Ending Sexual HIV Transmission: Lessons Learned from Perinatal HIV

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Data presented at the 2015 Conference on Retroviruses and Opportunistic Infections (February, Seattle, WA) confirmed that oral emtricitabine/tenofovir used as preexposure prophylaxis (PrEP) for HIV infection was highly effective. The Ipergay and PROUD studies both demonstrated an 86% reduction in HIV incidence in men who have sex with men randomized to receive active drug (McCormack & Dunn, 2015; Molina et al., 2015). The HPTN 067 ADAPT trial showed that high levels of PrEP adherence occurred in a sample of young women (Bekker et al., 2015). The Partners Demonstration Project revealed near elimination (96% reduction) of sexual HIV transmission with an integrated approach offering antiretroviral therapy (ART) for an HIV-infected partner and PrEP for an HIV-uninfected partner (Baeten et al., 2015). In that study, there were only two HIV transmissions and neither had detectable drug levels at the time of HIV acquisition. Surveillance from San Francisco demonstrated that PrEP was scaling up, with 10% to 15% of men who have sex with men already taking PrEP, and that PrEP uptake was highest in people who would benefit the most (Grant et al., 2015). The San Francisco modeling suggested that a reduction in HIV transmission would be possible with countywide scale-up of PrEP, with a further reduction in incidence and higher rates of viral suppression. It is time to widely disseminate an integrated treatment and prevention paradigm to end HIV transmission.

The success of perinatal HIV prevention highlights possibilities for consideration in the broader HIV epidemic. Widely heralded as one of the greatest public health successes in the United States, perinatal HIV transmissions declined from 1650 in 1991 to 151 by 2009, a greater than 90% reduction (Nesheim et al., 2012). Several interventions led to this success: (a) routine prenatal HIV screening, (b) rapid HIV testing during labor and delivery, (c) maternal ART and infant ART prophylaxis, and (d) infant replacement feeding. Vital work remains to maintain these successes and achieve the elimination of perinatally transmitted HIV (Nesheim, Harris, & Lampe, 2013).

While perinatal HIV prevention efforts have been unique, including a time-limited focus, special motivations to protect infants, and increased opportunities for intervention when pregnant women engage in care, some themes are shared by prevention of perinatal HIV transmission and sexual HIV transmission (Figure 1). Reviewing successes from perinatal HIV prevention can inform a collective strategy to end sexual HIV transmission (Table 1).

Integrated HIV Treatment and Prevention

The Perinatal HIV Prevention Cascade first proposed by the Institute of Medicine in 1998 (Stoto, 1998) is designed to decrease the rate of perinatal HIV transmission and can inform a strategy to reduce sexual HIV transmission. The cascade is a series of steps that can be taken to reduce the risk of transmission from mother to child, each of which can be adapted to reduce sexual transmission. For example, routine prenatal HIV screening can be adapted to rapid HIV testing during labor and delivery. Maternal ART and infant ART prophylaxis can be adapted to PrEP for an HIV-uninfected partner. Infant replacement feeding can be adapted to infant replacement feeding. While the cascade was designed specifically for perinatal HIV transmission, it can be adapted to sexual HIV transmission. For example, the cascade can be adapted to a sexual cascade, which includes preexposure prophylaxis, sexual HIV transmission, and sexual HIV prevention.

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Embracing and Offering Multiple Approaches

The landmark AIDS Clinical Trials Group 076 trial demonstrated the benefits of reducing vertical transmission by providing zidovudine to pregnant women living with HIV and their HIV-exposed infants. The subsequent broad implementation of these findings dramatically decreased perinatal HIV transmission rates from 25% to 11% (Connor et al., 1994). Innovation is required to further reduce infections through routine HIV screening, access to prenatal care, and expanded and fully suppressive ART regimens.

Likewise, the end of sexual HIV transmission will require multiple approaches rather than championing one favored idea. Early treatment, pre- and postexposure prophylaxis, routine HIV testing, client-centered counseling, male and female condoms, serosorting (the adaptation of sexual practices based on HIV status), and negotiated safety all have important and complementary roles to play. Multiple ideas and people will foster an evolution of ideas and their dissemination.

