eHealth for Stigma Reduction Efforts Designed to Improve Engagement in Care for People Living with HIV

Deepa Rao, PhD, MA,
Department of Global Health and Department of Psychiatry and Behavioral Sciences, University of Washington, Seattle

Sarah Frey, MSW, and
Department of Global Health, University of Washington, Seattle

Megan Ramaiya, MSc
Department of Psychology, University of Washington, Seattle

Abstract

Purpose of review: HIV-related stigma remains a significant barrier to engagement in care for persons living with HIV (PLWH) worldwide. This review examines the use of eHealth technologies for reducing stigma as a pathway toward improved engagement in care for PLWH. We provide a brief overview of effective stigma reduction interventions for PLWH, both eHealth and others, identify gaps in the research on use of eHealth technologies for stigma reduction, and suggest potential research avenues moving forward.

Recent findings: The majority of HIV-related eHealth studies use technology to improve ART adherence. To date, few HIV-related eHealth studies have included any measurement of stigma.

Summary: Given the current narrow evidence base, further research is needed to determine whether eHealth technologies can help to reduce stigma and improve engagement in care for PLWH.

Keywords

HIV; stigma; eHealth; technology; HIV treatment engagement; intervention

Introduction

Considering the Joint United Nations Programme on HIV/AIDS '90-90-90' treatment targets for people living with HIV (PLWH) [1], behavioral interventions for HIV are now directly focusing on engagement in care outcomes. This three-part target strategy states that by 2020:

90% of PLWH will know their status; 90% of those diagnosed will receive sustained antiretroviral therapy (ART); 90% of those receiving ART will reach viral suppression. Internalized stigma, or the degree to which PLWH endorse negative beliefs associated with HIV about themselves [2], continues to significantly impede optimal engagement in HIV care worldwide [3, 4]. Specifically, internalized stigma, as opposed to stigmas that operate in the public sphere, has a direct impact on individual's adherence behaviors [5]. Thus, HIV-related stigma reduction may positively impact the 90-90-90 targets. Accordingly, the HIV research field is shifting from examining stigma as a primary intervention outcome to exploring stigma reduction as a pathway toward improved engagement in care for PLWH [6].

Electronic health (eHealth) technologies, which comprise wide-ranging information and communication resources including text messaging, email, and internet-based tools such as videos, games, chat rooms, and social media [7], represent a novel and exciting platform for enhancing social connectedness. Thus, they are uniquely positioned to aid in delivery of stigma reduction interventions for improving care engagement in PLWH. Additionally, eHealth technologies may provide ideal resources for measuring stigmatizing attitudes in both research and clinical practice. Researchers have recently developed methods of measuring implicit and explicit stigma using validated instruments on electronic devices [8, 9], a tremendous milestone for studies conducted entirely through mobile technologies.

The potential benefits of eHealth interventions are manifold: not only do they align with the global public health agenda by generating access to evidence-based treatment for large numbers of individuals at potentially low costs [10], but they also address distance- and transportation-related barriers to treatment engagement by providing the opportunity to seek and receive care from the comfort of home. With PLWH in particular, eHealth can also confer benefits of protection via anonymity in settings with high levels of stigma against PLWH [11].

The purpose of this review is to examine the utility of using eHealth technologies to reduce stigma as a pathway towards improved engagement in care for PLWH. We provide a brief review the literature base on effective stigma reduction interventions for PLWH (delivered through both eHealth and non-eHealth approaches), identify current gaps in the research on use of eHealth technologies for stigma reduction, and suggest ways forward to strengthen this nascent yet important line of research as we continue to move towards the 90-90-90 targets.

Non-eHealth Approaches to Reduce HIV-Related Stigma: What Works?

