



## **PARTNERSHIPS**

Funded by National Institute of Mental Health

## **IMPLEMENTED BY**

Duke University School of Nursing  
University of Cape Town  
Florida State University  
University of North Carolina at Chapel Hill  
One Cow Standing





MASI

## THE SHORT OF IT

Pilot testing MASI (MASakhane Siphucule Impilo Yethu; Xhosa for 'Let's empower each other and improve our health') is pilot testing an adapted version of the HealthMpowerment app to improve antiretroviral therapy adherence among South African adolescents and young adults living with HIV.



**50**

**50 adolescents and young adults living with HIV participating in pilot testing**



**MASI is enrolling in Cape Town, South Africa**

**15-21**

**Age range of participants**

# BACKGROUND

**Adolescents are disproportionately affected by HIV<sup>1</sup> and repeatedly demonstrate lower levels of ART adherence compared to adults.<sup>2-3</sup>**

Suboptimal adherence is associated with increased morbidity, mortality, and the forward transmission of HIV.<sup>4-6</sup> Despite the recognition that adolescents face unique challenges<sup>7,8</sup> and regularly demonstrate poor adherence,<sup>9,10</sup> recent reviews of interventions to improve ART adherence among adolescents have described the current evidence as both “sparse” and “lacking in its quality.”<sup>11,12</sup>

Developmental theories and research suggest that **adolescents are particularly sensitive to the social networks in which they are embedded.**<sup>13-15</sup> Social networks have been shown to influence adolescent behaviors including substance use,<sup>16-19</sup> diet,<sup>20,21</sup> and adherence to medications for chronic diseases.<sup>22,23</sup> While little is known about the relationship between social network-level factors and ART adherence among adolescents, **social networks are likely to influence ART adherence in this population. Thus, there is a critical need to identify social network-level factors associated with adolescent ART adherence so that they can be targeted by novel interventions.** With access to mobile phone technology increasing among youth in settings like South Africa,<sup>24,25</sup> mHealth interventions hold promise as an effective way to reach young people in HIV prevention and care interventions.<sup>26,27</sup>

# STUDY DESCRIPTION

## AIM 1

**Identify the relationship between social network-level factors (structural and functional characteristics) and clinical outcomes including viral suppression and ART adherence among adolescents living with HIV in Cape Town, South Africa.** Dr. Mulawa added a custom tablet-based social network assessment to collect egocentric network data among a cohort of adolescents with HIV. She analyzed these egocentric network data (n = 100) to explore the relationship between social network-level factors and clinical outcomes.

## AIM 2

**Iteratively customize the HMP app to promote ART adherence among adolescents living with HIV by engaging their social networks.** Dr.

Mulawa and her team adapted the HMP app for South African adolescents, resulting in MASI (MASakhane Siphucule Impilo Yethu; Xhosa for 'Let's empower each other and improve our health'). Informed by the findings of Aim 1, Dr. Mulawa's team then conducted in-depth interviews (IDIs) with adolescents (n = 15) to further customize MASI, for this population. Dr. Mulawa and her team then conducted a usability study with 12 participants. Participants installed the MASI app on their phones and used it for daily for 3 weeks. At their follow up visit, they were then asked about their experiences using the app, app content, app improvements, etc.



**15 in-depth Interviews to customize the MASI app**



**Usability testing with 12 participants for 3 weeks**

## AIM 3

**Pilot test MASI with 50 adolescents and young adults to (a) assess its feasibility and acceptability and (b) explore preliminary effects on ART adherence and social support.**

From participant feedback collected in aim 2, the team further tailored and updated the app to reflect the unique needs of the population and enhance optimization in the South African setting. 50 adolescents and young adults are currently being randomized to MASI or comparison condition (information-only version of MASI), and will be completing assessments at baseline, 3-month, and 6-month follow-up.

