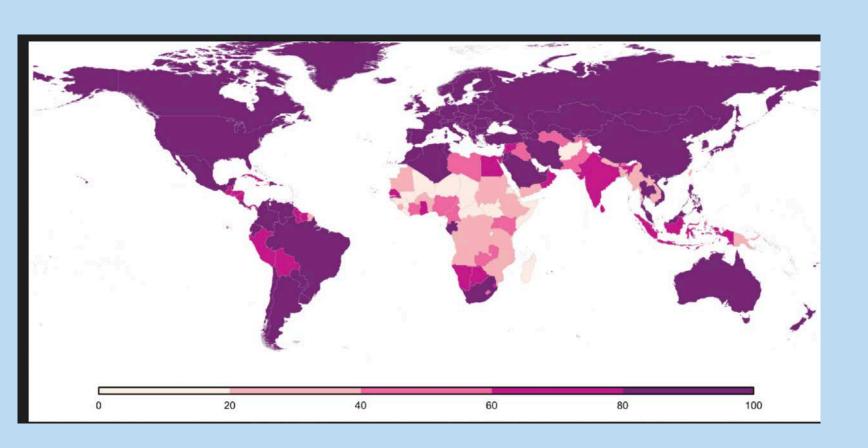
Prevention for Youth 2.0

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Proportion of youth (15-24) using the Internet, 2017



70% of the worlds youth are online

- In 104 countries, >80% of the youth population are online.
- In developed countries, 94% of young people aged 15-24 use the Internet compared with 67% in developing countries and 30% in Least Developed Countries.



Youth and Technology

- Mobile phones are pervasive among youth
 - 95% of teens now report they have a smartphone or access to one
 - 90% of teens go online at least multiple times per day
- Youth are avid consumers of social media
 - 90% of teens use social media platforms, and most (71%) use more than one





Preferences for comprehensive mHealth interventions among youth

- Multiple formative studies have identified comparable preferences for intervention components across multiple settings (both US and globally)
- Features mentioned consistently include:
 - ✓ Facilitating connections to providers and peers
 - ✓ Inclusion of *discreet* reminders for HIV prevention/care related activities
 - ✓ Provision comprehensive, holistic and accurate information
 - ✓ Games/rewards/incentives for usage
 - ✓ Careful attention to privacy/confidentiality



Caveat: Most recent focused on "older adolescents/young adults"

- Both biomedical and technological innovations must understand youth and carefully design protocols for them.
- There are likely important differences in the characteristics of younger youth.
 - Differences in the social environment of younger vs. older youth
 - Younger youth spend more time with their families; the latter spend more time with friends/peers/partners.
 - Differences between perinatally and behaviorally infected adolescents in terms of stigma dynamics and disclosure.





How is this relevant to MTN?

 Lessons learned from development of mHealth interventions can be directly applied to development of microbicide "technology" across Phase I-IV trials.





HIV, mHealth and Youth

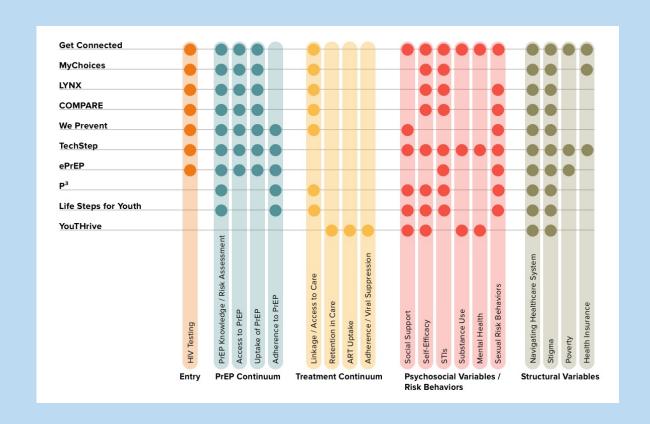
- These technologies offer key functions that are relevant to youth:
 - Anonymity,
 - Social support,
 - Provision of real-time assessment and feedback, and
 - Highly engaging features

 While much progress has been made along the Continuum of Prevention and Care, large gaps exist in the availability and inclusion of mHealth interventions to support biomedical trials



iTech: Technology and the ATN

- One of three funded U19's comprising the ATN
- iTech supports 10+ technologyfocused studies addressing the full prevention and care continuum for youth
- Majority of studies engaging YMSM and trans youth.
- One study for HIV+ youth
- Total number of planned participants in iTech: >3000





Incorporating "youth focused" engagement strategies can support <u>acceptability</u>, <u>usability</u>, and <u>adherence</u>

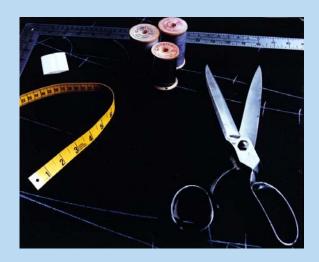
Key Considerations

- ✓ Tailoring interventions to users
- ✓ Fostering social (peer) support
- ✓ Inclusion of game-based elements
- ✓ Provision of self-monitoring/feedback
- ✓ Inclusion of "push factors" (reminders, notifications)



Why Tailor?

