

A STRATEGY TO STOP HIV AND AIDS

THE BRITISH COLUMBIA EXPERIENCE



BRITISH COLUMBIA
CENTRE *for* EXCELLENCE
in HIV/AIDS

Treatment of HIV/AIDS

While an outright cure or a preventive vaccine for HIV/AIDS remains elusive, remarkable advances in HIV treatment have been achieved over the past two decades. Most significant among these advances is the development of highly active antiretroviral therapy (HAART). HAART is a combination of antiretroviral drugs that can fully suppress HIV replication and therefore renders the number of viral copies present in a patient's blood undetectable, as measured by commercially available plasma viral load assays.

In 1996, at the International AIDS Conference in Vancouver, two international clinical trials, INCAS1 and Merck 035,² were presented demonstrating that HAART could drive plasma HIV viral load to undetectable levels on a sustained basis. Key evidence was also presented demonstrating that undetectable plasma HIV viral load was an independent predictor of disease free survival among untreated HIV infected individuals within the MACS cohort.³ As a result, HAART emerged as the new standard of care for the treatment of HIV infection.

Within months HAART use significantly reduced morbidity and mortality among treated patients, allowing dramatic improvements in the quality and duration of life for HIV-infected individuals. In B.C., by 1999, (within three years of the establishment of the provincially funded HAART program) the BC Centre for Excellence

in HIV/AIDS (BC-CfE) documented an 85% reduction in HIV/AIDS mortality among patients engaged in treatment.

HAART uptake today remains suboptimal, even in Canada despite the subsidized nature of our health programs. This is particularly apparent among hard to reach individuals who often have additional challenges related to drug dependency, mental illness, limited education, unstable housing and co-morbidities. Particularly affected are Aboriginal peoples who have greater risk of HIV infection and greater AIDS mortality than non-aboriginals in Canada.⁴⁻¹⁰

Treatment as Prevention (TasP)

It has long been suspected that antiretroviral therapy (ART) can impact HIV transmission. This has been under consideration since ART first emerged in the 80's. While it has been clear that biologically ART can decrease HIV transmission, there has been a longstanding concern that this effect could be overwhelmed by increased risk behaviors, also commonly referred as behavioral disinhibition, risk overcompensation or therapeutic optimism.

However, shortly after the initial roll out of HAART in 1996, ecological data from Taiwan and British Columbia suggested that HIV new diagnoses had decreased in

an unexpected fashion. Most intriguingly, in British Columbia, the effect of HAART on HIV new cases was apparent despite the steady rise in syphilis rates. At the same time, it became clear that HAART had the potential to eliminate vertical transmission of HIV. Taken together, these data suggested that HAART could be much more effective in reducing HIV transmission at the population level than it had been previously suspected.

These observations fueled the interest of the BC-CfE to further explore the potential of HIV treatment as prevention. The latter was addressed using demographic and mathematical models, which surprisingly suggested that maximal coverage with HAART could lead to the near elimination of HIV transmission. These results were published in the *Lancet* in 2006,¹¹ and presented at the same time at the International AIDS Conference in Toronto. Our models further suggested that HAART expansion in addition to preventing AIDS morbidity and mortality would become *cost-averting* as it would virtually eliminate HIV transmission by all routes.¹²⁻¹⁴

The powerful and sustained ability of HAART to suppress viral replication is responsible for the decrease risk of HIV transmission among treated HIV positive individuals. Evidence to support this association can be readily found in vertical transmission studies where the use of HAART has led to the near complete prevention of transmission of HIV from the infected mother to the

newborn.¹⁵⁻¹⁸ Further, among sero-discordant couples (one infected and one uninfected partner) transmission is a direct function of the level of viremia in the infected member of the couple, and this is effectively decreased to very low levels with HAART thereby dramatically reducing risk of transmission.¹⁹⁻²⁴ Most notably, the HPTN 052 trial among 1763 sero-discordant couples found that immediate ART initiation (i.e., CD4 count 350-500/mm³) led to a 96.3% reduction in HIV transmission.²⁵

There is also strong evidence of the impact of HAART in the prevention of HIV transmission derived from cohort and population based studies. BC-CfE published the first study suggesting a key role of HAART in the prevention of HIV transmission in injection drug users in the Downtown Eastside of Vancouver.²⁶ In addition, reductions in community viral load due to the expansion of ART coverage have been associated with a decreasing number of new HIV diagnoses in several jurisdictions, including Taiwan;²⁷ British Columbia, Canada;^{11,28} and San Francisco, USA.²⁹ At the population level, the BC-CfE has documented expanded HAART uptake was associated with a 52% reduction in HIV incidence in B.C. between 1996 and 2009 when HAART was first introduced in B.C.²⁸

HIV Treatment as Prevention was initially regarded as controversial; however, this notion has gained the

support of the international community, including the World Health Organization (WHO) and the Joint United Nations Programme on HIV/AIDS (UNAIDS).³⁰ Indeed in 2009, the AIDS program at WHO published a paper in *The Lancet*, which independently validated this approach.³¹ In February 2009, an international summit in Vancouver co-convened by the International AIDS Society, the World Bank and the Global Fund, with support from the Public Health Agency of Canada and with participation of WHO, UNAIDS, PEPFAR, the Clinton Health Initiative, Médecins Sans Frontières, the National Institutes of Health, and international research-based pharmaceutical industries, among other key international stakeholders, charted the course for further expansion of HAART in the developing world aimed to simultaneously maximize the impact of HAART on AIDS related morbidity and mortality as well as HIV transmission. Subsequently, in May of 2011 experts from around the world met again in Vancouver at the 1st Annual International HIV Treatment as Prevention Workshop to continue to build the momentum around Treatment as Prevention.

Seek & Treat for Optimal Prevention of HIV/AIDS (STOP HIV/AIDS)

BC continues to expand its HIV Treatment as Prevention efforts. This is aimed to decrease HIV/AIDS-related

morbidity and mortality as well as HIV new cases in the province. In addition to promoting traditional prevention strategies, including education, condom use, and behavior change, HIV Treatment as Prevention in BC promotes HIV testing and expanded access to HAART under the BC-CfE Treatment Guidelines, which are consistent with the IAS-USA 2010 Guidelines.

The Seek and Treat for Optimal Prevention of HIV/AIDS (STOP HIV/AIDS) initiative launched in 2009 has been nested within the province's HIV Treatment as Prevention efforts to specifically evaluate the impact of enhanced outreach efforts within two highly affected communities, the Downtown East Side in Vancouver, and Prince George, in the North of BC.

STOP HIV/AIDS is a four-year pilot project primarily supported by a \$48-million funding commitment by the Government of British Columbia. Partners of the pilot include the BC-CfE, Vancouver Coastal Health, Northern Health, Provincial Health Services Authority, and Providence Health Care. Additional research funding has been provided by the National Institute of Drug Abuse at the US-NIH, the Canadian Institutes of Health Research, Merck, Gilead, ViiV, and BMS. To learn more, visit our [STOP HIV/AIDS Website](#).

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