A Multi-Disciplinary Approach to Implementation Science: The NIH-PEPFAR PMTCT Implementation Science Alliance

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Abstract: In resource-limited countries, interventions to prevent mother-to-child HIV transmission (PMTCT) have not yet realized their full potential health impact, illustrating the common gap between the scientific proof of an intervention’s efficacy and effectiveness and its successful implementation at scale into routine health services. For PMTCT, this gap results, in part, from inadequate adaptation of PMTCT interventions to the realities of the implementation environment, including client and health care worker behaviors and preferences, health care policies and systems, and infrastructure and resource constraints. Elimination of mother-to-child HIV transmission can only be achieved through understanding of key implementation barriers and successful adaptation of scientifically proven interventions to the local environment. Central to such efforts is implementation science (IS), which aims to investigate and address major bottlenecks that impede effective implementation and to test new approaches to identifying, understanding, and overcoming barriers to the adoption, adaptation, integration, scale-up, and sustainability of evidence-based interventions. Advancing IS will require deliberate and strategic efforts to facilitate collaboration, communication, and relationship-building among researchers, implementers, and policy-makers. To speed the translation of effective PMTCT interventions into practice and to advance IS more broadly, the US National Institutes of Health, in collaboration with the President’s Emergency Plan for AIDS Relief launched the National Institutes of Health/President’s Emergency Plan for AIDS Relief PMTCT IS Alliance, comprised of IS researchers, PMTCT program implementers, and policy-makers as an innovative platform for interaction and coordination.

Key Words: HIV/AIDS, PMTCT, implementation science, PEPFAR

INTRODUCTION

One of the great successes in HIV research has been the progressive series of clinical trials that have identified highly effective interventions to prevent mother-to-child HIV transmission (PMTCT) and maintain the health of HIV-positive mothers. Rapid implementation of these interventions in the United States led to a 92% decline in perinatally acquired HIV infections between 1991 and 2005. In low- and middle-income countries, implementation of PMTCT interventions continues to expand, especially through support by the President’s Emergency Plan for AIDS Relief (PEPFAR) and the Global Fund to Fight AIDS, tuberculosis, and malaria. Indeed, new HIV infections among children in low- and middle-income countries dropped 35% between 2009 and 2012. However, despite this scale-up, implementation of interventions to identify and treat pregnant HIV+ women has been slowed by significant bottlenecks and challenges in the very settings where they are most needed. As a result, a considerable number of HIV-infected pregnant women remain unidentified and do not receive treatment. Moreover, in 2012, an estimated 260,000 children still became infected with HIV, a reality far from the global goal of less than 40,000 per year.

Implementation science (IS) holds promise as a scientific strategy to address current barriers to effective implementation of evidence-based interventions in PMTCT programs. Specifically, IS is an approach which aims to investigate and address major bottlenecks that impede effective implementation of scientifically proven interventions for public health impact and to test new approaches to identifying, understanding, and overcoming barriers to the implementation of these interventions. Yet, support of IS alone will have limited impact unless it is accompanied by efforts that facilitate utilization of scientific evidence generated from these studies by health program implementers and policymakers. Therefore, effective application of IS to PMTCT will require deliberate and strategic efforts to facilitate collaboration, communication, and relationship-
building among researchers, implementers, and policymakers.

To meet this challenge, the National Institutes of Health (NIH), through the Fogarty International Center, is collaborating with the Office of the US Global AIDS Coordinator (OGAC) to host the NIH-PEPFAR PMTCT Implementation Science Alliance (the Alliance). This novel platform brings together US and sub-Saharan African-based PMTCT researchers, program implementers, and policymakers as well as representatives from multilateral organizations. The Alliance aims to improve communication among these stakeholders and catalyze collaboration to enhance the evidence base for translating effective PMTCT interventions into community- and population-level services, programs, and strategies at scale.

DEFINING IS WITHIN THE PMTCT CONTEXT

As a relatively new field, the definition of IS and the type of research it encompasses may vary according to setting and sponsor. For the purposes of the Alliance, we define IS according to the NIH: as the study of methods to promote the integration of research findings and evidence into health care policy and practice to achieve their potential public health impact. IS seeks to evaluate the behavior of health care professionals, patients, and other stakeholders as one of the key variables in the sustainable uptake and adoption of evidence-based interventions. Furthermore, IS aims to investigate and address major factors (eg, social, behavioral, economic, and management) that impede effective implementation and to test new approaches to identifying, understanding, and overcoming barriers to the adoption, adaptation, integration, scale-up, and sustainability of evidence-based interventions, tools, policies, and guidelines.

Domains of the PMTCT implementation environment where IS can play a key role include the following: (1) maternal health seeking behaviors, HIV-related stigma, health care worker, and patient preferences; (2) health systems (eg, laboratory specimen/result transport, supply chains, and patient referral systems); (3) policies (eg, cadres and levels of health care facilities allowed to prescribe antiretroviral treatment [ART]); (4) human resources (eg, staff numbers, expertise, and deployment); and (5) infrastructure (eg, number and location of facilities).

