Yvonne Duijvestijn, MD
Paul Caesar
Tjalling de Vries, MD
Medical Center Leeuwarden
Dick Veenendaal, MD, PhD
Laboratory of Public Health in Friesland
Leeuwarden, The Netherlands

Selecting Protective Apparel for the Degree of Exposure Anticipated

To the Editor:

The Occupational Safety and Health Administration's Standard on Occupational Exposure to Bloodborne Pathogens mandates that the employer provide the healthcare worker with protective apparel that is commensurate with the "task and degree of exposure anticipated."[1] In effect, and as supported by the literature, this makes the selection process procedure-oriented.[2] The question that logically arises is how the infection control professional can determine a garment's protective capability.

At the moment, there are two tests that are being used to demonstrate a barrier material's effectiveness. The methodologies were developed by the American Society for Testing and Materials (ASTM) and adopted as standards by that organization in 1995. Both tests use the same mechanical device. One of the tests assesses a material's level of resistance to liquid penetration and the other to viral penetration.[3,4] The results are expressed on a pass/fail basis, with a passing mark awarded to a material that is able to resist penetration when challenged at a level of pressure of 2 psi.

Unfortunately, expressing the test results on a pass/fail basis prevents the infection control professional from determining the performance capability of a product that could render it suitable for the "degree of exposure anticipated." By the same token, it prohibits the manufacturer from identifying material that is able to resist penetration at (for example) 3 psi.

Gowns are classified as Class II Medical Devices, and the Food and Drug Administration has included the ASTM's tests as a point of reference to be used by the manufacturer when submitting a 510(k) application for marketing approval. In addition, the agency is permitting the manufacturers of those materials that pass the tests to promote their product(s) as being "liquid-proof" or "impervious."[5] However, characterizing the performance of those materials in that manner is contrary to what has been reported in the clinical literature.

For example, one in vivo study found the level of pressures in the abdominal area of a surgical gown to be as high as 2.9 psi during surgery.[6] This may well have accounted for the earlier report of liquids having penetrated gowns made of materials that had passed the ASTM tests.[7]

Not to be overlooked as well is that, whatever the material's liquid-resistant capability, the construction of a garment, particularly in critical locations such as the glove-gown interface, can render it ineffective. A study examining that area found that some 70% to 80% of the gowns tested leaked.[8] It should be noted that the researchers proposed a solution to this problem that has yet to be pursued commercially.

More than a decade has passed since the beginning of the era of the awareness of the hazards associated with the transmission of bloodborne pathogens. What is incredible is that there is no evidence available at this time that indicates that anyone has ever acquired human immunodeficiency virus as a result of blood having penetrated a protective-type garment. Even more impressive is the fact that it is likely that an overwhelming percentage of the gowns used during this period would have failed the ASTM's tests. Nevertheless, considering the pressure to reduce costs, it would not be fiscally prudent to indiscriminately provide every employee with what the ASTM has established as being the maximum level of protection required.

Under no circumstance should this be interpreted to imply that there is no need for garments that afford both the level and extent of protection that the users deem necessary. What it does mean is that there is still a need for a test method that reports a material's resistance to liquid penetration on a graduated scale. Then and only then will the infection control community be able to intelligently assess a product's protective capability and be reasonably assured that the garment they select is suitable for the "degree of exposure anticipated."

REFERENCES

1. Occupational exposure to bloodborne pathogens—OSHA. Final rule. *Fed Regist* 1991;56(235):64004-64182.
2. Belkin NL. Gowns: selection on a procedure-driven basis. *Infect Control Hosp Epidemiol* 1994;15:713-716.
3. American Society for Testing and Materials. *F1670-95 Standard Test Method for Resistance of Materials Used in Protective Clothing to Penetration by Synthetic Blood.* West Consnohocken, PA: ASTM; 1995.
4. American Society for Testing Materials. *F1671-95 Standard Test Method for Resistance of Materials Used in Protective Clothing to Penetration by Bloodborne Pathogens Using Phi-X174 Bactreriophage Penetration as a Test System.* West Conshohocken, PA: ASTM; 1995.
5. Office of Device Evaluation, Center for Devices and Radiological Health, Food and Drug Administration. *Interim Guidance for Substantiating Liquid-Proof or Impervious Claim Using ASTM ES-21 and ASTM ES-22 Standard Test Methods.* March 15, 1995.
6. Smith JW, Tate WA, Yazdani S, Garcia RY, Muzik AC, Nichols RL. Determination of surgeon-generated pressures during various surgical procedures in the operating room. *Am J Infect Control* 1995;23:237-246.
7. Telford GL, Quebbeman EJ. Assessing the risk of blood exposure in the operating room. *Am J Infect Control* 1993;21:351-356.
8. Meyer KK, Beck WC. Gown-glove interface: a possible solution to the danger zone. *Infect Control Hosp Epidemiol* 1995;16:488-490.

