

# The Truth About HIV/AIDS and Infection Control Practices in Dentistry

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We are writing in response to a lecture given by Dr. John Hardie on infection control at the Ottawa Hospital, Civic Campus, on September 23, 1998. Dr. Hardie is currently chief of dentistry at the King Fahad National Guard Hospital in Riyadh, Saudi Arabia, and a frequent contributor to the *Journal of the Canadian Dental Association*. He is known to many in the dental profession for his criticism of current infection control guidelines as they apply to dentistry. During his lecture, Dr. Hardie made reference to his theories on the HIV/AIDS epidemiology, which include, among other things, a rejection of the theory that HIV causes AIDS. While different opinions ought to be respected, it is imperative that dental practitioners have a clear understanding of HIV and AIDS epidemiology before considering any changes to widely accepted infection control measures. For this reason, and in response to many of the claims made by Dr. Hardie during his lecture, the Region of Ottawa-Carleton health department would like to take this opportunity to review the epidemiology of HIV/AIDS for *Journal* readers as it pertains to current infection control policies and procedures in dentistry.

## HIV AND AIDS

The first report of a new immunodeficiency syndrome appeared in the Centers for Disease Control and Prevention's (CDC) *Morbidity and Mortality Weekly Report* in June 1981. The report described five young homosexual men in Los Angeles with *Pneumocystis carinii* pneumonia.<sup>1</sup> Shortly thereafter, the CDC published reports of opportunistic infections among Haitian immigrants and hemophiliacs and in an infant who had received a blood transfusion in San Francisco in late 1982.<sup>2</sup> The prevalence of the infection among homosexual men and recipients of blood transfusions led researchers to suspect a blood-borne and/or sexually transmitted link. In 1983, French researcher Françoise Barré-Sinoussi isolated the HIV. In 1984, four reports were published in *Science* by Robert Gallo and colleagues, providing the strongest evidence that HIV was in fact the AIDS virus.<sup>2</sup>

Since the early 1980s, researchers have acquired substantial, credible scientific evidence to support the hypothesis that HIV causes AIDS. First, HIV infection is always found in AIDS cases when such information is sought.<sup>3,4</sup> Second, the virus can be grown in pure culture from persons who have the disease. Third, the natural history of HIV infection, and the progression of the disease to AIDS, is well understood and comprehensively documented in the medical literature. Indeed, knowledge of the natural history of HIV infection has facilitated the development of new therapies which, in recent years, have helped prolong the lives of many persons living with HIV/AIDS. Finally, studies of AIDS cases among recipients of blood transfusions have documented the transmission of HIV from infected (i.e., HIV-positive) blood to uninfected persons who subsequently developed the disease.<sup>3</sup>

## THE EPIDEMIOLOGY OF HIV/AIDS IN CANADA

The epidemiology of HIV and AIDS in Canada has changed substantially over the last decade. As of December 31, 1997, a total of 15,528 cumulative AIDS cases had been reported.<sup>5</sup> The total number of AIDS cases, after adjustment for reporting delay, is estimated to be 20,000 (67 per 100,000 population). The trend in delay-adjusted AIDS cases peaked at about 2,200 cases per year in 1993, then declined gradually until 1995, when it began a sharp decline.<sup>5</sup> The decrease in the number of reported AIDS cases in recent years is attributed to new therapies that delay the onset of AIDS among HIV-positive persons. Another reason may be decreased reporting by physicians and other health care workers. New treatments that delay or prevent the development of AIDS have made it more difficult to rely on AIDS incidence as an indicator of the extent of HIV disease in Canada. Consequently, HIV laboratory test reports have become an important source of information concerning HIV in Canada.

