Editorial

HIV Screening for Healthcare Providers: Can We Provide Sense and Sensibility Without Pride or Prejudice?

David K. Henderson. MD

"Prosperity is *not* without *many fears and distastes; and adversity is not without comforts and hopes."*
-Francis Bacon. Apothegms: Of Adversity

The prosperous face of American medicine has changed more in the past decade than in any previous five decades combined. We are, as a country, witness to the greatest explosion in science and technology in our history. Medical science is able to accomplish today what would have been viewed, just 30 years ago, as too preposterous for competent science fiction. The pace at which new scientific information is being developed is mind boggling. A casual mid-July 1994 search of the National Library of Medicine's citation database for the subject "acquired immunodeficiency syndrome" elicited 12,342 citations in the Medline (1991-1994) file alone. Gene therapy, stem-cell harvests, molecular medicine, and cytokine immunomodulation all have become commonplace in American academic medicine. Unfortunately, the 1990s also present us with new and formidable fears and distastes, many of which represent virtually unexplored territory for American healthcare. Medicine is faced with new and remarkably dynamic scientific and economic realities: 1) the need to provide quality care to all Americans at a cost our economy can tolerate; 2) the need to develop effective strategies to decide when to use (and when not to use) the expensive new technologies that have changed the face of medicine; 3) the need to develop effective funding strategies and mechanisms to pay for these new and expensive technologies; 4) the need to develop effective strategies to manage the complex set of problems presented by relatively new diseases, such as the ongoing human immunodeficiency virus (HIV) epidemic; and 5) the need to bring healthcare institutions into compliance with the expanded standards and regulatory requirements that have become increasingly prevalent throughout all aspects of healthcare.

In the 1990s, we also are observing dramatic changes in the manner in which healthcare is provided. Further, because of its relative expense, American medicine is receiving remarkably intense scrutiny both from the public at large and from our business and political leaders. Medicine is faced with the difficult necessity of engineering and initiating its own cost-cutting changes while maintaining or even increasing the quality of the services provided. The cost-effectiveness of healthcare strategies and interventions has become a major concern. Most healthcare institutions have been forced to learn rapidly about business and economic concepts that heretofore have been almost entirely foreign, including competition, managed care, customer focus, quality improvement, and cost-effectiveness. Out of necessity, American medicine, long focused exclusively on the biological sciences, has discovered business and economic sciences.

Science, unfortunately, cannot provide all of the necessary guidance to steer American healthcare successfully into the next century. Emotion, fear, politics, pride, and prejudice all influence the course

From the Warren *G. Magnuson Clinical Center, National Institutes of Health, Bethesda,* Maryland.
Address reprint requests to David K. Henderson, MD, Building 10 Room *2C 146,* National *Institutes of Health, 9000 Rockville Pike, Bethesda, MD 20892.*
94-ED-105. Henderson DK. HIV screening for healthcare providers: can *we provide sense and sensibility without pride or prejudice?* Infect Control Hosp Epidemiol *1994;15:631-634.*

that medicine will follow. The societal response to the HIV epidemic provides a distinctive example. Over the past several years, a variety of nonscience issues have influenced substantially public perceptions regarding the transmission and transmissibility of HIV[1] With respect to managing the HIV epidemic in society, the combatting of irrational fear and misplaced anxieties has required considerable resources and has, on occasion, diverted attention from crucial primary prevention efforts. Perhaps no issue has galvanized the public's attention more than the risk of provider-to-patient transmission of HIV

The well-documented and perhaps even more widely publicized instances of transmission of HIV from a Florida dentist to his patients[2,3] produced a virtual firestorm of anxiety, initially resulting in the publication of United States Public Health Service guidelines for managing HIV and HBV-infected providers,[4] and, ultimately, resulting in the passage of federal legislation (PL 102-141) requiring states to implement the July 1991 Centers for Disease Control (CDC) guidelines or their "equivalent." The 1991 guidelines recommended that providers who perform what the document refers to as "exposure-prone invasive procedures" know their HIV and hepatitis B serostatuses.[4] Further, the guidelines recommend that providers who are either HIV seropositive or e-antigen positive for hepatitis B should not perform exposure-prone invasive procedures unless they have sought the counsel of an expert review panel and have been advised under what circumstances, if any, they may continue to perform these procedures.[4] Finally, the guidelines note that infected providers who elect to perform exposure-prone invasive procedures must notify prospective patients of their serostatus before the procedure is performed.[4]

