

not guilty until proven the opposite beyond statistical significance, it is very dangerous to release on probation suspects of serial killing.

## REFERENCES

1. Rello J. Impact of nosocomial infections on outcome: myths and experience. *Infect Control Hosp Epidemiol* 1999;20:392-394.
2. Soufir L, Timsit J-F, Mahe C, Carlet J, Regnier B, Chevret S. Attributable morbidity and mortality of catheter-related septicemia in critically ill patients: a matched, risk-adjusted, cohort study. *Infect Control Hosp Epidemiol* 1999;20:396-401.
3. Maki DG. Infections due to infusion therapy. In: Bennett JV, Brachman PS, Sanford JP, eds. *Hospital Infections*. Boston, MA: Little Brown & Co; 1992:849-892.
4. Danzig LE, Short LJ, Collins K, Mahoney M, Sepe S, Bland L, et al. Bloodstream infections associated with needleless intravenous infusion system in patients receiving home infusion therapy. *JAMA* 1995;273:1862-1864.
5. Macías-Hernández AE, Hernández-Ramos I, Muñoz-Barrett JM, Vargas-Salado E, Guerrero-Martínez FJ, Medina-Valdovinos H, et al. Pediatric primary gram-negative bacteremia: a possible relationship with infusate contamination. *Infect Control Hosp Epidemiol* 1996;17:276-280.
6. Macías AE, Muñoz JM, Bruckner DA, Galván A, Rodríguez AB, Guerrero FJ, et al. Parenteral infusions bacterial contamination in a multi-institutional survey in Mexico: considerations for nosocomial mortality. *Am J Infect Control* 1999;27:285-290.
7. Rello J, Vallés J. Hospital-acquired pneumonia in the ICU patient. *Semin Respir Crit Care Med* 1997;18:133-140.
8. Rello J, Torres A, Ricart M, Vallés J, Gonzalez J, Artigas A, et al. Ventilator-associated pneumonia by *Staphylococcus aureus*: comparison of methicillin-resistant and methicillin-sensitive episodes. *Am J Respir Crit Care Med* 1994;150:1545-1549.
9. Rello J. *Acinetobacter baumannii* infections in the ICU. *Chest* 1999;115:1226-1229.
10. Rello J, Sa-Borges M, Correa H, Leal SR, Baraibar J. Variations in etiology of ventilator-associated pneumonia across four treatment sites: implications in antimicrobial prescribing practices. *Am J Respir Crit Care Med*. In press.
11. Vallés J, Artigas A, Rello J, Bonsoms N, Fontanals D, Blanch L, et al. Continuous aspiration of subglottic secretions in preventing ventilator-associated pneumonia. *Ann Intern Med* 1995;122:179-186.
12. Rello J, Soñora R, Jubert P, Artigas A, Rue M, Vallés J. Pneumonia in intubated patients: role of respiratory airway care. *Am J Respir Crit Care Med* 1996;154:111-115.
13. Rello J, Jubert P, Vallés J, Artigas A, Rué M, Niederman MS. Evaluation of outcome for intubated patients with pneumonia due to *Pseudomonas aeruginosa*. *Clin Infect Dis* 1996;23:973-978.

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## The author replies.

I agree with Macías that my editorial is just a piece in the complex puzzle of understanding the contribution of nosocomial infections (NIs) to outcome. The impact of NIs on outcome has been classically overemphasized by inappropriate estimations of attributable mortality, basically due to a failure to adjust for severity of illness, and this has contributed to the fact that this myth has flown too high. My current belief is that survival in patients with NIs depends above all on the degree of severity at the moment of the diagnosis.<sup>1,2</sup> In our experience,<sup>3</sup> most device-related infections are usually caused by pathogens involved in endogenous episodes, and this is a benign process with no significant excess of mortality, if appropriate antibiotic treatment is provided early.

In spite of this, I agree that pathogens acquired exogenously appear to have a poorer prognosis.

This trend was well documented in a study<sup>4</sup> reporting that mortality directly related to pneumonia caused by *Staphylococcus aureus* was 20 times greater in methicillin-resistant episodes than in cases of pneumonia caused by methicillin-sensitive strains. What we have learned, and what this author's own experience<sup>5,6</sup> confirms, is that the epidemiological pattern of exogenous organisms may vary from hospital to hospital, and control measures or therapeutic approaches should be customized to each institution.

In the field of ventilator-associated pneumonia, our group has demonstrated that effective drainage of subglottic secretions<sup>7</sup> and periodic monitoring of the intracuff pressure<sup>8</sup> are inexpensive and effective measures in preventing primary endogenous pneumonia. As expected, these measures reduced the period of intubation, but did not modify the ICU survival rate.<sup>7</sup> In contrast, presence of secondary endogenous or exogenous pathogens will be associated with significant excess mortality,<sup>2,9</sup> and I anticipate that these measures will become ineffective.

All of these pieces of the puzzle are partially recognized but are extremely important in addressing key messages regarding therapy and prevention. Careful handling of the artificial devices (intravenous catheters, intratracheal tubes) is extremely important in preventing NI. The current evidence, however, suggests that these measures should be customized to each institution, as is the case for empirical therapy for nosocomial infections.<sup>6</sup> In the presence of appropriate infection control measures, mortality is not significantly increased, but the reduction in the rate of endogenous infections by specific interventions will contribute to reducing the economic burden associated with these infections. In contrast, in the presence of exogenous pathogens, the approach should be different and should be targeted to antimicrobial-control programs and increasing handwashing compliance.

## REFERENCES

1. Rello J, Vallés J. Mortality as an outcome in hospital-acquired pneumonia. *Infect Control Hosp Epidemiol* 1999;20:392-394.
2. Rello J, Rué M, Jubert P, Muses G, Soñora R, Vallés J, et al. Survival in patients with nosocomial pneumonia: impact of the severity of illness and the etiologic agent. *Crit Care Med* 1997;25:1862-1867.

## Reasons That Healthcare Workers Decline Influenza Vaccination in a New Zealand Hospital Environment

### To the Editor:

The Centers for Disease Control and Prevention currently recommends that healthcare workers (HCWs) be vaccinated against influenza each year.<sup>1</sup> This policy seems to be focused on keeping hospitals operational in the event of a severe influenza epidemic and on preventing transmission to at-risk patients, rather than as a protective mechanism for HCWs (who neither fit into the usual high-risk groups nor show evidence of a greater risk of complications).

Auckland Healthcare has operated influenza vaccination programs for some years. Uptake generally has been poor despite extensive advertising, visiting immunization nurses, drop-in immunization clinics, and a no-charge program.

The occupational groupings of those vaccinated were identified, and nonvaccinated HCWs were identified from payroll lists. Of staff who