Whole People With Reproductive and Sexual Desires

In 2002, the World Health Organization published a pioneering definition of sexual health:

Sexual health is a state of physical emotional, mental, and social wellbeing in relation to sexuality; it is not merely the absence of disease, dysfunction or infirmity. Sexual health requires a positive and respectful approach to sexuality and sexual relationships as well as the possibility of having pleasurable and safe sexual experiences, free of coercion, discrimination and violence. (World Health Organization, 2002, p. 5)

Consistent with this definition, the conversation in perinatal HIV shifted from prevention of vertical HIV transmission to a broader focus on women’s health (Burr, Fry, Weber, Armas-Kolostroubis, & Lampe, 2009). Earlier identification of HIV, primary HIV prevention, preconception care, and safe conception options became priorities. Extending reproductive...
Table 1. Applying Lessons Learned From Perinatal HIV Prevention

<table>
<thead>
<tr>
<th>Perinatal HIV Prevention Strategy</th>
<th>Theme</th>
<th>Opportunities to Expand to Sexual HIV Prevention</th>
</tr>
</thead>
<tbody>
<tr>
<td>The original cascade combined treatment and prevention strategies, iterating with new methods.</td>
<td>Integrated HIV treatment &amp; prevention.</td>
<td>Develop an iterative framework integrating HIV treatment and prevention.</td>
</tr>
<tr>
<td>Expanded view of perinatal HIV prevention to include women’s reproductive and sexual health.</td>
<td>Whole people with sexual &amp; reproductive desires.</td>
<td>Greater emphasis on planning to allow reproductive and sexual well-being to thrive. More emphasis on the impact of treatment and prevention for the whole person.</td>
</tr>
<tr>
<td>USPHS, ACOG, CDC guidelines.</td>
<td>Guidelines, association opinions, protocols.</td>
<td>Integrate treatment and prevention guidelines with capacity building, including provider and patient toolkits for implementation.</td>
</tr>
<tr>
<td>Leveraging the best treatment and prevention services when and where a woman presents for care.</td>
<td>HIV testing everywhere, anytime, anyhow.</td>
<td>Fully routinize HIV testing by eliminating interrogations and offering testing at all points of contact; point of care antigen and RNA tests.</td>
</tr>
<tr>
<td>Review of transmissions and missed opportunities: locally grown, individual review, listening to the woman.</td>
<td>“Each one matters” systemic review.</td>
<td>Enhanced engagement with newly diagnosed and long-term HIV-uninfected people, to understand resilience and opportunities for systems change.</td>
</tr>
<tr>
<td>Champions can make institutional change and are found in diverse roles.</td>
<td>Champions and change-makers are everywhere.</td>
<td>Support first followers who champion the end of HIV transmission; recognize leaders at all levels; grow community support to eliminate transmission.</td>
</tr>
<tr>
<td>Protecting infants from HIV is a compelling story that mobilized resources and people.</td>
<td>A compelling story.</td>
<td>Develop a compelling story about human connection; reproductive and sexual wellbeing are essential for fostering humanity.</td>
</tr>
</tbody>
</table>

Note. USPHS = U.S. Public Health Service; ACOG = American Congress of Obstetricians and Gynecologists; CDC = Centers for Disease Control and Prevention; RNA = ribonucleic acid.

health care to men living with HIV is the next step in realizing comprehensive sexual and reproductive care. Planning for success rather than coping with missed opportunities allows for an ongoing conversation about reproductive life planning rather than viewing vertical transmission only through the lens of pregnancy.

Adapting a whole person/whole health approach to sexual HIV transmission would shift our language to one of sexual wellness, not just an absence of disease, or condom utilization, or adherence to ART. This approach requires recognizing reproductive and sexual desires and sexual fulfillment as goals deserving support. This is not just about the science of eliminating sexual HIV transmission, it is also about fostering sexual health, engaging with people, and leveraging the motivation to lead satisfying sexual lives.

