HIV/AIDS and Infection Control Practices in Dentistry: A Rebuttal

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I appreciate the opportunity of responding to the article by Dr. Nutt and her colleagues. Their purpose is to prove that the epidemiology of HIV/AIDS in Canada justifies current infection control policies for dentistry. Their article contains confusing statistics and broad generalizations, but no specific clinical evidence to substantiate the application of recommended infection control practices for the prevention of HIV/AIDS transmission during dental treatment. Accordingly, it is submitted that the correspondents have failed to achieve their objective.

To justify their thesis, the authors have chosen an eclectic mix of topics: HIV and AIDS, the epidemiology of HIV/AIDS in Canada, the pandemic of HIV/AIDS, the HIV test, HIV transmission, and infection control and dentistry. Brief but salient critiques of these subjects are presented below; however, the major focus of the rebuttal is on establishing the inadequacies that exist in dental infection control policies relating to HIV/AIDS transmission.

HIV and AIDS

In 1973[1] it was established that retroviral isolation and purification must be based on certain laboratory procedures. These procedures include the density gradient ultrafugation of the specimen suspected of containing the retrovirus (e.g., HIV), the selective extraction from the resulting solution of the band having a density gradient of 1.16 gm/mL, and then the electron microscopic examination and photomicroscopy of this isolate. The electron photomicrographs published by Barré-Sinoussi and Gallo are of unpurified cell cultures or of stimulated cell cultures and are not the contents of a band clearly described as having the critical density gradient of 1.16 gm/mL. To date, Barré-Sinoussi has not fulfilled the criteria for HIV isolation.

In a 1997 interview, Montagnier[2] (Barré-Sinoussi's supervisor) admitted that "we did not purify" HIV. Dr. E. de Harven,[3] Emeritus Professor of Pathology, University of Toronto (whose résumé includes appointments at the Sloan-Kettering Institute, Toronto General Hospital, pioneering work in retrovirology and associate editorships of *Virology* and *Cancer Research*), observed in 1998 that neither Gallo nor any other investigator had produced "electron micrographs of retrovirus looking objects in uncultured plasma of a single AIDS patient, or … [had] obtained 'HIV isolates' from uncultured plasma." Dr. de Harven[4] is of the opinion that "neither electron microscopy nor molecular markers have so far permitted a scientifically sound demonstration of retrovirus isolation directly from AIDS patients." This absence causes Dr. de Harven[4] to conclude, "Obviously, the HIV/AIDS hypothesis has to be scientifically reappraised." This opinion, from an eminent scientist with strong connections to Canadian and international medical research, questions the validity of the etiology, pathogenesis and treatment of AIDS as expressed by Dr. Nutt and her co-writers.

The Epidemiology of HIV/AIDS in Canada

The figures appearing in this section require clarification if they are to be understood in a rational context.

The number 20,000 is for the estimated total of all AIDS cases occurring in Canada during a *19-year* period, i.e., from 1979 until 1997. This figure approximates the number of Canadian women *per year* diagnosed as having breast cancer and is considerably less than the 45,000 Canadians who die of heart failure *each year*.[5] Health Canada records[6] indicate that about 70% of the 20,000 cases have died. Therefore, the chance of the average family dentist treating an AIDS patient is far lower than the already minimal opportunity as may be extrapolated from the ratio of 67 per 100,000 as quoted by the authors. The true ratio may be as low as 20 per 100,000 population, and it is this lower figure that should have been given when relating the epidemiology of AIDS to the clinical practice of dentistry.

Using the figures given by Dr. Nutt and employing simple mathematics, 33,191 individuals tested positive for HIV infection during the period of 1985 to 1994. This is a yearly average of 3,319 cases. According to Dr. Nutt, 2,830 new positives occurred per year from 1995 to 1997, which represents a 15% decrease from the previous yearly experiences of HIV infection. This positive news negates the idea of a continuing HIV epidemic, but is ignored by Dr. Nutt in her attempts to demonstrate that the demographics of HIV-positive individuals are changing.