To further characterize the complexities of IS, we consider it within a framework made up of 4 inter-related components: (1) understanding the implementation environment; (2) studying the actual process of implementation; (3) testing innovative implementation approaches; and (4) linking evidence from such research to policy making, program implementation, and scale-up. The first 3 components describe dimensions of IS itself, the results of which directly inform policy-making, program design/adaptation, and future research priorities. The fourth component focuses on advancing the impact of IS by enhancing the communication and collaboration among researchers, policy makers, program implementers, and representatives of HIV-affected communities to enhance knowledge translation and optimal uptake of evidence-based interventions (Table 1).

FOSTERING USE OF IS TO ADDRESS PMTCT IMPLEMENTATION CHALLENGES THROUGH MULTIDISCIPLINARY COLLABORATION—THE ALLIANCE APPROACH

Given that IS is increasingly recognized as critical to ensure that proven health interventions can be effectively implemented and brought to scale, the NIH, in collaboration with OGAC, is hosting the Alliance while also supporting IS research that will inform PEPFAR and in-country policymakers/implementers as they develop more efficient and cost-effective methods to deliver proven interventions for PMTCT. This Alliance builds on important scientific advances in the field and a growing portfolio of investment by the US Government, including the NIH and OGAC (Table 2), and uses the NIH/PEPFAR Collaboration for Advancing Implementation Science in Prevention of Maternal-Child HIV Transmission Request for Applications (NIH PEPFAR RFA) as a platform. The Alliance emerged from recognition on the part of NIH and PEPFAR of the importance of communication and collaboration between NIH-funded researchers and program implementers and policy-makers in the field for the successful implementation of proven interventions to reduce mother-to-child HIV transmission of HIV. The Alliance serves as a “living laboratory” to experiment with methods and approaches to enhance collaboration between researchers and users of research evidence and will serve as a source of learning to inform ongoing and future IS efforts at NIH, OGAC, and beyond.

In this capacity, this Alliance creates a forum with four meetings over two years to enable a cross-fertilization of ideas, insights, and experiences as the research progresses and the implementation environment evolves. More specifically, this approach aims to:

- Enable PMTCT IS research to be better informed by challenges and priorities identified by policy makers and program implementers;
- Encourage use of IS evidence to inform local, national, and global policies; and
- Inform NIH, donors, and other funding agencies, multilateral organizations, the scientific community, program implementers, and policy-makers on how best to encourage and facilitate connections between researchers and users of research evidence.

The Alliance is comprised of a diverse set of experts both from the US and sub-Saharan Africa, all of whom are working in the PMTCT field. In an effort to create a well-represented consortium of experts, key stakeholders from the following groups are included: (1) scientists receiving NIH PEPFAR RFA grant awards; (2) program implementers and policy makers from PEPFAR-supported countries; (3) representatives of multilateral institutions (eg, WHO, UNAIDS, and UNICEF); (4) IS methodologists; and (5) key US government representatives and global experts working in leading HIV/AIDS/PMTCT organizations. Communication among Alliance members has been facilitated and catalyzed through in-person meetings. The Alliance is
being guided by a steering committee of experts from NIH and OGAC, the Elizabeth Glaser Pediatric AIDS Foundation, the Anova Health Institute (South Africa), and the World Health Organization. Through this steering committee, expertise in research, program implementation, and policy/advocacy is used to guide the Alliance’s activities as well as the development and dissemination of deliverables informed by these activities.

The Alliance has been built on a platform of research funded through the NIH PEPFAR RFA. Specifically, in 2012, the NIH awarded funding for several highly meritorious projects addressing a wide range of topics (Table 3). These topics include optimizing integrated PMTCT and maternal/child health services; increasing uptake of and retention in PMTCT services; facilitating HIV testing and education of male partners; examining the effect of “buddy” systems to help mothers adhere to feeding guidelines; comparing cost-effectiveness of faith-based and clinic-based approaches; increasing efficiency in early infant HIV diagnosis; and measuring the impact of PMTCT programs on maternal and infant health outcomes. These studies link directly to local programs, researchers, and institutions in 7 countries (Cote D’Ivoire, Democratic Republic of Congo, Kenya, Mozambique, Nigeria, South Africa, and Zambia) receiving PEPFAR support and will support PEPFAR’s focus on using scientific evidence to inform policy and programs. Data gathered through these IS studies will also help maximize the impact of investments in curbing the HIV epidemic globally, contributing to the goal of achieving an AIDS-free generation.