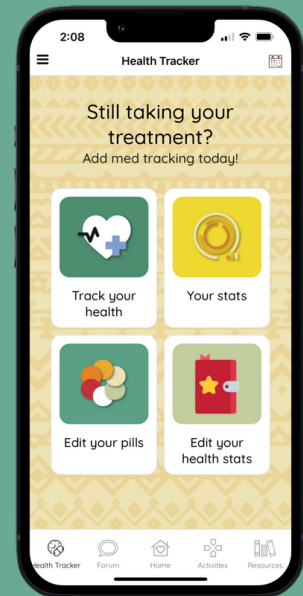
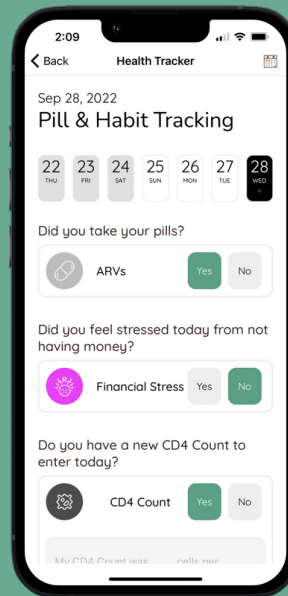


**50 adolescents participating in pilot testing**

# APP HIGHLIGHTS

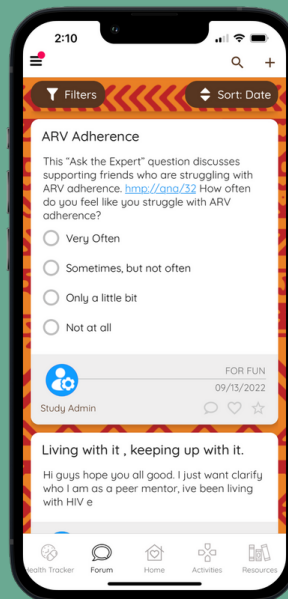
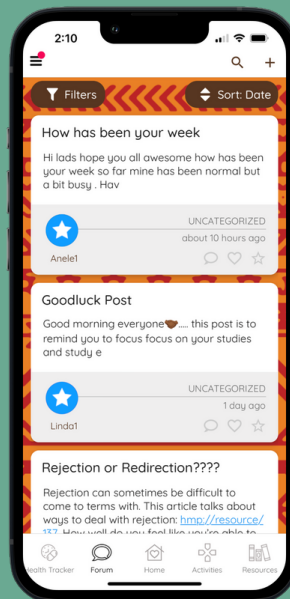
## Health Tracker

Participants can complete activities (quizzes, fill-it-in, break-it-down, etc.) on a variety of topics. Upon completing a certain number of activities, participants can earn in-app badges.



## Forum

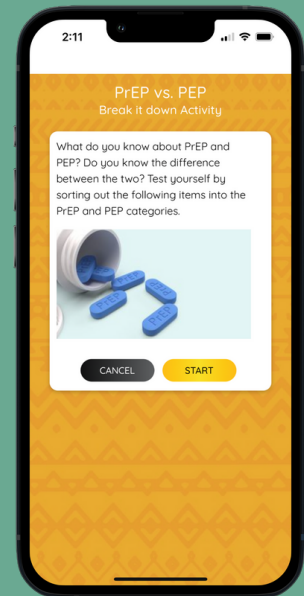
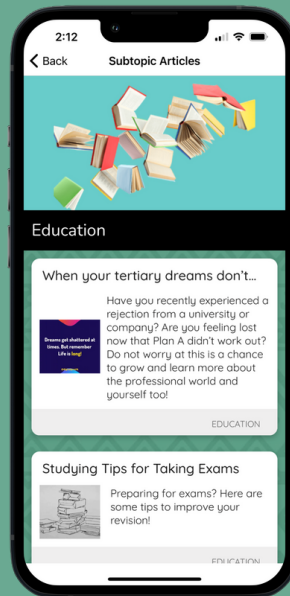
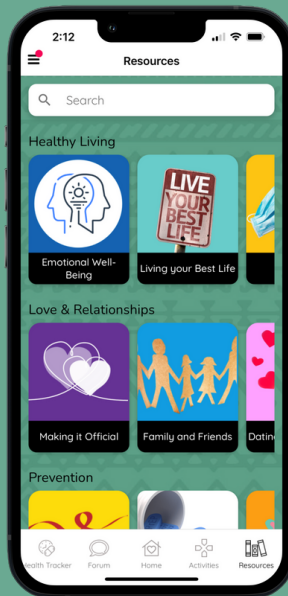
Forum discussions and polls foster community support and peer-to-peer sharing within the app.