In one existing review of traditionally delivered (i.e., non-electronic) HIV-related stigma reduction interventions, Brown, Macintyre, and Trujillo [12] identified 22 stigma reduction programs delivered in both high-income and low- and middle-income country (LMIC) settings. Four intervention categories for reducing HIV-related stigma — both in the public sphere among community members and internally for PLWH themselves — were identified: (1) *educational* or *information-based* strategies; (2) *contact* with affected persons; (3) *counseling* approaches; and (4) training in *coping skills* [12]. Interventions that target

education are among the most frequently implemented, and are generally designed to counter misinformation about PLWH by providing up-to-date knowledge on the biology of HIV/AIDS, modes of disease transmission, and methods for risk reduction. Education can be used with community members, to counter public stigma, as well as with PLWH themselves, to reduce internalized stigma. *Contact*-based interventions include direct (e.g., guided face-to-face discussions, shared social activities) and/or indirect (e.g., case vignettes, live or recorded testimonials from PLWH) social contact between community members and PLWH. Contact supports the reduction of stigma on bi-directionally, potentially reducing internalized stigma for PLWH and public stigma among community members. Increasing evidence supports use of contact-based interventions in improving attitudes and reducing stigma more broadly [13–15]. Corrigan, a leading anti-stigma researcher, identified contact as a key best practice of 'Strategic Stigma Change'[16] and theorized that development of personal relationships between community members and PLWH is a necessary means of dispelling misinformation, generating empathy, and humanizing HIV. The third and fourth strategies are used specifically to reduce internalized stigma carried by PLWH. *Counseling* approaches provide structure and support for attitudinal and behavioral change, while *coping skills* interventions help PLWH navigate stigmatizing situations individually or in groups by teaching behavioral techniques such as conflict diffusion, guided relaxation, and desensitization.

The Brown and colleagues review suggested that more research was necessary to determine the effectiveness of these approaches [12]. For instance, several studies that incorporated education-based interventions reported reductions in public stigmatizing attitudes and behaviors at follow-up. However, consistent with Corrigan's suggestions [16], these changes trended in a superficial direction, with little-to-no change in deeper-seated fears regarding HIV or in attitudes over time. Contact-based interventions emerged as one of the more promising strategies, though only when combined with one or more additional intervention components.

In our own work to develop, test and evaluate an in person, group-based program to reduce internalized stigma in African American women living with HIV in the United States (US) (the UNITY workshop), we also noted the benefit of including additional methods such *active learning* and *modeling*, and perhaps most importantly, a focus on enhancing *social support* [17–20]. Our studies with the UNITY workshop have shown that social support and contact were key components of reducing stigma among African American women living with HIV, and most significantly, stigma reduction and increased social support were closely tied to decreases in HIV viral load.

Revisiting the evidence behind stigma's potential impact on the 90-90-90 targets, several researchers have found specific associations between HIV-related stigma and antiretroviral therapy (ART) adherence. Katz and colleagues (2013) conducted a review of 23 studies that examined the association between stigma and adherence (on intrapersonal, interpersonal, and structural levels), and found that 75% of 20 cross-sectional studies demonstrated an association between stigma reduction and ART adherence. However, only three studies from the review examined associations between stigma reduction and adherence longitudinally,

two of which showed null findings. Thus, the authors refrained from drawing conclusions from the few available studies [21].

While several non-intervention studies have documented associations between stigma and engagement in care for PLWH [22–25], only one intervention study in Senegal evaluated the impact of a community- and health facility-level program for reducing enacted and perceived stigma and increasing engagement in HIV care services [26]. Stigma was measured in the context of service delivery for key populations at-risk for or currently living with HIV (Men who have Sex with Men (MSM) and Female Sex Workers (FSW)). The authors found a reduction in stigma, but did not examine its association with engagement in care. They also reported a 41% loss to follow up among MSM and 10% among FSW.