TABLE 1. Components of IS in Relation to PMTCT

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<th>Component</th>
<th>Description</th>
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<td>Understanding the implementation environment</td>
<td>This component relates to the “formative research” stage and aims to enhance understanding of facilitators and barriers to introducing and scaling up an intervention before its widespread implementation, through qualitative and quantitative approaches, including policy review, stakeholder interviews, focus groups, infrastructure assessments, and structured surveys. Areas that might be addressed include evaluation of the acceptability of lifelong antiretroviral therapy (Option B+) by HIV-infected pregnant women, flexibility of the supply chain system to decentralize delivery of ART, and understanding the role of stigma in women’s and men’s health seeking behaviors.</td>
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<td>Studying the actual process of implementation</td>
<td>This component focuses on enhanced understanding about what happens “in the real world” when an intervention (eg, HIV testing and counseling) is delivered through a public health program. Descriptive qualitative and quantitative research and program evaluation approaches address such areas as degree of uptake of an intervention, feasibility of implementation, pace, and scale of program implementation, cost, robustness of an implementation approach across different settings, fidelity, and adherence to an intervention, training requirements for delivery of an intervention, patient and provider preferences, unintended consequences, barriers, and impact. Areas that might be addressed include measurement of patient flow patterns, impact of fully implemented PMTCT programs, and cost-effectiveness of delivery models.</td>
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<td>Testing implementation approaches</td>
<td>This component focuses on designing and testing new implementation approaches designed to overcome barriers or optimize intervention delivery. In addition to studying many of the same issues as in #2, controlled comparative study designs allow for a counterfactual and for conclusions about attribution of the intervention to health outcomes to be drawn about relative merits of alternative approaches. For example, this approach might compare mobile vs. static services, point-of-care vs. centralized laboratory testing, or introduction of feeding buddies for new mothers.</td>
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<td>Linking research, policy making, and implementation</td>
<td>These 3 domains must be closely linked to optimize impact. Policy and implementation design should be informed by research. Research should be targeted to fill information gaps needed for effective policy making and implementation. Policies should effectively facilitate implementation. Synergies among researchers, policy makers, implementers, and representatives of HIV-affected communities can be achieved through such means as establishing a collaboration (such as the Alliance), cross-training and joint learning, incentivizing collaboration (eg, requirements of research grants), and providing explicit sensitization to the cultures and motivators of these 3 domains.</td>
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KEY QUESTIONS AND INSIGHTS ON COMMON CHALLENGES

Although the Alliance’s activities are ongoing, a number of critical questions and insights on common challenges related to PMTCT IS have emerged from the dialogue and proceedings of the two initial Alliance meetings held in March 2013 and January 2014 (to obtain copies of Alliance meeting reports, please e-mail: CGHSAdministration@nih.gov).

The questions include:

- What are the primary methodological barriers to using scientific evidence to inform policy?
- What are the critical junctures at which researchers and research evidence could most effectively inform the policy-making process?
- What are considered to be minimal criteria for determining scalability of research evidence?
- Can interim research results inform programs and policy?
- What implementation data (eg, cost, training needs, and supply needs) are needed, in addition to effectiveness results of intervention strategies, to inform scale-up?
- How can we best reconcile the differential time scales of the research (generally long) and policy-making (often urgent) processes?
- What are feasible and valid methods to measure how well policies have been informed by research evidence?

Critical observations and recommendations that have emerged include the following:
Greater collaborative engagement among researchers, implementers, policy makers, and representatives from HIV-affected communities throughout the research and policy-making process would enable more relevant and timely design of research, and enhance effective use of evidence to eliminate new HIV infections through PMTCT.

Reconciling the differential timelines and project horizons for researchers and policy-makers would enable researchers to be more responsive to the policy and programmatic environment and would allow policy-makers and program implementers to more effectively use scientific evidence.

Extrapolating data/evidence from local specific context to the national level is often challenging. Understanding when...
and what type of evidence is sufficient to transfer an innovation from one context to another is critical.

- The changing policy and evidence landscapes, which affect study designs, must be anticipated when planning and conducting relevant research.
- PMTCT researchers can learn from other disease areas (e.g., tuberculosis and tobacco) and disciplines (e.g., economics) to gain from different perspectives and experiences on how to achieve effective translation of evidence into policy and practice.
- It is important to build capacity in IS as it relates to public health by training new investigators and creating an established field for IS with funding opportunities and a defined career pipeline.

The end goal of the Alliance is to contribute to essential advances in the fields of IS and PMTCT and inform current thinking on best practices for evidence-based program and policy development related to PMTCT. The Alliance will strive to offer the fields of IS and PMTCT insights on the above questions and observations while also building its own capacity in IS methodologies. Efforts will be made to build a sustained collaborative platform for the PMTCT IS Alliance beyond the 2 years of this project to facilitate continued communication, collaboration, and sharing of lessons learned.

CONCLUSIONS

Research focused on the challenges of effective and sustainable implementation of proven interventions in real-world settings is critical to the goal of achieving an AIDS-free generation and ensuring the survival and health of mothers and their HIV-exposed children. To speed the translation of effective PMTCT interventions, integration of clinical research evidence, program implementation, and policy is critical. Finding innovative ways to bring together and foster collaboration of IS researchers with implementers, policymakers, and community participants should speed the translation of effective PMTCT interventions to benefit maternal and child health both at a country level and globally.

REFERENCES