# APP HIGHLIGHTS

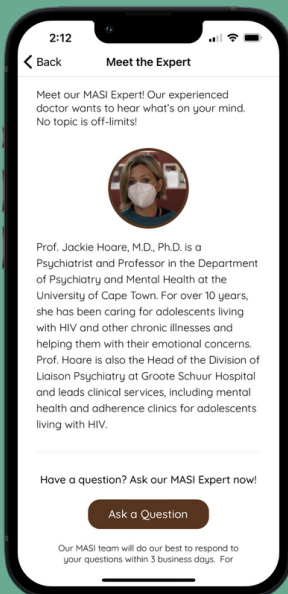
## Resources & Activities

Provides educational content across range of health topics, as well as supports app engagement and behavior change through information and skill-building.



## Ask the Expert

Health care providers answer anonymous user questions and connect users to resources



## FINDINGS

Coming soon!

## WHAT'S NEXT

The MASI study team will analyze the pilot RCT data to further improve the MASI app and study. Findings from the RCT will guide development of an R01 proposal that rigorously evaluates the effectiveness of the mHealth intervention on ART adherence and HIV clinical outcomes.

# REFERENCES

1. UNICEF. Statistical Update on Children, Adolescents and AIDS 2015.
2. Lamb MR, Fayorsey R, Nuwagaba-Biribonwoha H, Viola V, Mutabazi V, Alwar T, et al. High attrition before and after ART initiation among youth (15–24 years of age) enrolled in HIV care. *AIDS*. 2014;28(4):559–68.
3. Nachega JB, Hislop M, Nguyen H, Dowdy DW, Chaisson RE, Regensberg L, et al. Antiretroviral therapy adherence, virologic and immunologic outcomes in adolescents compared with adults in southern Africa. *J Acquir Immune Defic Syndr*. 2009;51(1):65–71.
4. Glass TR, Sterne JA, Schneider MP, De Geest S, Nicca D, Furrer H, et al. Self-reported nonadherence to antiretroviral therapy as a predictor of viral failure and mortality. *AIDS*. 2015;29(16):2195–200.
5. Cohen MS, Chen YQ, McCauley M, Gamble T, Hosseinipour MC, Kumarasamy N, et al. Prevention of HIV-1 infection with early antiretroviral therapy. *N Engl J Med*. 2011;365(6):493–505.
6. von Wyl V, Klimkait T, Yerly S, Nicca D, Furrer H, Cavassini M, et al. Adherence as a predictor of the development of class-specific resistance mutations: the Swiss HIV Cohort Study. *PLoS One*. 2013;8(10):e77691.
7. Adejumo OA, Malee KM, Ryscavage P, Hunter SJ, Taiwo BO. Contemporary issues on the epidemiology and antiretroviral adherence of HIV-infected adolescents in sub-Saharan Africa: a narrative review. *J Int AIDS Soc*. 2015;18:20049.
8. Hudelson C, Cluver L. Factors associated with adherence to antiretroviral therapy among adolescents living with HIV/AIDS in low- and middle-income countries: a systematic review. *AIDS Care*. 2015;27(7):805–16.
9. Mofenson LM, Cotton MF. The challenges of success: adolescents with perinatal HIV infection. *J Int AIDS Soc*. 2013;16:18650.
10. Kim SH, Gerver SM, Fidler S, Ward H. Adherence to antiretroviral therapy in adolescents living with HIV: systematic review and meta-analysis. *AIDS*. 2014;28(13):1945–56.
11. Shaw S, Amico KR. Antiretroviral Therapy Adherence Enhancing Interventions for Adolescents and Young Adults 13–24 Years of Age: A Review of the Evidence Base. *J Acquir Immune Defic Syndr*. 2016;72(4):387–99.
12. Ridgeway K, Dulli LS, Murray KR, Silverstein H, Dal Santo L, Olsen P, et al. Interventions to improve antiretroviral therapy adherence among adolescents in low- and middle-income countries: A systematic review of the literature. *PLoS One*. 2018;13(1):e0189770.
