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Additional benefits of AIDS vaccine development

Developing a preventive AIDS vaccine is one of the greatest scientific challenges of our time. With 7,400 new HIV infections occurring every day and approximately 1.8 million AIDS-related deaths per year, it remains imperative that we ensure the development of a vaccine to help end the AIDS pandemic. Efforts to develop such a vaccine have produced many ancillary benefits, particularly in the developing countries that have been hardest hit by the pandemic and where candidate vaccines must be clinically evaluated.

BENEFITS TO PUBLIC HEALTH

Understanding the epidemic:

The preparatory research that informs the design and conduct of clinical trials can be of great value to understanding health problems in developing countries. HIV vaccine researchers must collect up-to-date epidemiological data about the

prevalence and incidence of HIV infection in the populations from which they hope to recruit clinical trial volunteers. That information becomes a part of the scientific literature, adding not only to the general understanding of the pandemic, but creating a more textured picture of regional epidemics. Such detail can help local public health officials and other agencies refine HIV prevention and treatment strategies.

Reaching most at risk populations:

Researchers frequently conduct socio-behavioral research to better characterize specific high-risk groups within a given community—say, youth in informal settlements or men who have sex with men. They use these studies to fine-tune their outreach to such groups and anticipate how specific needs might be addressed in the execution of a clinical trial. Such research can generate valuable

qualitative information, such as patterns of risk and health-seeking behavior and common misconceptions about HIV and other sexually transmitted diseases. This information too can help shape public health interventions and policies.

An IAVI-supported study conducted by the Center for Geographic Medicine Research-Coast in Kilifi, Kenya—an affiliate of the Kenya Medical Research Institute—has helped to convince the Kenyan Ministry of Health of the need for outreach and the provision of health services to MSM to reduce the burden of sexually transmitted infections, including HIV. The Kenya National AIDS Control Council website now hosts an online version of a manual to train health care providers to appropriately address the needs and concerns of MSM clients.

IAVI partnered with the Uganda Virus Research Institute (UVRI) on a study of HIV incidence and prevalence in the fishing communities of Lake Victoria that was primarily funded by the European and Developing Countries Clinical Trials Partnership. People in these impoverished and marginalized communities are believed to be especially vulnerable to HIV, but have not benefited from Uganda's relatively extensive roll-out of HIV services. Identifying a need for basic health services in the fishing communities, the project team forged partnerships with government and private care providers to link the communities with basic health care, family planning and HIV-prevention services. The project team has shared its findings with the Ministry of Health, the Uganda AIDS Control Programme and the Uganda AIDS Commission to support future efforts to address the needs of this population.

Increasing awareness: The health care services provided in vaccine trials and preparatory studies, most notably voluntary counseling and HIV testing (VCT), can significantly benefit the communities involved; indeed, many people who may not otherwise utilize VCT do so when they volunteer for HIV-related studies. So far, IAVI has supported the provision of VCT to more than 250,000 people through the clinical trials and other research it supports.

IAVI also has helped improve the quality of VCT in communities where it works. It has supported VCT training and refresher courses for counselors at collaborating research centers across sub-Saharan Africa and occasionally extends such support to surrounding health care facilities as well.

- *Uganda: IAVI has worked with UVRI to train and equip health workers from Kisubi Hospital in Wakiso, a rural area, to deliver VCT services to people in their homes.*
- *Rwanda: IAVI has worked with its partner in Rwanda, Projet San Francisco, to improve health care services at government health centers in and around Kigali and supported their efforts to train counselors in providing VCT to couples.*
- *Zambia: With the Zambia Emory HIV Research Project in Lusaka, IAVI has provided health care referrals to all people who volunteer to participate in vaccine trials but are ineligible due to a pre-existing health condition or because they are already HIV infected. Those who test positive during IAVI-supported trials are, in line with standard ethical practice, ensured access to treatment and care for a predetermined period.*

of antibodies that neutralize a wide variety of circulating HIV variants. This challenge alone has fueled significant innovation.

Theraclone Sciences, the biotechnology company that played a central role in an IAVI-led effort to isolate novel broadly neutralizing antibodies against HIV, subsequently won a contract from a Japanese company to find such antibodies against Influenza and has found a new antibody target on the virus for vaccine development. It is now working on developing therapeutic antibodies against influenza. Theraclone is also collaborating with the pharmaceutical giant Pfizer to address infectious diseases and cancer.

Supporting others: IAVI has provided financial or technical support to more than 20 national, regional and global civil society organizations engaged in HIV prevention, research literacy education, advocacy, community involvement, addressing gender issues in HIV research and the inclusion of vulnerable populations in Africa, China, Brazil, Europe, India, the US and Canada.

BUILDING RESEARCH CAPACITY

Any AIDS vaccine for the developing world, where the majority of new infections occur, must be evaluated in clinical trials conducted in developing countries. This, however, requires sophisticated biomedical research centers. Hence, to support the clinical evaluation of candidate vaccines and related epidemiological studies on HIV, IAVI has worked in partnership with local research centers to establish a laboratory network that spans five sub-Saharan African countries. It has equipped and renovated laboratories and trained scientists and technicians in the scientific methods and clinical procedures essential to the professional and ethical conduct of AIDS vaccine trials (for more detail, see IAVI Fact Sheet: *How IAVI builds scientific capacity in developing countries*).

Such capacity building is likely to have a lasting impact. Experience in the rigorous conduct of clinical trials and biomedical research can be of particular value. Building on the infrastructure and experience provided by IAVI, research

centers can launch more of their own applied research programs on a host of microbial and parasitic diseases that disproportionately afflict developing nations. Capacity building can also provide professional opportunities to local scientists and technicians and help attenuate the “brain drain” that has long troubled the developing world.

SEEDING INNOVATION

The ancillary benefits of AIDS vaccine research are not confined to developing countries. Much as the driving technologies of the US space program found unexpected applications in different areas of science and industry, the HIV vaccine challenge offers a unique opportunity to advance efforts to fight other diseases. Consider just one of the major problems of AIDS vaccine development: the elicitation

The neutralizing antibody challenge in HIV research has also forced scientists to think up new approaches to vaccine design. IAVI, for example, is working with the laboratories of the Neutralizing Antibody Consortium that it oversees to apply innovative strategies that integrate synthetic chemistry, molecular biology and computing to recreate the specific targets on HIV that are bound by powerful anti-HIV antibodies. Those same strategies, or the technologies developed to implement them, could be applied to devise vaccines and treatments for a wide variety of diseases—not necessarily just those caused by highly mutable viruses. They could, beyond that, prove valuable in unexpected ways to fields unrelated to biomedical research.



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