- Tailoring increases the message or content relevance to an <u>individual</u> end-user.
- Tailored interventions have been found to produce higher rates of behavior change and <u>maintenance</u> than non-tailored programs in a variety of health domains.
- A review of internet-based behavioral interventions for chronic illness suggests that user engagement may be <u>sustained</u> by addressing health concerns that are relevant to the user and offering tailored advice and feedback.

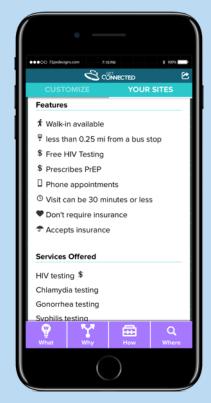


Noar SM et al., Psychol Bull. 2007 Jul; 133(4):673-93. Kreuter MW, et al. Taylor & Francis: New York. 2013:288. [SEP] Schubart et al. *Computers, Informatics, Nursing.* 2011;29(2):81-92.





TESTS Types of Tests **BLOOD TEST SALIVA TEST URINE TEST SWAB TEST** 0 **VISUAL EXAM**





HIV/STI Testing & PrEP Awareness

- A motivationally-based, brief online intervention that employs <u>individual and systems-level</u> <u>tailoring technology</u> to reduce barriers to linkage into competent HIV/STI prevention for YMSM.
 - Site tailored on: Age,
 Race/Ethnicity, Sexual Identity,
 HIV/STI Testing, Structural
 Struggles, Sources of Support,
 Values

Fostering social support

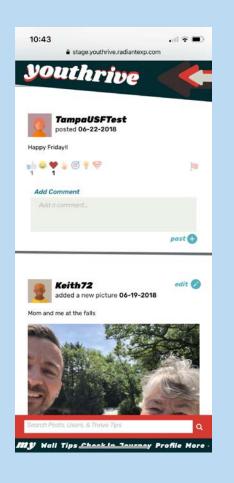


- Features that facilitate the receipt of social support found to positively influence engagement in a range of digital behavior change interventions.
- The availability of social support has been shown to promote engagement by making users feel valued and supported throughout the intervention
- Technological advances show promise for generating support networks that bypass geographic boundaries.





10:40 a stage.youthrive.radiantexp.com youthring **O New Posts** ThriveBot posted 07-05-2018 Breaking newsl @keith72, has just completed a Journey. %



ART Adherence

Interactive web-based intervention leverages:

- (1) enhanced peer-to-peer interaction
- (2) SMS medication reminders,
- (3) mood, substance use, and ART adherence self-monitoring
- (4) tailored ART and HIV informational content to optimize ART adherence.

Inclusion of game-based elements



• Interventions can utilize gamification to deliver highly engaging content, enhancing the degree and depth of participant interaction and increasing behavior change opportunities.



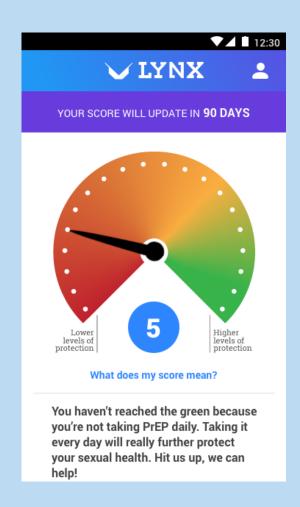






Provision of self monitoring and feedback

- Can introduce a routine/habit that can become a behavior with time due to repetition.
- Can be motivational especially if one is able to see positive results or a trend of improvement.
- Leads to self-evaluation and reflection, leading the individual to make efforts to achieve the set targets.
- Increases self efficacy and determination which can impact behavior change.





Inclusion of "push factors" (reminders, notifications)

- Prompts (email or text reminders) in promoting continued user engagement with digital health interventions
- Notifications should be discreet (e.g. no mention of HIV or specific ART/PrEP medications)







How is this relevant to MTN?

- Lessons learned from development of mHealth interventions can be directly applied to development of microbicide "technology"
- Youth input can provide critical insights into all stages of protocol design and implementation.



Creating opportunities for youth perspectives through research

- Challenge assumptions on how we traditionally collect data (from adults) when we designing studies with/for youth.
 - Use of social media to understand how youth voice their experiences outside of a clinical setting.
 - Engage youth early in the research process through both qualitative and quantitative approaches.









