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## AIDS Prevention Research: Training and Mentoring the Next Generation of Investigators from Low- and Middle-Income Countries

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### Keywords

AIDS research; low- and middle-income countries; training

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In this special issue, we present research from scientists from low- and middle-income countries (LMIC) who have participated in the University of California, San Francisco (UCSF) International Traineeships in AIDS Prevention Studies (ITAPS) program. The goal of ITAPS is to teach skills to early-career LMIC investigators so they can more independently perform and publish their research going forward. We currently focus on training in analysis and interpretation of research results and development and submission of manuscripts for publication. We also provide a mentor training program in which we enroll more experienced LMIC investigators, many of whom are alumni of the ITAPS manuscript writing program, to learn mentorship skills and to practice them by participating side-by-side with UCSF faculty in all aspects of training. Trained mentors are then supported and encouraged to provide training and workshops for junior investigators in their own institutions or countries.

We partner closely with ongoing international research networks, particularly with the International AIDS Vaccine Initiative (IAVI), the Blood Systems Research Institute (BSRI), and the WHO Collaborating Center for HIV Surveillance in Iran. We have also collaborated with the Elizabeth Glaser Pediatric AIDS Foundation and the Centers for Disease Control and Prevention (CDC) – President’s Emergency Plan for AIDS Relief (PEPFAR). These collaborations are vital; they allow us to leverage existing support, and to identify trainees who are already embedded in research projects and can apply skills learned during the ITAPS training to their existing research roles.

ITAPS has evolved considerably since its start in 1988, from an initial focus on developing and implementing research protocols to manuscript writing and mentorship training. The delivery of training has also evolved, based in part on funding constraints, but also in response to the wide availability of reliable internet and ease of real-time distance communication. We currently use a mix of UCSF-based and in-country workshops, distance

learning and online teaching modules. Since 2007, we have trained 97 LMIC early-career investigators who to date have published 74 manuscripts based on their research. Of the 12 mentors trained since 2014, 10 have implemented 16 in-country workshops, enrolling 336 participants.

Although the program has been highly successful, it is not without its hurdles. Funding for international training is limited, particularly to support the extensive faculty time needed to mentor and train LMIC early-career investigators, which invariably continues beyond the end of the formal training period. ITAPS has been funded through an R25 mechanism by the U.S. National Institute of Mental Health/NIH but is also supported by our partners IAVI and BSRI, as well as the Starr Foundation. Without this additional support, our training capacity would be highly constrained. Furthermore, understanding the fundamentals of study design, data management and biostatistics is critical to analyzing and interpreting the results of one's research; however, many early-career LMIC investigators have not had formal training or do not have a working knowledge of these areas. In response, we are expanding the content of training to include workshops and distance-learning in targeted biostatistics and analysis, which we hope will improve trainees' skills and future research independence.

LMIC investigators face additional barriers to publishing and mentorship. Many must juggle heavy clinical and teaching responsibilities so that carving out time to conduct research and write manuscripts can be particularly challenging. In addition, mentoring junior investigators is often not recognized as an important component of a researcher's responsibilities. Unless mentoring junior staff is supported as an essential requirement for professional advancement, it will be difficult to expand the impact of training (1).

In this special issue of *AIDS & Behavior*, we present a range of manuscripts from ITAPS trainees that reflects the geographic spread of our alumni, as well as the diversity of research in which they are engaged. In all, 18 papers are included from 14 different countries, encompassing sub-Saharan Africa, Latin America and the Caribbean, South and Southeast Asia, and Iran. Many of these articles are based on studies among hard-to-reach populations, including persons who inject drugs (2,3), female sex workers (4), and men who have sex with men and transgender women (5–7). Two articles from Jamaica address risk behaviors among under-age youth and the homeless (8,9). LMIC investigators are well-positioned to evaluate these groups because they are sensitive to local cultural nuances and have links to local organizations through which they can access hard-to-reach populations. With the roll-out by many countries of Option B+ to prevent mother-to-child transmission (MTCT) of HIV (10), interest in evaluating the uptake and impact of the program is high; five articles in this issue address the impact of this and other efforts to prevent MTCT (11–15).

This special issue demonstrates the global reach of our program. The long-term impact of ITAPS is illustrated by the fact that since 1988, we have trained 286 early- and midcareer scientists from 54 LMIC who have gone on to publish more than 3600 manuscripts in peer-reviewed scientific journals. Most of these publications by our alumni have been completed as they have advanced their research careers and without our assistance. This is the eighth special issue in which we have published the work of our alumni (16–22). By training

mentors to support new cohorts of early-career investigators, we are expanding the impact and sustainability of the ITAPS training model.

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