eHealth Technologies to Reduce HIV-Related Stigma

Given the benefit that SMS messaging and online chat rooms have for anonymous social support [27], different eHealth modalities have potential for targeting each of the mechanisms described above (education, contact, counseling and coping skills) to reduce HIV-related stigma for PLWH. In the general population, both computer- and web-based intervention packages have demonstrated effectiveness when used to provide psychoeducation and cognitive behavioral therapies to reduce emotional distress [28, 29]. In the HIV treatment and prevention field, the majority of published eHealth behavioral studies have used these technologies to promote ART adherence [30]. Few eHealth studies, however, have directly included measurement of stigma, either as primary or secondary outcome or as mediator. In one study in India, a brief (3-session), tablet-based intervention for reducing HIV stigma among healthcare staff is currently being evaluated, with the ultimate goal of improving the quality of providers' attitudes toward and treatment of PLWH [31]. The intervention combines educational content related to HIV stigma with contact, which is achieved via video vignettes depicting stigmatizing interactions between PLWH and healthcare staff. The intervention uses a video walkthrough of a healthcare facility and asks participants to identify locations within the healthcare setting where stigmatizing interactions might occur. Vignette cast members included actors, study staff, and three people openly living with HIV. Ultimately, participants obtain navigational assistance as well as contact via ehealth modalities.

In our own work on development of a behavioral stigma reduction intervention (The Positive Living Program) among African-immigrant PLWH in the US, we found that a tablet-based program was useful in reducing internalized stigma scores ($p = 0.2$) and depressive symptoms ($p < 0.01$) between intervention and 1-week follow up in a pilot feasibility study of 25 African immigrants [32]. The Positive Living Program intervention was based on an eHealth ART adherence program called Turning to Sunshine developed by Simoni and colleagues for use in China [33], as well as the UNITY workshop (as described above, UNITY uses an in person, group format) [17, 19]. The Positive Living Program presents elements of behavioral activation, problem solving, and other basic cognitive behavioral techniques in an online format. Videos from the UNITY workshop are incorporated into the Positive Living Program, which we developed to be delivered completely online. An online

physician helps the participant navigate the exercises, and an in person, health care worker assists the patient with any technical issues or program questions.

Outside of this work, investigators interested in developing feasible and effective eHealth interventions for improving medication adherence among PLWH have primarily explored questions regarding the feasibility of using technology for stigma reduction. In a qualitative study of transgender women and MSM in Thailand, researchers found that participants universally endorsed the idea of developing local eHealth resources to address internalized stigma related to HIV and improve public perceptions about HIV [34]. In another qualitative study, researchers identified desired content and features of a mobile app aimed at improving the healthcare needs of English and Spanish-speaking PLWH residing in the US [35]. While the purpose of these studies was gathering general information on HIV treatment, participants indicated that eHealth could be a useful avenue for enhancing social support, including chat forums, testimonials of lived experiences, and follow-up with personal outreach. Notably, a recent study found that PLWH from underserved populations in the US were willing to use smartphones for research [36], but found an inverse relationship between smartphone use and age, HIV stigma, social isolation, and other predictor variables.

More recent studies of eHealth interventions to promote ART adherence have begun to include measures of stigma. For example, the ongoing Mobile phone-based Approach for Health Improvement, Literacy and Adherence (MAHILA) trial study [37] is assessing the feasibility, acceptability, and preliminary efficacy of an eHealth intervention for enhancing self-care and ART adherence among HIV-infected women in India. In this study, investigators have included internalized stigma as a secondary outcome for analysis. Interestingly, in a recent Australian study of text messaging to improve HIV medication adherence, investigators did not find that text messaging was associated with ART adherence, but instead found that lower perceived stigma in PLWH was associated with increased adherence [38].

Conclusion

Given the exceedingly small evidence base on the effectiveness of eHealth interventions to reduce internalized stigma for PLWH, it is yet to be determined whether eHealth technologies can be effectively employed to improve engagement in care for this population. Relatedly, a salient theoretical and empirical question also remains: Can we effectively distill the essential mechanism of contact into electronic platforms for the purpose of reducing internalized stigma? On one hand, the speed, anonymity, availability, low cost, and convenience of eHealth technology indicate great theoretical promise for reducing stigma and helping PLWH engage in care. Yet, on the other hand, researchers have been asserting for years that, as we increase our reliance on technology for interpersonal connection in both personal and professional spheres, our dependence on this technology also fosters increased feelings of loneliness and isolation [39, 40]. It is possible that eHealth technologies may only create the illusion of interpersonal connectedness and support, while effectively diminishing critical opportunities for in-person, face-to-face interactions. In-person interactions provide key contexts for experiences of empathy through physical proximity and closeness, as well as generation and interpretation of facial expressions and body language,

which may serve as core mechanisms for stigma reduction. Furthermore, we must also acknowledge that technology can do little for people who experience severe stigma to the point of social isolation not only in physical domains, but also in the electronic world.

