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## Will the Real Infection Rate Please Stand?

In his summary of the First International Conference on Nosocomial Infections held in 1970, R.E.O. Williams began: "Quite clearly, the first message from this conference is the need for surveillance. It is essential that hospital staffs know what is going on in the hospital . . ." In 1987, after nearly two decades of increasing surveillance, do we really know what is going on in the hospital?

With nearly every US hospital now conducting some form of infection surveillance, there should be no shortage of data. But shortcomings in data analysis abound. Does the average hospital staff member know what is going on in his or her hospital when informed that the nosocomial infection rate is 4.5%, or the postoperative wound infection rate is 1.5%? In a vacuum, such figures are meaningless. Numerous factors, both real and factitious, affect reported infection rates. Real factors known to influence infection rates include: illness acuity of patient population, handwashing practices, surgical techniques, catheterization procedures and protocols, and respiratory therapy equipment cleansing practices. Alterations in infection rates that can be attributed to such factors are noteworthy, and can serve as the basis for instituting or modifying specific infection control practices. As simple as this idea appears, the number of studies that unequivocally demonstrate such cause-effect relationships with nosocomial infections is very low. One major reason for the lack of conclusive studies is the confounding effect of factitious or methodological variables. These include, but are not limited to definitions of infections and specifically of nosocomial infections, and methods and intensity of infection surveillance. Also included among factitious factors are aspects of medical and hospital practice having little or no influence on

actual infection rates, but which have a profound influence on the surveillance system's ability to detect infections. This point is illustrated by the current trend to diagnose and treat uncomplicated urinary tract infections without obtaining a urine culture. Surveillance systems that rely heavily on urine culture results for the detection of urinary tract infections will experience a decreasing urinary tract infection rate solely because of this change in practice, which in turn will result in decreasing efficiency of the surveillance system.

The paper by Reimer et al<sup>2</sup> (pp 237-240) raises another factor that factitiously influences infection rates. Reimer and colleagues demonstrated, not unexpectedly, major differences in wound infection rates based on method of surveillance. With standard surveillance there was a 1.5% wound infection rate, but with a method employing postdischarge telephone interviews of surgical patients, a surgical wound infection rate of 5.4% was found. Of significance was the observation of an inverse relationship between length of hospital stay and postdischarge detection of wound infection, ie, less than 10% of surgical patients were hospitalized six days or less, but 70% of postdischarge infections occurred in this group.

In this age when prospective payment is becoming the rule rather than the exception, the mean length of hospitalization has been substantially shortened in most hospitals. Infection surveillance systems designed primarily to detect in-house infections (with little or no postdischarge surveillance), will fail to detect an increasing proportion of nosocomial infections because of this decreasing length of hospital stay, thus producing a decreasing infection rate that may be purely factitious—an experience previously reported.<sup>3</sup>

At St. Vincent Hospital and Medical Center, we recently reviewed our wound infection data for elective bowel resections for 1972 through 1985. During this period the postoperative wound infection rates fell from 12% (1972-1974) to 6% (1975-1982) to 3% (1983-1985). This decrease had been attributed to various changes in surgical practice designed to reduce infection rates—primarily antimicrobial prophylaxis. Although there was a

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fairly constant mean postoperative length of hospital stay (13 days) from 1972 to 1982, the mean dropped to 11.5 days during the last three-year period, undoubtedly as a result of prospective payment systems. Simultaneously, the mean postoperative day that the wound infections became manifest increased from 9.2 days (1972-1974) to 11.0 days (1975-1982) to 12.5 days (1983-1985), presumably a result of more effective antimicrobial prophylaxis. On the surface it appeared that infection prophylactic measures had been effective. However, with our infection surveillance system, which is designed to detect in-house infections and is ineffective in detecting postdischarge infections, the decrease in postoperative hospital stay plus the increase in time of detection of infections would result in a decrease in observed infection rates, even if the true infection rate remained constant. This phenomenon has weakened our ability to assert with confidence that our postoperative bowel infection rates have significantly decreased, particularly for the period of 1983 through 1985.

Day surgery was rare more than five years ago, but in the era of prospective payment has grown to the point that it constitutes a significant proportion of the surgical procedures performed in many hospitals. Because such patients are typically discharged the day of surgery, detection of infection, by necessity, must rely on postdischarge surveillance. An infection rate of 7.8%<sup>2</sup> in day-surgery patients, if true for other institutions, must be viewed with concern.

It is clear that as hospital practices evolve, it will become increasingly important for infection surveillance programs to develop an effective mechanism for detecting nosocomial infections following patient discharge. Many have grappled with this problem, but a cost-effective approach has not been forthcoming. The patient telephone interview system used by Reimer et al<sup>2</sup> would appear to merit consideration. Until an effective postdischarge surveillance system is implemented, infection rates based on in-house surveillance only will be increasingly illusory.

One can quite legitimately question the importance or significance of nosocomial infections that become manifest after discharge. Are the frequency, morbidity, and economic impact of such infections sufficient to justify the cost of implementing an effective system for detecting them? Unfortunately, such a question is unanswerable until a reliable surveillance system has gathered the data for analysis. The paper by Reimer et al does suggest an answer to part of the question: the frequency of such infections is probably greater than most suspect.

#### REFERENCES

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