This latter concept, the prospective notification of patients of a healthcare worker's serostatus, became the focus of a great deal of criticism from medical and surgical societies. Criticism leveled by the medical community at the restrictive and unrealistic aspects of these guidelines -- primarily on the basis of the inadequacy of the science base -- has often been viewed by the public as self-serving, an unreasonable "circling of the wagons" by the medical profession. Few would argue against practice restrictions if the risk for iatrogenic infection was substantial; however, the available data suggest the opposite. The "equivalence" wording in the 1991 CDC guidelines, however, appears to have provided states with a mechanism to craft individual guidelines. States essentially are required by the legislation to certify that their guidelines are equivalent to the CDC recommendations. As of April 1, 1993, only eight states or U.S. territories subject to the law had certified that the CDC guidelines had been implemented, 26 noted that equivalent guidelines had been implemented, and 25 had asked for a 1-year extension, permissible by law.[5] Curiously, several of the states reporting that equivalent guidelines had been implemented have published guidelines that directly conflict with the CDC recommendations. Very few of the states' guidelines, if any, require prospective notification of patients about an infected provider's status.

Nonetheless, adversity is alive and well, as many "pain and suffering" legal actions (none documenting transmission; many citing the psychological trauma of being worried about acquiring infection from an infected practitioner) have been filed against infected practitioners, based primarily on the CDC 1991 guidelines. In this issue of Infection Control and *Hospital Epidemiology,* Sell et al[6] bring some comfort and hope into this adversity by providing a detailed, modeled cost-effectiveness analysis of serologic screening of surgeons and dentists. Whereas serologic screening programs are only a small part of this complex issue, nonetheless, a screening program is a key component of any program designed to restrict the practices of infected providers. Sell's article uses reasonably conservative assumptions regarding the risks for provider-to-patient transmission as well as quite liberal assumptions about screening program efficacy and still finds serologic screening to be among the more expensive medical lifesaving programs. Their results are strikingly similar to those recently reported by Phillips et al[7] and underscore the need to assess the usefulness of any public health initiative in detail before requiring broad-based implementation.

Several aspects of the model described by Sell et al are particularly relevant to the readership of *Infection Control and Hospital Epidemiology* First, these authors have used available data and scientific techniques to provide an estimate of the economic realities of screening healthcare workers for HIV infection. Such information, grounded in science, is unquestionably the comfort and hope in our current adversity. I believe that, to manage any risk effectively, one has to be able to place the risk into appropriate perspective; that is, to come to a clear understanding of the magnitude of the risk. Whereas risks estimated in the one-in-a-million range often are quite difficult to perceive accurately, when reframed in the real-dollar and scientific contexts provided by Sell et al as "cost per transmission prevented," the magnitude of risk becomes much more apparent.

Second, the model described by Sell et al allows a correction for the clustering of infections associated with a single (perhaps unique) provider, a phenomenon that appears to have been operating in the Florida outbreak and a phenomenon commonly encountered

in published case reports of iatrogenic hepatitis B infections.[8]

Third, to make their assessment of the cost of preventing HIV infections, Sell et al consider four possible screening scenarios, each of which, at one time or another, has been advocated as a sensible national strategy for minimizing the risks for iatrogenic transmission of HIV 1) one-time voluntary screening, 2) one-time mandatory screening, 3) annual voluntary screening, and 4) annual mandatory screening. Although all screening programs studied in their model were prohibitively expensive, importantly, voluntary programs were substantially more cost-effective than were mandatory programs.

Fourth, their model evaluates the effect of these programs over a 15-year period, providing a long-range view of this issue, rather than looking at only one point in time.

Fifth, the authors note that a number of costs associated with HIV screening, such as productivity losses of infected providers, are not included in their model, and they further note that inclusion of the excluded costs would make the screening programs even less cost-effective in their model.

In any event, their model predicts a remarkably high cost for serologic screening of healthcare workers in the categories studied by Sell et al (arguably representing the highest risk of provider-to-patient transmission) in order to prevent even a single case of iatrogenic HIV transmission.