Despite the limitations inherent in use of eHealth technologies, their utility and potential benefits for stigma reduction and engagement in care for PLWH remain worthy of investigation. In thinking toward future research directions, several avenues for exploration emerge. First, future research studies would clearly benefit from an examination of eHealth for HIV-related stigma reduction and engagement in care, varying in-person and online treatment arms or using dismantling approaches to identify which aspects of interventions are helpful. Use of dismantling approaches (e.g., component analyses, single-case experimental designs) may be especially impactful, given our limited current knowledge of the active ingredients or core mechanisms underlying effective stigma reduction interventions both within and outside of the context of HIV [12]. Post-hoc qualitative methods may be an additional means of gathering participant feedback on the putative active ingredients of these interventions.

Second, future studies should contrast outcomes in varying populations to understand when, where, and for whom eHealth technologies can be of benefit for HIV-related stigma reduction. For example, it may be the case the eHealth technologies can entice isolated, social media users to leave their homes and engage in person social support, where stigma reduction may be most impactful. Carefully designed studies will be critical to learn the power and limitations of eHealth interventions for stigma reduction.

Third, though eHealth technologies may function as self-help resources for stigmatized PLWH, their utility for non-specialist or lay providers with limited-to-no prior experience in delivery of health services should also be examined. Smartphones and tablets, for instance, are highly portable, user-friendly devices that that may be accessed by lay healthcare providers who wish to regularly or intermittently reference digitally available intervention guides while providing clinical services in the field. Strategic use of these technologies by lay providers may have notable global health impact, given that 90% of the HIV burden exists in LMICs with chronic shortages of trained health workers [12].

Fourth, questions of intervention dosage also remain: online or smartphone-based interventions alone may be sufficient for some PLWH with internalized stigma. However, for others with higher needs, such interventions may serve as an entry point for future face-to-face interventions. This latter use of technology would be much like the stepped-care model of treatment used in Sweden with online Cognitive Behavioral Therapy [29], where patients participate in online treatment while waiting to receive in-person care from a psychotherapist. Those who find their emotional distress reduced after participation are instructed to remove themselves from the waitlist, while non-improvers remain in queue for in-person treatment.

In light of ongoing advances in biomedical and behavioral HIV prevention and treatment, the global community is beginning to fathom an HIV/AIDS-free generation for the first time in nearly thirty years. It is our hope that, within the next decade, novel intervention research

at the intersection of HIV, stigma reduction, and eHealth will allow us to continue narrowing the treatment gap in PLWH worldwide.

References

1. Joint United Nations Programme on HIV/AIDS 90-90-90: An ambitious treatment target to help end the AIDS epidemic. Geneva: UNAIDS 2014.

2. Link BG. Understanding labeling effects in the area of mental disorders: An assessment of the effects of expectations of rejection. American Sociological Review. 1987:96–112.

3. Knettel BA, Cichowitz C, Ngocho JS, Knippler ET, Chumba LN, Mmbaga BT et al. Retention in HIV Care During Pregnancy and the Postpartum Period in the Option B+ Era: A Systematic Review and Meta-Analysis of Studies in Africa. J Acquir Immune Defic Syndr. 2017. doi:10.1097/qai.0000000000001616.

4. Kempf MC, McLeod J, Boehme AK, Walcott MW, Wright L, Seal P et al. A qualitative study of the barriers and facilitators to retention-in-care among HIV-positive women in the rural southeastern United States: implications for targeted interventions. AIDS Patient Care STDS. 2010;24(8):515–20. doi:10.1089/apc.2010.0065. [PubMed: 20672971]

5. Rao D, Feldman B, Fredericksen R, Crane P, Simoni J, Kitahata M et al. A Structural Equation Model of HIV-Related Stigma, Depressive Symptoms, and Medication Adherence. AIDS and Behavior. 2011;epub ahead of print.

