

SCIENCE TO PROGRAM IMPACT

OVERVIEW

A strong focus on the linkage between research findings and program activities is the foundation of the U.S. Centers for Disease Control and Prevention's (CDC) successful public health impact. Scientific excellence, integrity, and public health ethics are at the core of the CDC mission. CDC leadership and support for the U.S. President's Emergency Plan for AIDS Relief (PEPFAR) and its activities around global tuberculosis (TB) have contributed to broader scientific knowledge, as related to global health. Over the past 15 years, global HIV and TB experts at CDC have developed over 2,000 scientific protocols supporting the collection and reporting of data to guide, monitor, and evaluate programs.

CDC'S ROLE

CDC serves as a leader in the production of top-notch science to inform program development and improve public health impact worldwide. As part of its global HIV and TB program, CDC ensures compliance with global public health standards regarding scientific integrity and human protections in both data collection and service delivery. This is accomplished by overseeing the review and approval of scientific information products; providing training, capacity-building, and technical assistance on protection for human subjects and scientific ethics; and monitoring regulatory compliance. These activities ensure that high quality research is conducted, that the rights and well-being of study participants are protected, that data collected are accurate, complete, and verifiable from source documents; and that such studies are in compliance with approved protocols, their standard operating procedures, guidelines for Good Clinical Practice and Good Laboratory Practice, and all applicable regulatory requirements.

To strengthen the link between public health research and practice in CDC's global HIV and TB programs, CDC coordinates, develops, and oversees several different operational research initiatives, including Public Health Evaluations, Implementation Science, Key Population Implementation Science, and Combination Prevention Impact Evaluations. The purpose of these activities is to yield knowledge that will enhance the delivery of services and maximize the population-level impact of HIV prevention, care, and treatment services provided in the 44 PEPFAR-supported country and regional offices, as well as those initiated at CDC headquarters.

ACCOMPLISHMENTS / RESULTS

CDC-supported implementation science has resulted in public health program developments that strengthen and expand the global prevention and treatment landscape for TB and HIV. Among these are advances in the access to and accuracy of HIV testing; the development and scale-up of models for HIV treatment services, including methods to improve retention and adherence to antiretroviral treatment (ART); the expansion of voluntary medical male circumcision services (VMMC); innovations in the prevention of mother-to-child transmission (PMTCT); the impact of integrating HIV services into those for antenatal care and TB; and the development of model HIV testing and treatment services for key populations.

Numerous specific examples highlight the critical role performed by CDC, working in partnership with local research partners, in advancing PEPFAR goals. Data from implementation science research on provider-initiated testing and counselingⁱ in Botswana contributed to widespread introduction of routine testing into PMTCT programs across Africa. A detailed multi-country study of the PMTCT cascadeⁱⁱ yielded data that provided the basis for further evaluation of these programs. Evaluation of home-based testing and counseling in Ugandaⁱⁱⁱ that included analyses of cost-effectiveness^{iv} led to expanded implementation of home-based testing, which has been adopted in many other countries. A CDC project that developed methodologies for costing analysis of ART programs in five countries led the way for the systematic expenditure analysis that is routinely utilized throughout PEPFAR; this type of analysis is now a central component of country operational planning.^v A randomized trial that demonstrated the effectiveness of cell phone text messaging in improving ART adherence and virologic suppression contributed to its widespread introduction into programs.^{vi} A multi-country study of risk factors for low ART retention demonstrated the higher success rates among programs that provide for community-delivery of ART, which supported their further expansion.^{vii} A study of TB diagnostic algorithms among persons with HIV^{viii} and of the cost-effectiveness of expanding TB diagnostic testing^{ix} contributed to new guidance from the World Health Organization (WHO) on TB/HIV management. CDC's development and field evaluation of new assays for use of dried blood spots for monitoring ART resistance^x and viral load^{xi} are now in increasingly widespread use. Scientific protocols used to monitor scale-up of VMMC,^{xii} PMTCT Option B+,^{xiii} and the WHO Test and Start guidelines^{xiv} have demonstrated progress in each of these areas while also providing data that highlight critical challenges in reaching adolescents^{xv} and men^{xvi} that need to be addressed in every country program. Recent studies demonstrate the cost-effectiveness of demand creation strategies for VMMC,^{xvii} the comparative impact of different cervical cancer treatment approaches on cervical HIV shedding,^{xviii} the potential for index client testing to facilitate active case-finding of persons with HIV infection,^{xix} and the reduction in community-level HIV incidence that can be attained through a combination prevention approach that includes the provision of ART for all persons with HIV infection.^{xx}

CDC country offices are staffed with global HIV and TB experts who work closely with local and international research partners to develop operational research capacity at local universities and other institutions. The alignment of CDC scientific experts in country offices with local implementing partners plays a crucial role in facilitating the rapid translation of research findings into HIV and TB programs.

As of 2018, critical information and findings from CDC-supported work have been shared through over 4,000 information products, including more than 1,600 manuscripts published in peer-reviewed journals, over 1,300 abstracts presented at scientific conferences, and over 1,000 other publications, such as surveillance reports, technical guidance, and training materials. CDC has also provided technical consultation to support the publication of over 100 documents published by WHO and UNAIDS, including technical guidance documents to support the implementation of national HIV and TB programs.

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