Models of this type, while undeniably intriguing, are subject to substantial limitations. I feel it is important to emphasize that, at least in my own opinion, the estimates provided by Sell et al represent a minimum cost per transmission avoided and, in fact, may underestimate vastly this cost. More than 4 years' additional experience has accrued since the first information about the Florida dentist's cases surfaced.[9] To date, no additional cases of provider-to-patient transmission have been documented, despite the national publicity about this case-cluster and despite aggressive (and extremely expensive and labor-intense) evaluation of the patients of some infected providers.[10-14] Extensive experience with so-called "look-back" studies involving more than 20,000 patients who had care provided by HIV-infected practitioners has yet to identify another case in which provider-to-patient transmission seems probable.[15]

The risk estimate used by the authors,[16] in my view, likely overestimates the risk, perhaps substantially. Certainly, the risk estimates for dentist-to-patient transmission of HIV provided by the American Dental Association[17,18] were several orders of magnitude lower than the CDC estimate used by Sell et al. The CDC estimate itself garnered a fair amount of criticism when it was presented initially. Four additional estimates of the risk for provider-to-patient transmission of HIV have been published[19]; all four suggest that the CDC figure used by these authors likely overestimates the risk.

The authors also include the costs of pre- and post-test counseling in their estimates; however, such estimates rarely include the particularly problematic cases that invariably and inevitably surface in a screening program of this type. In our own experience, these range from individuals with intermittently positive tests to individuals who have consistently indeterminate Western blot results to individuals whose samples are positive in one enzyme-linked immunosorbent assay but entirely negative in another. Such individual and very personal problem cases are labor intense and anxiety provoking both for the involved healthcare worker and for those managing the screening program.

Another factor not considered in the model discussed by Sell et al is the impact that such a screening program (and the consequent restrictions in practice that result from the program) might have on healthcare delivery in areas that have high HIV prevalence. Young surgeons may be less than enamored with the concept of training in high-seroprevalence areas, particularly if an occupationally acquired infection will result in a permanent loss of their careers. Eventually, the number of surgeons available to provide care in high-prevalence areas, both to HIV-infected and uninfected individuals, may be compromised. Although not directly measurable in dollars, such a phenomenon (not at all unlikely, in my view) could have substantial impact on the quality (and ultimately on the cost) of care delivered in high-prevalence areas.

Finally, one might generate concern about the possible impact of screening programs (particularly mandatory programs) on recruitment and retention of high-quality individuals into medicine. One cross-sectional study of senior residents in internal medicine and family medicine in the United States in 1989[20] (well before the Florida dentist case, and well before the publication of the July 1991 CDC guidelines) found that 23% of those who participated in the survey would elect not to care for AIDS patients in their practices and also found that 23% of survey respondents were choosing specific locations for their practices that had a low HIV seroprevalence. One can only imagine what impact mandatory practice restrictions for infected providers might have had on these already discouraging findings. Even some of the most prestigious academic training programs in areas serving large numbers of HIV-infected patients have had relative difficulty attracting high-quality applicants. If

https://doi.org/10.1086/646825 Published online by Cambridge University Press

practice restrictions ultimately are enforced for healthcare providers who harbor certain bloodborne infections, such a requirement clearly could have a substantial adverse impact on recruitment and retention of candidates, especially for professions that routinely involve invasive procedures with their attendant risks for occupational infection with these same bloodborne pathogens.

Several arguments have been put forth in support of a relatively restrictive policy for HIV-infected providers,[21] including the argument that healthcare providers first should do no harm. Such an argument would be cogent, in my view, first, if the risk were more than a negligible one and, second, if other substantially larger risks (eg, medical hypocompetence, drug and alcohol abuse by medical providers) were managed similarly. These latter risks do much more harm in a single year in the United States than might be done by allowing HIV-infected practitioners to perform invasive procedures for their entire careers.

Over the past several years, anxiety and occasionally hysteria, rather than science, appear to have contributed substantially to the shaping of public policy concerning appropriate management of HIV infected providers. Prevention resources are scarce. In my opinion, these dollars should be spent on initiatives that offer clear opportunities to gain substantial returns for these important investments. Healthcare costs continue to escalate; the healthcare industry accounts for an astounding fraction of our gross national product; our society is becoming less and less enamored both with medicine per se and with our current healthcare delivery system; and, at least in the minds of many healthcare providers, the unpleasant specter of externally mandated healthcare reform looms on the horizon. National prevention initiatives must be rational, grounded in science, and able to withstand the test of intense scrutiny with respect to their cost-effectiveness. The thoughtful, rational approach to one aspect of the extremely complex problem of the management of HIV-infected healthcare practitioners provided by Sell et al depicts yet another small ray of hope in the face of our current adversity