6. Grossman CI, Stangl AL. Editorial: Global action to reduce HIV stigma and discrimination. J Int AIDS Soc. 2013;16(3 Suppl 2):18881. doi:10.7448/ias.16.3.18881. [PubMed: 24242269]

7. Eng TR. The eHealth landscape: a terrain map of emerging information and communication technologies in health and health care. 2001.

8. Waters AJ, Miller EK, Li Y. Administering the Implicit Association Test in an ecological momentary assessment study. Psychol Rep. 2010;106(1):31–43. doi:10.2466/pr0.106.1.31-43. [PubMed: 20402424]

9. Rao D, Molina Y, Lambert N, Cohn SE. Assessing Stigma among African Americans Living with HIV. Stigma and Health. 2016;1(3):146–55. doi:10.1037/sah0000027. * Note: Though stigma has been identified as a barrier to treatment engagement in African American PLWH, few studies have sought to develop or adapt culturally relevant measures of stigma for this high-risk and understudied group. This study is among the first to culturally adapt and validate a brief measure of internalized and enacted stigma in African American PLWH, with the goal of informing future interventions in this population. [PubMed: 27761520]

10. Yah CS, Tambo E, Khayeka-Wandabwa C, Ngogang JY. Impact of telemonitoring approaches on integrated HIV and TB diagnosis and treatment interventions in sub-Saharan Africa: a scoping review. Health Promotion Perspectives. 2017;7(2):60–5. doi:10.15171/hpp.2017.12. [PubMed: 28326285]

11. Mboya B, Temu F, Awadhi B, Ngware Z, Ndyetabura E, Kiondo G et al. Access to HIV prevention services among gender based violence survivors in Tanzania. The Pan African Medical Journal. 2012;13 Suppl 1:5.

12. Brown L, Macintyre K, Trujillo L. Interventions to reduce HIV/AIDS stigma: What have we learned? AIDS Education and Prevention. 2003;15(1):49–69. [PubMed: 12627743]

13. Henderson C, Noblett J, Parke H, Clement S, Caffrey A, Gale-Grant O et al. Mental health-related stigma in health care and mental health-care settings. The Lancet Psychiatry. 2014;1(6):467–82. [PubMed: 26361202]

14. Thornicroft G, Mehta N, Clement S, Evans-Lacko S, Doherty M, Rose D et al. Evidence for effective interventions to reduce mental-health-related stigma and discrimination. The Lancet. 2016;387(10023):1123–32. ** Note: This narrative review provides a crucial window into interventions targeting reduction in mental-illness-related stigma and discrimination worldwide. Key findings include (1) clear short-term benefits of contact-based interventions; (2) weak evidence for longer-term benefits of stigma reduction initatives; and (3) few studies on intervention development and evaluation in low resource settings.

15. Corrigan PW, Morris SB, Michaels PJ, Rafacz JD, Rüsch N. Challenging the public stigma of mental illness: a meta-analysis of outcome studies. Psychiatric services. 2012;63(10):963–73. [PubMed: 23032675]

16. Corrigan P Best practices: Strategic stigma change (SSC): five principles for social marketing campaigns to reduce stigma. Psychiatr Serv. 2011 62(8):824–6. [PubMed: 21807820]

17. Rao D, Desmond M, Andrasik M, Rasberry T, Lambert N, Cohn S et al. Feasibility, Acceptability, and Preliminary Efficacy of the 'Unity Workshop': An Internalized Stigma Reduction Intervention for African-American Women Living with HIV. AIDS Patient Care & STDs. 2012;26(10):614–20. [PubMed: 22984780]

18. Kemp C, Simoni J, Turan J, Cohn S, Nevin P, Lipira L et al., editors. Social support and HIV stigma are associated with subsequent viral load and viral suppression among African American women living with HIV: An exploratory longitudinal analysis. 13th International AIDS Impact Conference; 2017; Cape Town, South Africa.