13. Brown BB. Adolescents' relationships with peers. In: Steinberg L, Lerner RM, editors. *Handbook of Adolescent Psychology* (2nd ed). Hoboken, New Jersey: John Wiley & Sons, Inc.; 2004.
14. Albert D, Chein J, Steinberg L. Peer Influences on Adolescent Decision Making. *Curr Dir Psychol Sci*. 2013;22(2):114–20.
15. Crosnoe R, McNeely C. Peer relations, adolescent behavior, and public health research and practice. *Family & community health*. 2008;31 Suppl 1:S71–80.
16. Leung RK, Toumbourou JW, Hemphill SA. The effect of peer influence and selection processes on adolescent alcohol use: a systematic review of longitudinal studies. *Health psychology review*. 2014;8(4):426–57.
17. Wang C, Hipp JR, Butts CT, Jose R, Lakon CM. Peer Influence, Peer Selection and Adolescent Alcohol Use: a Simulation Study Using a Dynamic Network Model of Friendship Ties and Alcohol Use. *Prevention science : the official journal of the Society for Prevention Research*. 2017;18(4):382–93.
18. Schaefer DR, Haas SA, Bishop NJ. A dynamic model of US adolescents' smoking and friendship networks. *Am J Public Health*. 2012;102(6):e12–8.
19. Lakon CM, Wang C, Butts CT, Jose R, Timberlake DS, Hipp JR. A Dynamic Model of Adolescent Friendship Networks, Parental Influences, and Smoking. *Journal of youth and adolescence*. 2015;44(9):1767–86.
20. Badaly D. Peer similarity and influence for weight-related outcomes in adolescence: a meta-analytic review. *Clinical psychology review*. 2013;33(8):1218–36.
21. Sawka KJ, McCormack GR, Nettel-Aguirre A, Swanson K. Associations between aspects of friendship networks and dietary behavior in youth: Findings from a systematized review. *Eating behaviors*. 2015;18:7–15.
22. Ahmad A, Sorensen K. Enabling and hindering factors influencing adherence to asthma treatment among adolescents: A systematic literature review. *The Journal of asthma : official journal of the Association for the Care of Asthma*. 2016;53(8):862–78.
23. Hullmann SE, Brumley LD, Schwartz LA. Medical and psychosocial associates of nonadherence in adolescents with cancer. *Journal of pediatric oncology nursing : official journal of the Association of Pediatric Oncology Nurses*. 2015;32(2):103–13.
24. Pew Research Center. *Emerging Nations Embrace Internet, Mobile Technology* [Internet]. Washington, D.C: Pew Research Center; 2014 [Available from: <http://www.pewglobal.org/2014/02/13/emerging-nations-embrace-internet-mobile-technology/>].
25. Ybarra ML, Mwaba K, Prescott TL, Roman NV, Rooi B, Bull S. Opportunities for technology-based HIV prevention programming among high school students in Cape Town, South Africa. *AIDS Care*. 2014;26(12):1562–7.
26. Hightow-Weidman LB, Muessig KE, Bauermeister J, Zhang C, LeGrand S. Youth, Technology, and HIV: Recent Advances and Future Directions. *Current HIV/AIDS reports*. 2015;12(4):500–15.
27. Forrest JI, Wiens M, Kanters S, Nsanzimana S, Lester RT, Mills EJ. Mobile health applications for HIV prevention and care in Africa. *Curr Opin HIV AIDS*. 2015;10(6):464–71.