REFERENCES

1. Henderson DK. The HIV- or HBV-infected healthcare provider and society's perception of risk: science, nonscience, and nonsense. *Ann Allergy* 1992;68:197-199.
2. Ou C-Y, Ciesielski CA, Myers G, et al. Molecular epidemiology of HIV transmission in a dental practice. Science 1992;256:1165-1171.
3. Ciesielski C, Marianos D, Ou C-Y, et al. Transmission of human immunodeficiency virus in a dental practice. *Ann Intern Med* 1992;116:798-805.
4. Centers for Disease Control. Recommendations for preventing transmission of human immunodeficiency virus and hepatitis B virus to patients during exposure-prone invasive procedures. *MMWR* 1991;40(RR-8):1-9.
5. Bell DM, Shapiro CN, Gooch BE Preventing HIV transmission to patients during invasive procedures. *J Public Health Dent* 1993;53:170-173.
6. Sell RL, Jove11 AJ, Siegel JE. HIV screening of surgeons and dentists: a cost-effectiveness analysis. *Infect Control Hosp Epidemiol* 1994;15:635-645.
7. Phillips KA, Lowe RA, Kahn JG, Lurie P, Avins AL, Ciccarone D. The cost-effectiveness of HIV testing of physicians and dentists in the United States. *JAMA* 1994;271:851-858.
8. Mishu B, Schaffner W. HIV-infected surgeons and dentists: looking back and looking forward. *JAMA* 1993;269:1843-1844.
9. Centers for Disease Control. Possible transmission of human immunodeficiency virus to a patient during an invasive dental procedure. *MMWR* 1990;39:489-493.
10. Rogers AS, Froggatt JW, Townsend T, et al. Investigation of potential HIV transmission to the patients of an HIVinfected surgeon. *JAMA* 1993;269:1795-1801.
11. Dickinson GM, Morhart RE, Klimas NG, Bandea CI, Laracuente JM, Bisno AL. Absence of HIV transmission from an infected dentist to his patients. *JAMA* 1993;269:1802-1806.
12. Von Reyn CF, Gilbert TT, Shaw FE, Parsonnet KC, Abramson JE, Smith MG. Absence of HIV transmission from an infected orthopedic surgeon: a 13-year look-back study. *JAMA* 1993;269:1807-1811.
13. Danila RN, MacDonald KL, Rhame FS, et al. A look-back investigation of patients of an HIV-infected physician. N *Engl J Med* 1991;325:1406-1411.
14. Mishu B, Schaffner W, Horan JM, Wood LH, Hutcheson RH, McNabb PC. A surgeon with AIDS: lack of evidence of transmission to patients. *JAMA* 1990;264:467-470.
15. Centers for Disease Control and Prevention. Update: investigations of persons treated by HIV-infected health-care workers—United States. *MMWR* 1993;42:329-331,337.
16. Centers for Disease Control. Draft-estimates of the risk of endemic transmission of hepatitis B virus and human immunodeficiency virus to patients by the percutaneous route during invasive surgical and dental procedures. Presented at the Open Meeting on the Risks of Transmission of Bloodborne Pathogens to Patients During Invasive Procedures; January 30, 1991; Atlanta, Georgia.
17. Neidle E, American Dental Association. Estimates of the risk of endemic transmission of hepatitis B virus and human immunodeficiency virus to patients by the percutaneous route during invasive surgical and dental procedures. Presented at the Open Meeting on the Risks of Transmission of Bloodborne Pathogens to Patients During Invasive Procedures; January 30, 1991; Atlanta, Georgia.
18. Siew C, Chang SB, Gnminger SE, Verrusio AC, Neidle EA. Self-reported percutaneous injuries in dentists: implications for HBV, HIV transmission risk. *J Am Dent Assoc* 1992;123:36-44.
19. Henderson DK. Human immunodeficiency virus in the healthcare setting. In: Mandell G. Dolin R Bennett L, eds. *Principles and Practice of Infectious 'Diseases.' 4th* ed. New York, NY: Churchill-Livingstone. In press.
20. Hayward RA, Shapiro ME A national study of AIDS and residency training: experiences, concerns, and consequences. *Ann Intern Med* 1991;114:23-32.
21. Henderson DK. Management of health-care workers who are infected with the human immunodeficiency virus or other bloodbome pathogens. In: DeVita V, Hellman S, Rosenberg S, eds. *AIDS-Etiology, Diagnosis, Treatment,* and Prevention. 3rd ed. Philadelphia, PA: Lippincott Co; 1993.