



## Epidemiologic Notes & Reports

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### The World Needs an HIV Vaccine

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Despite the availability and success of HIV antiretroviral treatment, the best hope for controlling the AIDS epidemic worldwide is the development of a safe, effective and affordable vaccine (1).

#### Response to the Need for HIV Vaccine Development

In May 1997, President Bill Clinton established a national goal to develop a vaccine to prevent AIDS within the next 10 years. In 1998, the Presidential Advisory Council on HIV/AIDS (PACHA) recommended to the President that all federal agencies, including The Centers for Disease Control and Prevention (CDC), should lend their experience and expertise to the development of an HIV vaccine and its evaluation. PACHA stated such support would be needed if the goal of developing an HIV vaccine were to be achieved.

The CDC heard PACHA's cry. The National Institute of Allergy and Infectious Disease (NIAID) is the lead institute at the National Institutes of Health (NIH) for HIV vaccine research. Dr. Anthony S. Fauci, director of NIAID, discussed key challenges in the search for a vaccine against HIV and restated the commitment of NIH to HIV vaccine development at the AIDS Vaccine 2001 meeting. To increase the pace of HIV vaccine discovery, NIH continues to increase HIV vaccine research funding. In 2002, over \$550 million was made available for HIV vaccine research and development, with research and development now being conducted by researchers from not-for-profit, public and private academic institutions (2).

In 2000, NIAID launched the HIV Vaccine Trials Network (HVTN), a global research network that will conduct clinical HIV vaccine research. The HVTN has already provided a wealth of data that

contributes to many researchers' optimism that a safe and effective HIV vaccine can be developed.

Another valuable initiative of NIAID is the Comprehensive International Program of Clinical Research on AIDS (CIPRA). This program will provide long-term support in international settings for fundamental laboratory and clinical studies of HIV/AIDS, especially in developing regions.

A third NIAID funded program on the NIH campus of the Vaccine Research Center (VRC) is investigating a candidate HIV vaccine. The VRC conducts all stages of HIV vaccine research, from basic investigations to clinical trials. In 2001, the VRC began its first clinical trial of a candidate HIV vaccine, producing small amounts of the HIV proteins, but not the intact virus.

#### Challenges to Developing an HIV Vaccine

According to the 2002 Jordan Report, several challenges exist in developing an HIV vaccine. The Jordan Report states that "in order to develop an effective HIV vaccine, researchers still need to improve upon current vaccine designs so that they will induce broadly reactive, long-lasting neutralizing antibodies and cellular responses. Once a vaccine demonstrates the ability to protect humans against HIV, it is likely that researchers will have a better opportunity to recognize the type, magnitude, breadth, and/or location of the immune responses associated with that protection."

Researchers need to understand that while the ideal vaccine is one that completely protects individuals from HIV infection (sterilizing immunity), it is more likely that the first HIV vaccine will allow an individual to remain healthy if infected after receiv-

ing the vaccination (controlled infection). The hope is that even if the vaccine cannot prevent infection, it can keep HIV levels low enough in the vaccine recipient that the recipient is not able to infect others. The greatest public health value of a vaccine will be in its ability to prevent transmission (3).

“Perhaps the greatest obstacle to HIV vaccine development is an insufficient understanding of the correlates of immune protection, which are better understood for other viral diseases,” said Dr. Fauci. Fauci added, “Among many challenges, it is essential to further illuminate the roles of cytotoxic T lymphocytes and antibodies in HIV disease. Other important challenges to HIV vaccine development include the high rate of HIV mutation within populations and individuals, the limitations of all current animal models of HIV disease, and the fact that HIV integrates itself into the DNA of host cells, where it can escape immune surveillance” (4).