Youth Engagement within iTech

- Convened at each participating site
- Regular in-person meetings
- Provide study specific feedback

Youth Advisory Boards (YAB)

Youth Advisory Council (YAC)

- 1 YAB member/site
- Meet monthly via videoconference
- Address larger issues for overall iTech research agenda

- Focus groups
- Usability testing
- In-depth interviews
- Social media "data mining"

Study Specific Input



Concrete Decisions Informed by iTech Youth

- Recruitment methods
- Recruitment ads (text and graphics)
- Screener and survey language (sexual risk behaviors, sexual and gender identity)
- App content



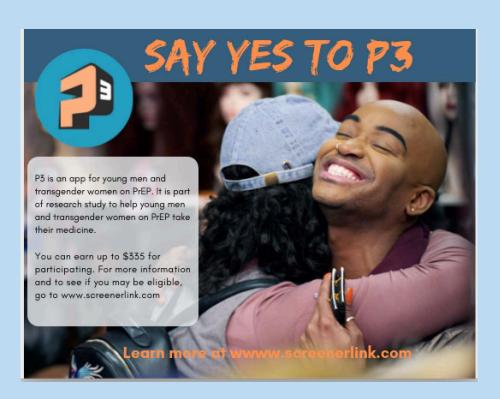
Initial Ads Shown to YAC

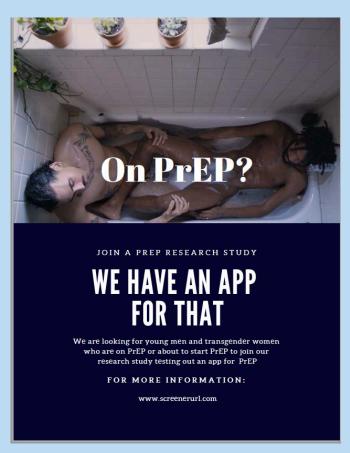


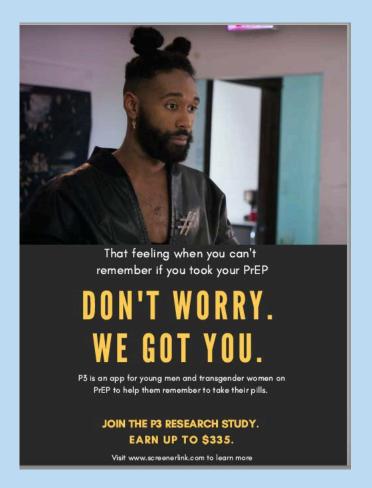




Final Ads (YAC approved)







How is this relevant to MTN?

- Lessons learned from development of mHealth interventions can be directly applied to development of microbicide "technology"
- Youth input can provide critical insights into all stages of protocol design and implementation.
- mHealth tools can augment microbicide trials possibly increasing adherence to product



Integration of new mHealth compatible technologies to measure microbicide use and adherence

Design concepts and operation principles for Smart Intra-vaginal Health **Monitoring Devices** Wojciech Niżański Jacek Lewandowski, Kuo-Ming Chao School of Computing, Electronics and Mathematics Dep. of Reproduction and Clinic of Farm Animals Wroclaw University of Environmental and Life Sciences Coventry University Coventry, UK Wroclaw, Poland j.lewandowski@coventry.ac.uk, k.chao@coventry.ac.uk wojciech.nizanski@up.wroc.pl Fig. 3. System architecture and conceptual designs of the intra-vaginal pH and temperature monitoring sensors.







Consider: the ChArGE platform

Comprehensive Health Adherence using Gaming and Engagement



Ayogo's EmpowerTM Platform

 Ayogo Health Inc. is a Canadian company incorporated in 2011 with personnel in Canada, the United States, the United Kingdom, and South Africa.







- HIPAA compliant hosting server environment
- Available in both iOS and Android app stores



Theoretical Basis

Fogg Behavioral Model

- App motivators include social support and game-based elements
- Ability is increased through knowledge and by identifying and receiving tailored feedback
- Regular self-reports and app notifications act as *triggers* and help participants establish daily adherence behaviors

Social Cognitive Theory

- *observational learning* by participating in app activities
- modeling and vicarious experiences
- self-efficacy and verbal persuasion from expert sources
- reinforcements (rewards and achievements "leveling up").