According to Health Canada statistics up to December 31, 1997, it is estimated that 41,681 individuals in Canada tested positive for HIV infection, with an average of 2,830 new positive test reports per year from 1995 to 1997.<sup>6</sup> In recent years,

the demographic profile of the population living with HIV/AIDS has changed. In the 1985-1994 testing period, men who have sex with men (MSM) accounted for 74.6% of positive HIV test reports. In 1997, MSM accounted for 37.6% of HIV-positive reports while heterosexual contact accounted for 21.8% of positive test reports. During the 1985-1994 testing period, heterosexual contact accounted for 7.4% of all positive test reports. Rates of HIV infection among women and injection drug users, as a percentage of the total population of HIV-infected individuals, have also increased, from 9.8% and 8.4% for 1985-1994 to 21.8% and 33.2% respectively in 1997.<sup>6</sup> Therefore, while the incidence of AIDS may be declining in Canada, the epidemic is affecting new populations, with a significant increase in the incidence of HIV infection among heterosexuals, injection drug users and women.<sup>6</sup>

### HIV/AIDS — A PANDEMIC

The Joint United Nations Program on HIV/AIDS estimates that there are currently 30.6 million people living with HIV/AIDS.<sup>7</sup> Of these, approximately 1.1 million are children under the age of 15.<sup>8</sup> There are 8.2 million children in the world today orphaned by AIDS. One of every three orphans is under the age of five.<sup>9</sup> Over 90% of persons living with HIV/AIDS are in developing countries, of which 20.8 million live in sub-Saharan Africa. Half of all HIV/AIDS infected persons in Africa are women, with heterosexual sex being the main mode of transmission. Globally, women are becoming increasingly affected by HIV and now account for approximately 41% of all HIV/AIDS cases. In the United States alone, estimates suggest that 650,000 to 900,000 Americans are now living with HIV, with at least 40,000 new infections occurring each year.<sup>10</sup>

### THE HIV TEST

The HIV test is a blood test that confirms the presence of HIV antibodies. The test is done in two parts — the enzyme-linked immunosorbent assay (ELISA test) followed by the Western Blot. The ELISA test is considered a screening test, while the Western Blot is a confirmatory test.<sup>11</sup> When a sample tests positive by ELISA, the test is repeated on the same blood sample. If an ELISA yields two positive results, then Western Blot is used to distinguish between HIV antibodies and other antibodies that may react to the ELISA. Together, *the two tests are more than 99.9% accurate*,<sup>12</sup> limiting the opportunity for either false negative or false positive results.<sup>13</sup> Indeed, the HIV test is among the most accurate screening tests used in medicine.

### HIV TRANSMISSION

HIV is mainly spread by having unprotected sex or sharing needles with an infected person. Other sources of transmission include the spread to newborn infants from infected mothers and, although rarer now, through transfusions of infected blood or blood products. HIV is found in the blood, semen or vaginal secretions of an infected person.<sup>14</sup> HIV transmission is very unlikely following exposure to non-bloody body fluids. However, non-bloody body fluids can spread other important

diseases, such as hepatitis B, tuberculosis, herpes simplex and streptococcus. Unlike other viruses, such as hepatitis B, HIV does not survive well outside the body.<sup>15</sup> While hepatitis B can survive on surfaces in a dried state for up to one week, laboratory studies have found that drying HIV reduces the viral amounts in a sample by 90 to 99% within several hours.<sup>15</sup> This has important implications for infection control practices in dentistry, in terms of the risk of transmission to both health care workers and patients.

### INFECTION CONTROL PRACTICES IN DENTISTRY

HIV transmission from a health care worker to a patient was first documented in 1990, when a Florida dentist was found to have transmitted HIV to six patients.<sup>15</sup> More recently, one patient in France developed HIV following prolonged orthopedic surgery.<sup>15</sup> From 1992 to 1996 in Toronto, 75 people developed hepatitis B following electroencephalography (EEG) with subdermal needle electrodes. The cause of the outbreak was attributed to poor infection control practices and an EEG technician who was a carrier of hepatitis B.