**The Development of a Safe and Effective HIV Vaccine**

According to NIAID, there is reason for hope that such an HIV vaccine can be developed, despite the challenges of developing a safe and effective HIV vaccine. One of the most promising facts is that the human immune system has the ability to control HIV under certain circumstances. For example, in most individuals with acute HIV infection, the immune system is capable of significantly down-modulating the burst of viremia found in the weeks immediately following infection. Additionally, a small subset of HIV-infected individuals shows little or no immune system deterioration and low levels of viral replication even after 15 or more years of infection, without the introduction of antiretroviral therapy. These examples and others continue to provide clues regarding the immune responses needed in a vaccine.

While difficult, findings suggest that the problem of viral diversity may not be insurmountable. According to NIAID, experimental vaccines have shown to have protection in animal models of AIDS. Further, in Phase I and Phase II human trials, candidate HIV vaccines have been well-tolerated and immunogenic. In human studies, an-

tibodies that can neutralize a broad spectrum of HIV subtypes have been observed.

**Conclusion**

Even in the face of continuing challenges, new scientific and technological information continues to enhance the field of HIV vaccine research. While the data from many studies are promising, a greater diversity of vaccine approaches is being tested, in addition to a historic number of products in the pipeline. For these reasons, there is sound confidence that the goal of identifying a safe and effective vaccine is now within our reach.

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In the April 2005 edition, we had a misprint in the Table 1 rabies chart listed on page 2. The total for the Number Positive column should read **23**.

## New Center Promotes Smoke-Free Policies in Kentucky Communities

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While most people recognize that secondhand smoke is harmful, most do not know the real extent of the danger. Secondhand smoke exposure is the third leading cause of preventable death following active smoking and alcohol abuse (1). Although many states and local communities have adopted strong workplace smoking restrictions, the tobacco-growing states lag behind in protecting workers from the dangers of secondhand smoke (2). In July 2003, the Lexington-Fayette Urban County Council passed Kentucky's first smoke-free law by an 11 to 3 vote, after a 2 ½-year education and advocacy campaign. The law was legally challenged with funding from the tobacco and alcohol industries and delayed in the Kentucky Court of Appeals. The Kentucky Supreme Court ruled in favor of the law, and it was implemented on April 27, 2004. The law prohibits smoking in most public places including, but not limited to, restaurants, bars, bowling alleys, bingo halls, convenience stores, laundromats, and other businesses open to the public. Compliance with the law is complaint-driven with fines beginning at \$100 for the first offense; \$250 for the second offense; and \$500 for the third and subsequent offenses.

### What are the Dangers of Secondhand Tobacco Smoke?

Secondhand smoke contains more than 4,000 chemicals (3). Sixty are known or suspected cancer-causing agents and more than 100 are chemical poisons. Some of the toxic poisons in secondhand tobacco smoke include acetone, ammonia, arsenic, benzene, butane, cadmium, carbon monoxide, DDT, ethanol, formaldehyde, hydrogen cyanide, lead, mercury, methanol, naphthalene, tar, toluene, and vinyl chloride. There is no safe level of exposure to firsthand or secondhand tobacco smoke.

### Why is Exposure to Secondhand Smoke a Worker Health Issue?

Servers exposed to secondhand smoke have the greatest risk of developing lung cancer and heart disease compared to other occupations (4-8). The

levels of secondhand tobacco smoke in restaurants and bars are 1.6 to 6 times higher than in office workplaces (9). The short-term effects of secondhand smoke exposure on worker and patron health is dramatic. Only five minutes of exposure stiffens the aorta as much as smoking a cigarette. Twenty minutes of exposure causes excess blood clotting, increasing the risk of heart attack and stroke. Thirty minutes of exposure increases the build up of fat deposits in blood vessels, increasing the risk of heart attack and stroke. Two hours of exposure increases the chance of irregular heartbeat that can be fatal or trigger a heart attack (1,10-14).

According to a 2004 UK study in which 10 venues (restaurants, bars, bowling alleys) were sampled, indoor air pollution dropped 91% when Lexington passed its smoke-free law (see Figure 1) (15). Prior to Lexington's non-smoking ordinance, all hospitality venues tested were heavily polluted and dangerously above the federal standard for outdoor air quality. When Lexington venues were compared to Louisville hospitality venues, indoor air pollution in Louisville (without a smoke-free law) was 17 times higher than in Lexington with a smoke-free law (16).