Guidelines, Association Opinions, Protocols

National guidelines provide standards for excellent care, set the tone for reimbursement, and serve as the basis for training. Perinatal HIV stakeholders benefited from a dedicated guidelines committee that published frequently updated, data-driven guidelines, now available as a living document (Panel on Treatment of HIV-Infected Pregnant Women and
The International Antiviral Society - USA prevention practice recommendations and CDC PrEP guidelines have established a standard of care for PrEP provision (CDC, 2014; Marrazzo et al., 2014). Provider education, capacity building, and consultation services are necessary for practice to change. A mechanism for frequently updating integrated treatment and prevention best practices would rapidly disseminate new information from research and real-world settings.

HIV Testing Everywhere, Anytime, and Anyhow

Perinatal HIV prevention interventions are based on knowing a woman’s HIV status. Routine first-trimester opt-out HIV testing or rapid testing at labor and delivery was recommended as part of the CDC’s 2006 routine HIV testing guidelines (Branson et al., 2006). Additionally, scale up of rapid testing in labor and delivery brought training and a new technology to labor and delivery staff, expanding opportunities for women to test for HIV—providing testing whenever she presented for care, regardless of gestational age, and without questions about risk factors. In contrast, general HIV testing is not universally routine. Those without identified risk factors are not always screened, and some testing programs require questions about sexual practices and substance use before a test is offered (Zheng, Suneja, Chou, & Arya, 2014).

“Each One Matters” Systemic Review

A single perinatal HIV transmission is devastating, typically triggering a series of formal or informal reviews, changes to protocols, or additional training. In 2005, the Fetal Infant Mortality Review method was adapted for review of perinatal HIV transmissions and missed opportunities (Lampe, Buckley, Abresch, Carlson, & Fitz Harris, 2014). The abstracted chart review and maternal interview reviewed by a community action team are key to the success of this initiative. Understanding the woman’s experience of overlapping facilitators and barriers to maximize her and her child’s health is invaluable.

Every HIV transmission could be considered a sentinel event. Those who remain uninfected (Pascale, Sternin, & Sternin, 2010) and those newly diagnosed with HIV have vital information to inform systems change. In many counties, case investigations are performed for new HIV infections, although the focus is on identifying recent sexual partners rather than opportunities to improve services. Investigating all of the 50,000 new HIV diagnoses in the United States would be a formidable task. However, local and regional review of people newly diagnosed with HIV, and some people who remain HIV uninfected, could make this possible.

Champions and Change-Makers are Everywhere

National and local perinatal HIV successes have champions: those who work beyond grant objectives and job descriptions. Champions can make institutional change and are found at any point of the perinatal HIV prevention cascade, perhaps in unexpected places—the front desk receptionist, physician, lab technician, social worker, and patients themselves. Champions for ending sexual HIV transmission are emerging, sometimes also in unexpected places. As in other fields of innovation, the first followers, or adopters (Sivers, 2010), have a key role in transforming a good idea into a social movement.

A Compelling Story

Saving infants from HIV infection is a compelling story. Perinatal HIV transmission continues to occur at an unacceptable rate, highlighting how the last mile is sometimes the most difficult: Sustaining enthusiasm until the goal is reached is a challenge. We now have the possibility of ending sexual HIV transmission—itsel a compelling story. Although sex and sexuality are, at times, ensnared in stigma and suspicion, we can reframe the story to include our shared desires for human connection. It is time to change the story from one of risk reduction to one of possibility.


**Conclusion**

Given recent advances in scientific knowledge made possible in partnerships between communities and researchers, now is the time to commit to ending HIV transmission. Perinatal HIV prevention has come a long way, with lessons that can be adapted to end sexual HIV transmission. A community-driven, iterative, and integrated treatment and prevention roadmap is needed to guide individuals, communities, and governments toward zero HIV transmissions. Lessons learned from prevention of perinatal HIV transmission can be adapted and applied to the prevention of sexual HIV transmission. At the core is an appreciation of whole people who have sexual and reproductive goals. Routine HIV testing should be made widely available and without strings attached. An integrated treatment and prevention framework with multiple approaches is supported by practice guidelines and protocols. A systematic review that regards every infection as preventable provides feedback to continuously update the integrated framework. Ultimately, success requires champions and change makers to mobilize around a compelling story of human connection.

**Disclosures**

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