Chickenpox in Apparently 'Immune' Hospital Workers

To the Editor:

Chickenpox is a fairly innocuous infection in the young, but it can be serious, even life-threatening, in adults. This is especially true of hospitalized patients who are immune-suppressed for any reason, including the stress of a serious illness. In order to prevent transmission of the varicella-zoster virus to patients, it is usually necessary to furlough susceptible hospital employees who have been exposed to chickenpox or disseminated zoster for the duration of the risk period-ten to 21 days after their exposure. Because of the profound economic, health and staffing implications of furloughing, we, like most others, depend heavily on testing to determine immune status.

Winthrop-University Hospital is a 530-bed university-affiliated hospital with 3,000 employees and ten to 13 chickenpox exposures annually among hospital personnel. Our experience that a positive or negative history of chickenpox is not a reliable way to determine immunity or susceptibility to chickenpox has been in agreement with the literature.[1] Therefore, shortly after commercial enzyme-linked immunosorbant assay (ELISA) tests became available, we began routine susceptibility testing of our employees. Persons with ELISA titers (Whittaker MA Bioproducts, Walkerville, Maryland) of less than 1.0 are considered nonimmune, those with titers greater than 1.0 are considered immune and persons with titers of 0.8 to 0.99 are considered borderline.

In that same six-month period, three cases of chickenpox occurred in employees who were considered to be immune with titers of 1.03, >2.95 and 1.51, respectively. All three cases were confirmed to be varicella by the physicians of the Infectious -Disease Division. Although this represents a false positive rate of only 0.3% (3 of 939), these three individuals in turn exposed over 100 others-both patients and staff—to chickenpox. As testing is intended to prevent such exposures, this episode was disconcerting.

Neither the supplier of the test kit nor the Centers for Disease Control (CDC) had received any reports of varicella developing in individuals whose tests showed immunity. Unfortunately, the sera from the three individuals had been discarded and could not be retested, nor were subsequent titers obtained to determine if there was a significant increase in their titers.

In order to check the accuracy of our test procedures, 32 sera that had been tested for varicella titers in our laboratory were sent to another laboratory that also uses an ELISA method (SmithKline Bioscience, Lake Success, New York). Both tests detect IgG-class antibodies. Not one of the 19 positives from our lab was an apparent false positive, allowing for some differences in test range values for seronegative or low-to-moderate positive titers (Table).

Using these test parameters for 1,001 employees tested by our employee health service from February 1989 to July 1989, 939 (94%) were positive or immune and 63 (6%) were negative or susceptible.

There are several possible explanations for the occurrence of chickenpox among "immune" employees. The individuals could have been rare cases who were infected twice with varicella virus. Alternatively, the infections might not have been varicella, although the history of recent exposure and the confirmation of the clinical picture by an infectious disease specialist makes this doubtful. The third possibility is that the tests were falsely positive because of high titers of antibody to a related virus (e.g., cytomegalovirus [CMV] or herpes simplex virus-type 1 [HSV-1]).[2] The fourth possiblity is that the tests could have been positive because of specimen mix-ups or technical errors. Finally, it must be remembered that different available test kits vary in their specificity and reproducibility when compared to one another,[3] and therefore, some or all must necessarily fall short in