### Why are Smoke-free Laws a 'Win' for Business as well as Health?

While the health benefits of smoke-free environments are obvious, the economic benefits are sometimes not as well known to health professionals or the public at large. All of the empirical studies using objective economic indicators show no negative economic impact on businesses including bars, restaurants, and the tourism industry (17-22). The only reports showing negative economic impact from smoke-free laws are those funded by the tobacco industry.

### What is the Kentucky Center for Smoke-free Policy?

As in the other tobacco growing states, Kentucky has a low rate of smoke-free workplace coverage. Given the success of Lexington's smoke-free law

and the tremendous need for policy change in other Kentucky communities, the Kentucky Center for Smoke-Free Policy (KCSP) was established to help rural and urban communities advocate for smoke-free environments or initiate a smoke-free campaign. The Center offers educational resources and technical assistance to Kentucky communities that are proposing, advancing or enacting smoke-free ordinances or regulations. The Center collaborates with state and national tobacco control partners, and is funded through a grant from The Robert Wood Johnson Foundation.

### How Can You Make Your Community Smoke-free?

Communities that are interested in advancing smoke-free policies are invited to visit the KCSP website at <http://www2.mc.uky.edu/TobaccoPolicy/ProjectTeam.HTM> and complete the online community readiness assessment (go directly to <http://www2.mc.uky.edu/TobaccoPolicy/23199/23199.htm>). KCSP staff can help by analyzing your readiness assessment, developing a tailored community needs assessment, and providing evidence-based, state-of-the-art technical assistance. For additional information on the Kentucky Center for Smoke-Free Policy, please contact us at [kcsp00@lsv.uky.edu](mailto:kcsp00@lsv.uky.edu) or call 859-323-1730.

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## **Grand Opening of the Kentucky Electronic Public Health Records System and Health Alert Network Help Center**

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March 15, 2005 marked the official grand opening of the Kentucky Electronic Public Health Reporting System (KY-EPHRS) Help Center, located within the Kentucky Cabinet for Health and Family Services (CHFS). The Help Center will be supporting both the Health Alert Network (HAN) as well as the EPHRS system that currently includes disease surveillance, with plans to support immunization registry, newborn screening, TB, STD, etc.

Initiated in 1999, the purpose of HAN is to build a nationwide network of strong public health agencies, which can effectively serve as the nation's frontline defense against terrorism and other public health threats. The web-based network intends to ensure that each community has rapid and timely access to emergency health information; a cadre of highly-trained professional personnel; and procedures for effective public health preparedness, response, and service.

The KY-EPHRS provides a disease surveillance system to successfully perform timely, accurate disease surveillance and reporting. Recent federal government activity revolving around bioterrorism has presented the DPH with an opportunity to replace the current antiquated collection methods with leading edge accessible technology. Implementation of the new KY-EPHRS allows for: electronic transfer of appropriate information from clinical information systems in the health care industry to public health departments; reduction in provider burden in the provision of information; enhancement of both the timeliness and quality of information provided; and the creation of surveillance systems to collect and monitor data for disease trends and/or outbreaks to insure public health personnel can protect the nation's health.

The Help Center can be reached toll-free at (877) 545-6175 from 8:00 AM to 4:30 PM Monday thru Friday. They can also be reached via email at: [chfs.kyephrs@ky.gov](mailto:chfs.kyephrs@ky.gov).



Terri Grimes, left, and Jimmie Patterson, right, cutting the ribbon for the grand opening of the Help Center for the Kentucky Electronic Public Health Records System and Health Alert Network (CHFS Photo/ Barbara Fox)



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**RETURN SERVICE REQUESTED**

**FIGURE. Fine particulate (PM 2.5  $\mu\text{g}/\text{m}^3$ ) Indoor Air Pollution Drops 91% After Lexington's Smoke-Free Law**