The figures presented by Dr. Nutt to justify this shift are confusing and inappropriate. She states that in 1997 the spectrum of HIV-positive individuals was composed of 37.6% homosexual men, 21.8% heterosexuals, 21.8% women and 33.2% injection drug users. This produces a total of 114.4%, which indicates a failure by the authors to recognize the heterogeneity of risk factors existing within these four groups. For example, among the injection drug users there are men and women, among the women there are those who are injection drug users or who have sex with at-risk bisexual men, and among the heterosexuals there are men and women who have sex with partners who have established risk factors. If Dr. Nutt had stratified the HIV figures according to single risk categories, the results would demonstrate no increase in HIV-positive rates among heterosexual Canadians with no risk factors, who constitute the overwhelming majority of the adult population. Dr. R. Mathias,[7] a virologist and epidemiologist at the University of British Columbia, has stated categorically, "There is no heterosexual spread of AIDS."

It is necessary to emphasize that the HIV test does not confirm the presence of HIV. Rather, it confirms the existence of markers that may (or may not) be surrogate identifiers for the virus.

In their haste to alter the epidemiology of HIV/AIDS, the authors have ignored the irony that a movement of HIV/AIDS from its traditional risk groups would not vindicate the credibility of preventive programs enthusiastically endorsed by their employers and funded by Canadian taxpayers.

HIV/AIDS — A Pandemic

The figure of 8.2 million children orphaned by AIDS is sad but grossly misleading unless it is accompanied by the number of children made parentless by malaria, tuberculosis, starvation, poverty, war and natural disasters, all of which have plagued Africa for years.

Three significant circumstances have eluded Dr. Nutt and her colleagues. The first is the status of health care in underdeveloped countries such as sub-Saharan Africa. In those locations, national figures on HIV/AIDS are based on inappropriate extrapolations from hospitalized patients and clients of STD clinics. The second circumstance is that most of the testing in Africa is unsupervised, not validated and conducted in dysfunctional laboratories using out-of-date reagents. The third is that the World Health Organization's clinical case definition for AIDS in Africa permits the diagnosis to be made based on the presence of weight loss, chronic diarrhea, prolonged fever and persistent cough. These conditions are neither new nor uncommon in Africa, Asia or India.[8-10] Thus, the numbers quoted by the authors should be considered from a critical and sceptical perspective.

While I do not wish to denigrate the occurrences in Africa, the epidemiology of HIV/AIDS there and in other foreign countries has a minimal influence on the infection control practices of Canadian dentists.

The HIV Test

It is necessary to emphasize that the HIV test does *not* confirm the presence of HIV. Rather, it confirms the existence of markers that may (or may not) be surrogate identifiers for the virus.

Highly specific antigen–antibody reactions do occur, for example, between hepatitis B (the antigen) and its vaccine (the antibody). However, antigens and antibodies having similar but not uniquely specific characteristics attract one another, creating the situation of cross-reactivity. Until HIV is isolated and purified from infected cases, it is impossible to determine if the antibody reactions to it are truly specific or examples of cross-reactivity. According to Dr. de Harven,[4] "Back in 1993 it became clear that the so-called HIV antibody tests badly lacked specificity, cross-reactivity being observed with patients suffering from a long list of pathological conditions." Therefore, the value of HIV tests must be questioned no matter how often they are performed on a single sample.

Dr. Nutt and her fellow writers believe that a test that is 99.9% accurate limits "the opportunity for either false negative or false positive results." A simple calculation demonstrates the inaccuracy of this statement:

The specificity of a test is its ability to recognize individuals who do not have the condition. An accuracy of 99.9% means that the test will fail to identify that 0.1% of the subjects do not have the disease. These people will be recorded as positive responders, when in reality they are false positives. For the purposes of this calculation, it will be assumed that Canada has a population of 30,003,000 and that there are 3,000 new cases of HIV infection per year. If the entire population was tested, the results should identify the 3,000 truly positive individuals. However, since the test is not 100% accurate, it would fail in 0.1% of tests on the remaining 30,000,000 to recognize that they do not have the infection. Unfortunately, 0.1% of 30 million is 30,000. Therefore, for the 3,000 true positives that the test would reveal, it would falsely identify 30,000 Canadians as being infected. A ratio of 10 to one in favour of false positives is unacceptable considering the emotional, financial and medical burdens that accompany the diagnosis of HIV infection and, by extension, AIDS.

The calculation demonstrates the inherent liabilities of tests that rely upon possible markers for a micro-organism rather than the verifiable presence of the causative agent.

Readers will appreciate that these details cast doubts on all of the predictions concerning AIDS derived from the results of current HIV tests.