19. Rao D, Kemp C, Huh D, Nevin P, Turan J, Cohn S et al. (In Press). Stigma Reduction Among African American Women with HIV: UNITY Health Study JAIDS; 2017 ** Note: This study presents the primary outcome findings of the UNITY Health Study, which investigated stigma reduction among African American women with HIV. Findings suggested that social support and contact were a key mechanisms for reduction of stigma in this population.

20. Aronson E, Wilson T, Akert R. Social Psychology Upper Saddle River, NJ: Pearson Education; 2005.

21. Katz IT, Ryu AE, Onuegbu AG, Psaros C, Weiser SD, Bangsberg DR et al. Impact of HIV-related stigma on treatment adherence: systematic review and meta-synthesis. J Int AIDS Soc. 2013;16(3 Suppl 2):18640. doi:10.7448/ias.16.3.18640. [PubMed: 24242258]

22. McDoom MM, Bokhour B, Sullivan M, Drainoni ML. How older black women perceive the effects of stigma and social support on engagement in HIV care. AIDS Patient Care STDS. 2015;29(2): 95–101. doi:10.1089/apc.2014.0184. [PubMed: 25494607]

23. Churcher S Stigma related to HIV and AIDS as a barrier to accessing health care in Thailand: a review of recent literature. WHO South-East Asia journal of public health. 2013;2(1):12–22. doi: 10.4103/2224-3151.115829. [PubMed: 28612818]

24. Kelly J, Amirkhanian Y, Yakovlev A, Musatov V, Meylakhs A, Kuznetsova A et al. Stigma reduces and social support increases engagement in medical care among persons with HIV infection in St. Petersburg, Russia. J Int AIDS Soc. 2014;17(4 Suppl 3):19618. doi:10.7448/ias.17.4.19618. [PubMed: 25394122]

25. Treves-Kagan S, Steward WT, Ntswane L, Haller R, Gilvydis JM, Gulati H et al. Why increasing availability of ART is not enough: a rapid, community-based study on how HIV-related stigma impacts engagement to care in rural South Africa. BMC Public Health. 2016;16:87. doi:10.1186/s12889-016-2753-2. *Note: South Africa provides a unique context to examine efforts to reduce HIV-related morbidity and mortality in LMICs. Though the country boasts the world's largest antiretroviral program and has successfully integrated HIV testing and treatment into primary care settings, less than half of PLWH remain unaware of their status, and only half of eligible clients are on ART. This key study uses qualitative methods with a robust sample size (N = 684) to directly assess stigma's role in maintaining the HIV epidemic throughout the country. [PubMed: 26823077]

26. Lyons CE, Ketende S, Diouf D, Drame FM, Liestman B, Coly K et al. Potential Impact of Integrated Stigma Mitigation Interventions in Improving HIV/AIDS Service Delivery and Uptake for Key Populations in Senegal. J Acquir Immune Defic Syndr. 2017;74 Suppl 1:S52–s9. doi: 10.1097/qai.0000000000001209. *Note: This study represents one of few efforts to design and deploy stigma reduction interventions for PLWH in resource-constrained LMICs. This pilot evaluation trial is especially notable due to its tailoring of a stigma reduction intervention for key populations (i.e., men who have sex with men and female sex workers) with comparatively high HIV burdens. [PubMed: 27930612]

27. White M, Dorman SM. Receiving social support online: implications for health education. Health education research. 2001;16(6):693–707. [PubMed: 11780708]

28. Bartolo A, Pacheco E, Rodrigues F, Pereira A, Monteiro S, Santos IM. Effectiveness of psycho-educational interventions with telecommunication technologies on emotional distress and quality

of life of adult cancer patients: a systematic review. Disability and rehabilitation. 2017:1–9. doi: 10.1080/09638288.2017.1411534.