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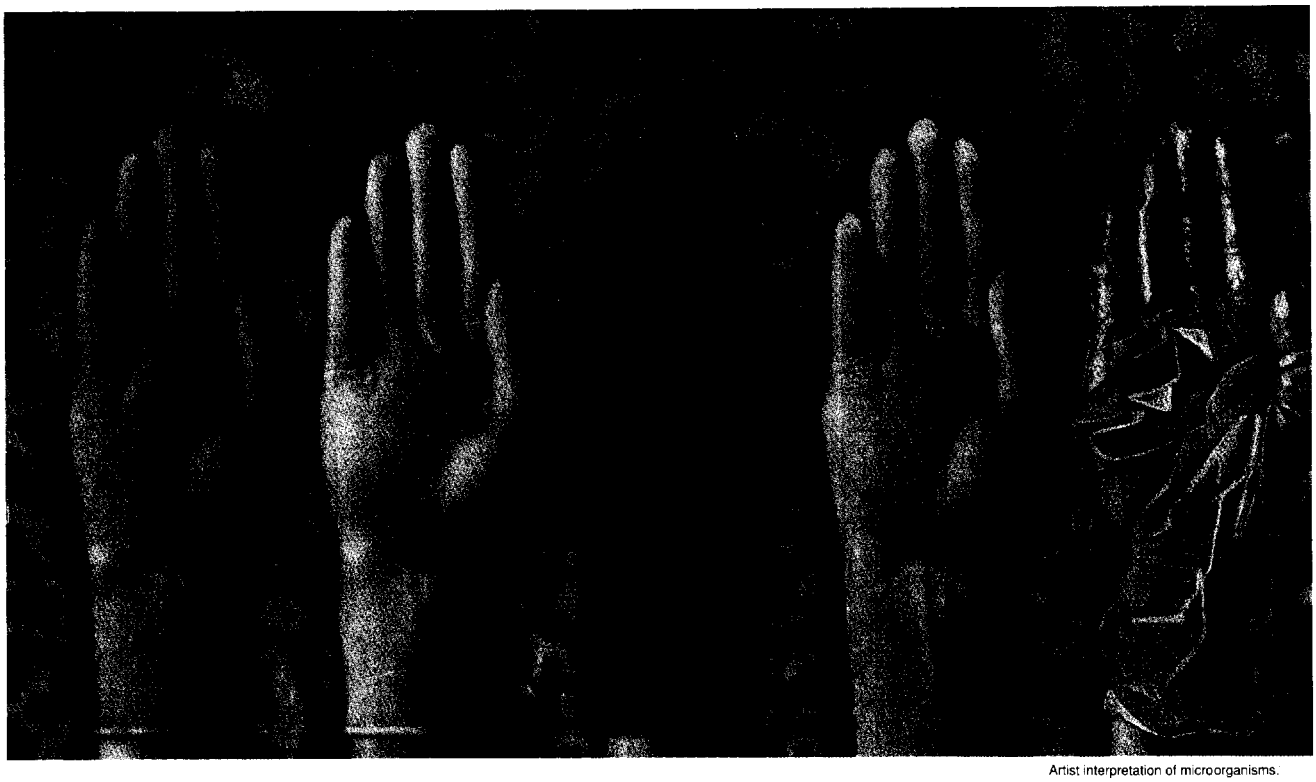

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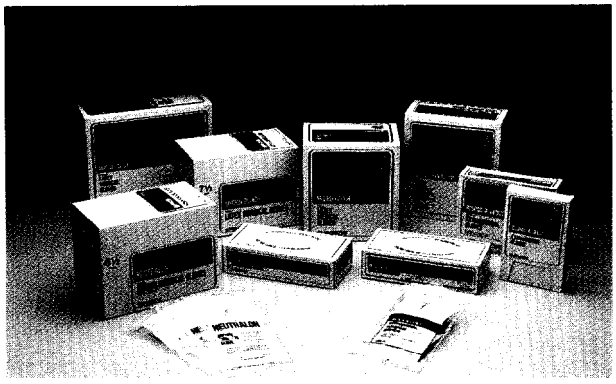

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predicting actual susceptibility. Unfortunately, large-scale comparisons of test kit results with actual susceptibility have not been carried out to our knowledge, and would be very difficult.

Presently, we keep all sera for 12 months so we can retest the sera should a "nonsusceptible" person develop chickenpox. We also test paired (acute and convalescent phase) specimens in anyone who develops chickenpox who was previously deemed to be immune.

We will now instruct all who are considered to be immune but who have been exposed to report to Infection Control or the employee health service if at any time during the ten-to-21-day risk period they feel prodromal symptoms of fatigue or malaise or develop any type of rash or vesicular eruption. We intend to furlough such employees until chickenpox has been ruled out. We would appreciate any correspondence about similar cases or other relevant matters, experience or explanation for the occurrence of chickenpox in individuals with "positive" titers.

Table
Results of ELISA Testing of Winthrop-University Hospital by the Employee Health Service

	Winthrop-University Hospital Laboratory Specificity		SmithKline Laboratory Specificity		
	ELISA Titer	No. Tested	ELISA Titer	No. Tested	Chickenpox
Seronegative or equivocal	10.99	13	CO.14	6	0
Low-to-moderate positive	1.0-2.39	9	0.15-0.53	17	2
Highly positive	>2.40	10	>0.54	9	1
Total		32		32	3

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REFERENCES

1. Kranski K. Holzman R, LaCouture R, et al. Hospital experience with varicella-zoster virus. Infect Control. 1986;7:312-316.
2. Shehab Z, Brunell P. Enzyme-linked immunosorbent assay for suceptibility to varicella. *J Infect Dis.* 1983;148:472-476.
3. Larussa P, Steinberg S, Waithe E, et al. Comparison of five assays for antibody to varicella-zoster virus and the fluourescent antibody-to-membrane antigen test. *J Clin Microbiol.* 1987;25:2059-2062.

Letters to the Editor should be addressed to INFECTION CONTROL AND HOSPITAL EPIDEMIOLOGY Editorial Offices, C41 General Hospital, University of Iowa Hospitals and Clinics, Iowa City, IA 52242. All letters must be typed, double spaced, and may not exceed four pages nor include more than one figure or table. The editors reserve the right to edit for purposes of clarity or brevity.

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