HIV Transmission

The information Dr. Nutt presents on HIV transmission contradicts her stated objective. Surely she or at least one of her colleagues realizes that her proclaimed major routes for HIV transmission, i.e., unprotected sex and needle sharing, are quite simply *not* within the scope of practice of dentists or their professional ancillaries. She admits that HIV is not a virile pathogen, and her remarks on hepatitis B, tuberculosis, herpes simplex virus and streptococcus have minimal relevance to a discussion on the epidemiology of HIV/AIDS and infection control policies in dentistry. Dr. Nutt must be aware of a recent comprehensive report by respected infection control practitioners[11] that emphasizes that hepatitis B virus should not be used as a model on which to base policies and procedures relating to HIV. Quite frankly, the paragraph has no details to support Dr. Nutt's contention that HIV "has important implications for infection control practices in dentistry" — the object of her final section.

Infection Control Practices in Dentistry

Despite its title and length, this section of Dr. Nutt's article contains only two brief references to dental issues; otherwise, it is a mixture of generalizations that fail to substantiate the writers' brief. Instead, the authors defuse their entire argument by admitting that "the risk of contracting HIV in the dental care setting is small." This is the crux of the discussion and the most significant comment in their article. However, before analyzing this opinion, it is necessary to place the Florida case in a realistic perspective.

In 1993, Gooch and others[12] concluded that there was in Dr. Acer's practice no evidence of HIV transmission occurring through patient-to-patient contact or via dental handpieces, prophylaxis angle handpieces, disposable needles or anesthetic carpules. Jaffe, the senior U.S. government official charged with investigating the transmission, expressed his frustration at the absence of a plausible route when he said, "With Acer all the possibilities we are picking over seem to be wrong, and yet, one has to be right. I wish I knew which one."[13] Following a lengthy, comprehensive and objective assessment of the circumstances, the United States General Accounting Office[14] concluded that since the precise route of transmission remained unknown, the Florida case should *not* be used as a model on which to base policies and procedures designed to prevent HIV transmission in dental practices. This wise advice has been ignored by the correspondents, who, without offering any new evidence, believe that this unexplained phenomenon should be the foundation for dental infection control.

In 1997, Laxton[15] indicated that the roots of infection control "are found in the very specific task of identifying, controlling, and preventing outbreaks of infection originating in hospitals, generally referred to as nosocomial infections." It is eminently rational that control of an infection cannot be achieved until it is defined and diagnosed, its transmission route identified, at-risk patients and procedures recognized and theoretical control techniques proven to be clinically effective, practical, safe and economically viable. Infection control practices in dentistry should be based on the same principles. In considering HIV, the first step is to determine whether it induces a nosocomial infection of dental origin according to the characteristics of such infections as established by the Centers for Disease Control in 1988.[16] To date, the documented instances of HIV infection relating to dental treatment do not satisfy these criteria. Even if HIV was a dental nosocomial infection, its route of transmission during dental care has not been discovered, and no attempt has been made to identify which categories of patients or procedures are associated with definite risks of acquiring HIV infection during dental treatment. Dr. Nutt and her colleagues admit that the risk of HIV transmission during dental treatment is small, but in the absence of the above crucial information, they are unable to quantify the magnitude of that risk. Without such a figure, it is impossible to determine the effectiveness of any preventive strategies.

This conclusion begs two questions that are vitally important to the relationship between HIV and infection control in the dental office: 1. To what level of occurrence should the small risk of transmission be reduced to justify the efforts and costs involved in achieving these lower levels, assuming that they can be measured? 2. In the absence of reliable methods for testing the usefulness of current recommendations, is it morally and ethically justified to suggest that these techniques are effective?

These are the crucial questions that Dr. Nutt and her colleagues have failed to answer. Accordingly, their treatise on the epidemiology of HIV/AIDS provides no evidence in support of official recommendations for infection control in dentistry. Not surprisingly, their numerous comments, opinions and statistics have provided no solution to the infection control puzzle.

Closing Remarks

Drs. Nutt, Ellis and Burry believe that alternative ideas on the cause of AIDS were abandoned in 1984 with the discovery of HIV. This is far from the truth. There have always been individuals who do not accept the popular opinion that HIV induces AIDS. Since the late 1980s and with increasing influence, an international group of prominent scientists (including Nobel laureates), medical researchers, lawyers, politicians and informed laypersons has had the courage, wisdom and tenacity to challenge the official dogma on HIV and AIDS. In the process it has amassed a considerable volume of pertinent literature. Access to these alternative ideas permits dentists to develop informed opinions on the enigma of HIV/AIDS and allows them to be better able to respond to patients' questions and the demands of regulatory agencies. ➧

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