Nathan L. Belkin, PhD
Retired
Clearwater, Florida

Using Electronic Media to Conduct an Emergency Infection Control Committee Vote

To the Editor:

Infection control committees (ICCs) have broad mandates to oversee infection control activities at hospitals. In practice, the hospital epidemiologist or medical director will direct most day-to-day activities. Occasionally, however, the ICC will need to decide an urgent matter that cannot wait until the next scheduled meeting.

On January 7, 2000, author MJW informed DS and ABK of a percutaneous blood exposure. The patient strongly refused a human immunodeficiency virus (HIV) test. The employee took HIV postexposure prophylaxis (PEP), which made her ill. The employee demanded that the patient be HIV tested so that she could stop HIV PEP if he did not have HIV.

Ohio law permits an ICC to authorize HIV testing over a patient's refusal when the ICC determines that a healthcare provider, emergency medical services worker, or peace

officer has sustained a significant exposure to the body fluids of that patient while rendering health or emergency care. As these situations occur with some regularity, the University Hospital ICC has delegated override authority (ie, the authority to order HIV testing despite a patient's refusal) to selected employee-health (MJW) and emergency-care physicians and the hospital epidemiologist (ABK).

After discussion, we concluded that this particular situation was ambiguous enough that a special meeting of the ICC should be called to determine whether or not the source patient should be HIV tested despite his refusal. In the afternoon of January 7, 2000, ABK sent a high-priority electronic message to 18 members of the ICC, summarizing the situation, asking for a vote, and informing the recipients they could call for additional clinical information. The morning of January 10, 2000, ABK sent the same message to 3 additional members of the ICC who had been inadvertently left off the original list. The message did not contain any personal identifiers for either the patient or employee.

By the late afternoon of January 10, ABK had received 14 replies, 13 to override (test the patient for HIV), and 1 not to override (not to test the patient). This represented an override vote by 67% of the ICC. Based on the result, ABK informed MJW that she had authorization to test the patient's blood for HIV and informed the ICC electronically of the vote's outcome. ABK also saved the electronic vote and correspondence in her files for documentation.

The electronic vote succeeded in bringing a timely resolution to a difficult situation. In the absence of this electronic medium, we would have needed to call together a face-to-face meeting, hold a teleconference, conduct a telephone poll, or send requests for votes by mail. Electronic mail (e-mail) has advantages over other methods. With e-mail, a message can be sent to large numbers of people quickly and with relative ease, especially if the intended recipients are listed in a common address book. The recipients can then reply with equal speed and ease.

Face-to-face meetings are difficult to arrange on short notice; a face-to-face meeting would have probably resulted in greater delay in obtaining resolution or lower response rate or both. E-mail is more readily available than teleconferencing facilities. Telephone polls require considerable time, in that someone must place individual calls or pages and then wait for responses. Furthermore, with individual calls, each recipient would probably hear a slightly different description of the scenario, whereas with e-mail all recipients got the same message. Requesting votes by mail would have resulted in a less timely result and probably a lower response rate.

E-mail's ease and rapidity can also be a disadvantage. It is easy to send a message to the wrong recipient. We were careful not to use any personal identifiers in our message in order to preserve the confidentiality of both the patient and employee. Also, while e-mail is increasingly used, it is still not as widely used as telephones or regular mail. Almost everyone can be reached eventually by telephone or mail, although there may be a delay, but not everyone has e-mail.

One minor difficulty we had with our electronic votes was the result of our ICC's members being on several e-mail systems. ABK has since created a group mail list for the ICC to ease future electronic communications.

Institutional procedures often do not take electronic communication into account. For example, University Hospital's medical staff defines a quorum based on "members present." How does one apply this definition when conducting an electronic vote or meeting? At the ICC meeting following the electronic vote, the University Hospital ICC approved a procedure for future electronic votes.

Amy Beth Kressel, MD
David Schwallie, JD
Mary Jo Wakeman, MD
University of Cincinnati
Cincinnati, Ohio

In Memorium
JONATHAN FREEMAN

With sadness, we report to you the death of Jonathan Freeman, MD, ScD, on May 23 from complications of lymphoma.

Dr. Freeman received his first academic appointment at Harvard Medical School in 1972 and joined the Harvard School of Public Health (HSPH) in 1990. The focus of Dr. Freeman's research at HSPH was nosocomial infections. He was dedicated to HSPH's programs in infectious disease and epidemiology, leading the Interdisciplinary Program in Infectious Disease in recent years. Until recently, he continued to treat infectious disease patients at the Veterans' Affairs Medical Center in West Roxbury.

Dr. Freeman is survived by his wife, Elsie, and his children, Noah and Esther.

https://doi.org/10.1086/503232 Published online by Cambridge University Press