increases, illness and death due to *S. aureus* also increase. In Spain the mortality rate is higher among patients with MRSA than among those with methicillin-susceptible *S. aureus* (MSSA), patients with MRSA endocarditis have a

slower response to adequate antibiotics than those with MSSA endocarditis, and patients with MRSA are kept in hospital longer than patients with MSSA.⁷

MRSA strains are usually resistant to many different antibiotics, becoming a reservoir for resistance genes. These genes may then be transferred from the resistant strains to other bacteria. An increase in the incidence of MRSA in the hospital setting would undoubtedly result in the spread of MRSA into the community.

The costs associated with *not* undertaking aggressive control measures to manage outbreaks of MRSA are thus substantial, and expenditures to contain outbreaks of MRSA seem worthwhile. Given the wide range of negative outcomes associated with MRSA, hospitals with a high endemic level of MRSA should focus attention on the subset of highly epidemic MRSA, defined by DNA fingerprinting techniques.⁸

A similar search-and-destroy policy would probably be cost effective in Canada, where the situation is still relatively favourable. Because the rate of MRSA is so much higher in the United States, it would also be advisable for Canadian hospitals to start isolating any patients who are transferred in from US hospitals.

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CLINICAL PRACTICE GUIDELINES

FOR THE CARE AND TREATMENT OF

BREAST CANCER



In February 1998 CMAJ and Health Canada published 10 clinical practice guidelines for the care and treatment of breast cancer, along with a lay version designed to help patients understand more about this disease and the recommended treatments. These guidelines are currently being revised and updated, and the series is being extended to cover new topics. The complete text of the new and updated guidelines is available at eCMAJ:

www.cma.ca/cmaj/vol-158/issue-3/breastcpg/index.htm

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Guideline 8. Adjuvant systemic therapy for women with node-positive breast cancer [Mar. 6, 2001]

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Guideline 11: Lymphedema [Jan. 23, 2001]