29. Andersson G, Carlbring P. Internet-Assisted Cognitive Behavioral Therapy. Psychiatr Clin North Am. 2017;40(4):689–700. doi:10.1016/j.psc.2017.08.004. [PubMed: 29080594]

30. Amico KR Evidence for Technology Interventions to Promote ART Adherence in Adult Populations: a Review of the Literature 2012–2015. Curr HIV/AIDS Rep. 2015;12(4):441–50. doi: 10.1007/s11904-015-0286-4. ** Note: This brief and important summary synthesizes a large body of recent research (i.e., between 2013 and 2015) on technology-assisted ART promotion interventions for adult PLWH. [PubMed: 26412085]

31. Radhakrishna K, Dass D, Raj T, Rakesh D, Kishore R, Srinivasan K et al. Development of a Novel Tablet-based Approach to Reduce HIV Stigma among Healthcare Staff in India. Perspect Health Inf Manag. 2017;14(Spring):1b * Note: This India-based study highlights the development of a tablet-based stigma reduction intervention for improving provider attitudes towards PLWH. It is one of few documented interventions that include stigma as a primary target and outcome.

32. Lipira L, Nevin P, Frey S, Velonjara J, Endeshaw M, Kumar S et al. The Positive Living Program: Development and pilot evaluation of a multimedia behavioral intervention to address HIV-related stigma and depression among African-immigrant PLWH in King County, WA . Under Review. 2017.

33. Simoni JM, Kutner BA, Horvath KJ, Yang JP, Chen WT, Shiu CS, Aunon FM, Li XH, Lu HZ, Hu M, Yu Y, Wang H (2016, 5). A computer-based program to promote art adherence, mental health, and treatment engagement among PLWHA in China: Development and initial acceptability. Poster (#49) presented at the 11th International Conference on HIV Treatment and Prevention Adherence, Fort Lauderdale, FL.

34. Anand T, Nitpolprasert C, Kerr SJ, Muessig KE, Promthong S, Chomchey N et al. A qualitative study of Thai HIV-positive young men who have sex with men and transgender women demonstrates the need for eHealth interventions to optimize the HIV care continuum. AIDS Care. 2017;29(7):870–5. doi:10.1080/09540121.2017.1286288. [PubMed: 28158952]

35. Schnall R, Bakken S, Rojas M, Travers J, Carballo-Dieguez A. mHealth Technology as a Persuasive Tool for Treatment, Care and Management of Persons Living with HIV. AIDS and Behavior. 2015;19(Supplement 2):81–9. doi:10.1007/s10461-014-0984-8.

36. Schnall R, Cho H, Webel A. Predictors of willingness to use a smartphone for research in underserved persons living with HIV. Int J Med Inform. 2017;99:53–9. doi:10.1016/j.ijmedinf. 2017.01.002. [PubMed: 28118922]

37. Reynolds NR, Satyanarayana V, Duggal M, Varghese M, Liberti L, Singh P et al. MAHILA: a protocol for evaluating a nurse-delivered mHealth intervention for women with HIV and psychosocial risk factors in India. BMC Health Serv Res. 2016;16(a):352. doi:10.1186/s12913-016-1605-1. * Note: This study is novel in its (1) use of lay or non-specialist providers (in this instance, nurses) to deliver a mobile phone-based adherence intervention for PLWH in India; and (2) measurement of stigma as a secondary analytic outcome. [PubMed: 27491288]

38. Mao L, Buchanan A, Wong HTH, Persson A. Beyond mere pill taking: SMS reminders for HIV treatment adherence delivered to mobile phones of clients in a community support network in Australia. Health Soc Care Community. 2018. doi:10.1111/hsc.12544.

39. Turkle S Alone Together: Why We Expect More from Technology and Less from Each Other. New York: Basic Books; 2011.

40. Turkle S Reclaiming Conversation: The Power of Talk in a Digital Age. New York: Penguin; 2015 ** Note: Turkle, a leading psychologist directing current discourse on technology, provides a critical reflection on the intersections of technology, identity, and human empathy in her latest book.