Evidence base

Input from target population

- Reviewed prior studies, expert consultation
- Conducted Focus groups
- Worked with youth advisory boards across multiple US states
- Performed In-depth interviews with youth including multiple rounds of usability testing of app prototypes

Findings

- Anonymity and privacy important for YMSM eHealth
- Game-based elements (e.g. levels, competition) influence intervention engagement
- Social support and connection with others are important features for apps for YMSM
- YMSM desire information on both HIV-related issues and general health and wellness



AllyQuest: ART Adherence for HIV-positive YMSM





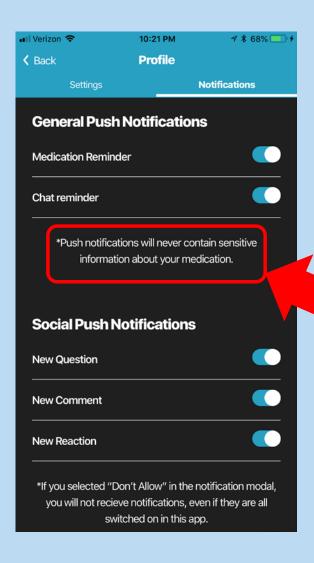


P³: Prepared, Protected, emPowered PrEP adherence for HIV-negative YMSM

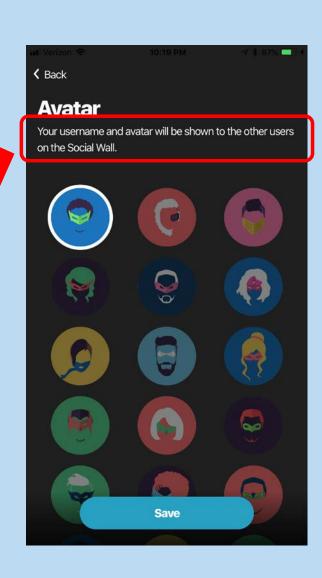
Goal is to create one comprehensive app that is flexible and incorporate tracking of other sexual health-related (e.g. HIV/STI testing) and health-related (e.g. smoking, drug use) behaviors



Privacy Features



Avatars, pseudonyms, confidential pin, 5-minute app time-out





Medication Tracking and Adherence Support

Medication reminder system:

- Personalized, discrete reminders and habit building solutions promote ART/PrEP adherence.
- Flexible to allow for alternate dosing schedules (ondemand PrEP, or future injectable formulations, microbicide use)

Tailored adherence strategies:

- Information provided during initial set up (e.g. time of day ART/PrEP taken) to suggest adherence strategies (e.g. Take when I brush my teeth)
- Healthcare provider dashboard for provision of in-app adherence counseling and tailored messages





Additional Features

Social Wall

- Prompts (e.g. How do you remember your meds?) kick-off daily discussions to foster community, peer sharing, model successful behaviors and provide reinforcement.
- Notifications are sent when someone has commented or "liked" a particular post to facilitate ongoing interactions between users

Daily Quests

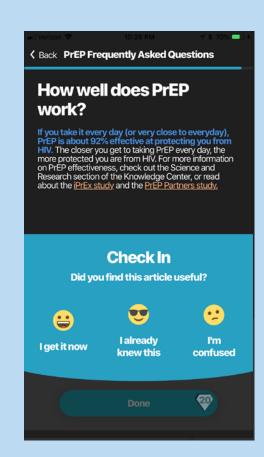
Actionable routine tasks help users set goals, build knowledge/skills.

Brain Games

Quizzes and fun interactive exercises help users test knowledge and skills

Knowledge Center

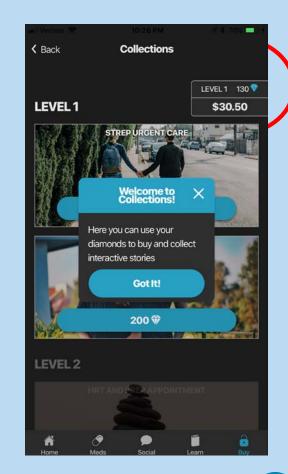
 Multimedia information related to: ART/PrEP, safer-sex, relationships and general health and wellness pulled from large content repository





Virtual and "Real" Rewards

- Virtual bank accounts are seeded with \$\$\$ at Day 1 and participants can either lose or gain \$\$\$ based on daily app usage
 - Tying the incentive to intervention use rather than the targeted behavior (adherence) reduces ethical concerns around coercion and minimizes the impact of the incentive on intrinsic motivation for adherence
- Unlocking "collections"
 - Multi-media (text, video) narratives feature characters navigating common situations that impact ART/ PrEP care & adherence (e.g. substance use, depression, stigma).
 - Webseries "Good Enough" developed by OpenTV (http://www.weareo.tv)





Opportunities await!

- How can we partner and leverage expertise in ATN with MTN and other biomedical networks?
- How can we use mHealth interventions to improve our data collection and the bench-to-community pipeline?
- How can we involve youth in order to obtain critical insights across all protocol stages?
- How can current (and future) mHealth tools augment biomedical trials and possibly increase product adherence?







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