The risk of contracting HIV and other diseases from blood-borne transmissions in the health care setting is not limited to patients. The CDC estimates that, in the United States, up to 5,000 HIV exposures may occur among health care workers annually.<sup>16</sup> Whether an exposure results in the transmission of HIV depends on a number of factors, including the amount of blood or volume of HIV exposure (i.e., the viral load), the kind of exposure (e.g., needlestick versus mucous membrane), the depth of the injury and/or wound, the invasiveness of the procedure performed on the infected patient before the injury, and the duration of contact. Data from several large studies indicate that, on average, there is a 0.3% risk of HIV infection after a needlestick or similar percutaneous exposure to HIV-infected blood.<sup>17</sup> While this risk is perceived by many to be quite small, there is good evidence to suggest that following universal precautions, including the use of gloves, will reduce the probability of transmission even further. Laboratory models of needlestick exposure have demonstrated that 50% of the blood in hollow needles and 80% in suture needles may be effectively removed when the needle passes through one or more layers of latex or vinyl gloves contacting the skin.<sup>18</sup> Canadian guidelines to reduce the transmission of blood-borne pathogens from patient to health care worker can be found in *An Integrated Protocol to Manage Health Care Workers Exposed to Bloodborne Pathogens*.<sup>19</sup>

While the risk of contracting HIV in the dental care setting is small, infection control practices are based not only on the risk of HIV exposure, but also on the risk of transmission of other important pathogens such as hepatitis B virus (HBV), hepatitis C virus (HCV), tuberculosis, cytomegalovirus, Epstein-Barr virus, herpes simplex virus and many others infections.<sup>20</sup> Transmission of HIV and other illnesses can occur when an individual comes into contact with infected blood and/or other body fluids. It is essential, therefore, that every effort be made to protect both health care workers and patients from exposure to serious and potentially life-threatening illnesses in dental practices

and other health care environments. For this reason, the Health Protection Branch of Health Canada provides infection control guidelines to all health care workers to reduce the risk of occupational transmission of blood-borne and other pathogens.<sup>21</sup> These guidelines are based on a consensus review of all the data currently available on HIV, HBV and HCV in Canada, and reflect both national and international expert opinion on the issue of infection control. Indeed, adherence to these guidelines is the safest and most effective way of reducing the risk of exposure to HIV and other serious infections in dentistry. Furthermore, health care workers have an ethical and legal obligation to ensure that patients are protected from avoidable harm in the health care setting, including exposure to HIV infection.

In conclusion, HIV is an important illness in our communities and the evidence of its existence, and its relationship to the development of AIDS, cannot be disputed. Theories surrounding alternative (i.e., non-HIV) causes of AIDS were largely abandoned in the mid-1980s, as more evidence became available linking HIV with AIDS. Furthermore, there is overwhelming evidence that the epidemiology of AIDS in Canada is changing, with transmission via heterosexual intercourse and injection drug use becoming increasingly more common.

Infection control measures are designed to reduce the risk of transmission of blood-borne and other pathogens from health care workers to patients, patients to health care workers, and patients to patients. Adherence to these guidelines is the safest and most effective way for dentists to protect themselves and their patients. Failure to comply with current Canadian infection control standards not only compromises public health and safety, but carries specific professional penalties as well. Any breach of generally accepted standards may be considered professional misconduct with the possibility of disciplinary action by provincial/territorial dental regulatory bodies. Similarly, failure to comply with generally accepted standards of care may lead a patient to take legal action against a health care worker, particularly if that patient developed a serious illness in a setting where such standards were not followed.

We would strongly urge anyone who attended Dr. Hardie's lecture on infection control, either in Ottawa or elsewhere, to conduct their own review of the literature on HIV/AIDS. Information is available from your local health department, Health Canada ([www.hc-sc.gc.ca](http://www.hc-sc.gc.ca)), the CDC ([www.cdc.gov](http://www.cdc.gov)), the World Health Organization ([www.unaids.org](http://www.unaids.org)), the Canadian Dental Association and provincial/territorial dental regulatory bodies. ♦

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*The views expressed are those of the authors and do not necessarily reflect the opinion or official policies of the Canadian Dental Association.*

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