HIV Prevention: Digital Health Interventions to Improve Adherence to HIV Pre-Exposure Prophylaxis

Summary Evidence Table

This table outlines information from the studies included in the Community Guide systematic review of digital health interventions to improve adherence to HIV pre-exposure prophylaxis. It details study quality, population and intervention characteristics, and study outcomes considered in this review. Complete references for each study can be found in the Included Studies section of the review summary.

Abbreviations Used in This Document:

CBO: community-based organization
CDC: Centers for Disease Control and Prevention
Chemsex - use of γ-hydroxybutyrate, γ-Butyrolactone, methamphetamine or mephedrone prior to or during sex.
CI: confidence interval
DBS: dried blood spots
Fmol: femtomole
HIV: Human Immunodeficiency Virus
HS: high school
IQR: interquartile range
MSM: gay, bisexual, and other men who have sex with men
NR: not reported
OR: odds ratio
PrEP: pre-exposure prophylaxis
RCT: randomized controlled trial
RR: relative risk
SD: standard deviation
SES: socioeconomic status
SMS: Short message service
STD: sexually transmitted disease
STI: sexually transmitted infection
TDF: tenofovir disoproxil fumarate
TFV-DP: tenofovir-diphosphate
TGW: trans-gender women
US: United States

Tests Used to Determine Study Participants' Mental Health, Drug and Alcohol Use

AUDIT: Alcohol Use Disorders Identification Test, Alcohol Use Disorders Identification Test (AUDIT) (auditscreen.org)
CES-D: Center for Epidemiologic Studies Depression Scale, National Institute of Mental Health, Center for Epidemiologic Studies Depression Scale (CES-D) (brown.edu)
DAST-10: Drug Abuse Screening Test, Instrument: Drug Abuse Screening Test (DAST-10) | NIDA CTN Common Data Elements
DUDIT: Drug Use Disorders Identification Test, Drug Use Disorders Identification Test (DUDIT) | www.emcdda.europa.eu
MHI5: Mental Health Inventory-5, The Revised Mental Health Inventory-5 (MHI-5) as an ultra-brief screening measure of bidimensional mental health in children and adolescents - ScienceDirect
PHQ-2: Patient Health Questionnaire-2, Patient Health Questionnaire-2 (PHQ-2) - Mental Disorders Screening - National HIV Curriculum (uw.edu)
PHQ-9: Patient Health Questionnaire-9, PHQ-9 (Patient Health Questionnaire-9) - MDCalc
TCU drug screen: Texas Christian University drug screen, TCU Institute of Behavioral Research

Outcomes and Formula Used in This Review:

Excellent PrEP adherence: 7 doses per week, or DBS TFV-DP ≥1250 or 1,246 fmol/punch
Good PrEP adherence: 4 doses or more per week, or DPS TFV-DP ≥700 or 719 fmol/punch
Poor PrEP adherence: less than 4 doses per week, or DBS TFV-DP <700 fmol/punch

Notes:

- Suitability of design includes three categories: greatest, moderate, or least suitable design. Read more >>
- Quality of Execution – Studies are assessed to have good, fair, or limited quality of execution. Read more >>
- Race/ethnicity of the study population: The Community Guide only summarizes race/ethnicity for studies conducted in the United States.
- Final Effect estimates greater than zero are rounded to the nearest tenth; estimates less than zero are rounded to the nearest hundredth.

Study	Intervention Characteristics	Population Characteristics	Results
Author, Year: Colson et al., 2020 **Study Design**: Individual RCT **Suitability of Design**: Greatest **Quality of Execution**: Fair	**Location:** Harlem, New York City, New York, US **Urbanicity:** Urban **Setting:** Community clinic in Harlem, New York City **Intervention Name:** Enhanced PrEP Adherence Package (enPrEP) **Type of Digital Health Intervention:** Text plus website **Digital Health Services:** Adherence tracking: NR Counseling: NR Information and education: in-person and online support groups providing information on HIV and related topics Reminder for taking pills: medication reminder that did not use words such as "PrEP" or "HIV", designed to be relevant to all study participants with no response required Support group: both in-person and online support groups to provide information, informal counseling, and social support **Frequency of Communication:** Weekly pill taking reminder **Provision of Feedback:** Unidirectional pill taking reminder Support group hosted by peer navigators to provide information and informal counseling **Provision of Equipment:** no	**Eligibility Criteria**: MSM and TGW, African American or black, male at birth, 18 years of age or older, residing in New York City, having condomless anal or neovaginal intercourse with male or TGW sexual partner in last 6 months, having any STI in past 6 months, or having on-going sex relationship with a male or TGW partner who's HIV positive **Population of focus:** MSM, TGW, African American persons, low income, unstable housing **Sample Size**: Intervention: 101 Control: 103 Total: 204 **Demographics**: *Age*: 44.6% 18-29 years; 39.2% 30-49 years; 16.2% 50 years or up *Sex*: 95.1% male persons; 4.9% TGW *Sexual orientation*: 48.5% homosexual; 48.5% bisexual; 1.5% heterosexual; 1.5% other persons *Race/Ethnicity*: 100% African American; 20.6% Hispanic persons *HIV risk factors*: NR *STD history*: NR *Substance use*: 15.7% problematic drug use, scored 3 or higher on the TCU Drug Screen *Alcohol use*: 18% harmful alcohol use, scored 8 or more on AUDIT *Mental health conditions*: 45.1% with depressive symptoms, scored 16 or higher on CES-D *Education*: 17.6% <HS; 44.1% HS graduate or equivalent; 25.0% some	**How Outcomes Ascertained**: self-report **Intervention Duration**: 12 months **Results**: Adherence to PrEP: proportion of study participants with good adherence at follow-up points Adherence measured by using 3-item Wilson adherence scale, and linearly transformed to create a scale of 0-100, with good adherence defined as ≥57 out of 100, equivalent to taking PrEP for an average of 4 out 7 days Intervention: 34/101 = 33.8% Comparison: 32/103 = 31.0% Absolute difference: 2.8 percentage points Relative difference: 9.0%

Study	Intervention Characteristics	Population Characteristics	Results
	Comparison: Standard PrEP adherence package with routine services offered by a CBO in Harlem, including case management, escort to appointments and HIV prevention support groups	college; 13.2% college graduate or post-college *Employment*: 45.1% employed; 54.9% not employed *Income*: 44.1% <$10,000; 22.1% $10,000-19,999; 9.8% $20,000-29,000; 20.6% $30,000 or more; 3.4% don't know or missing *Insurance*: 19.1% private insurance or self-pay; 63.7% Medicare/Medicaid; 0.5% missing, 16.7% no coverage of any type	
Author, Year: Fuchs et al., 2018 **Study Design**: Pre-post without comparison **Suitability of Design**: Least **Quality of Execution**: Fair	**Location:** San Francisco, California and Chicago, Illinois, US **Urbanicity:** Urban **Setting:** Community-based agencies and youth venues **Intervention Name:** iTEXT **Type of Digital Health Intervention:** Text plus email **Digital Health Services:** Adherence tracking: NR Counseling: NR Information and education: NR Reminder for taking pills: weekly customized and bi-directional text or email Support group: NR **Frequency of Communication:** Weekly pill taking reminder Weekly check-ins with participants to see how they were doing **Provision of Feedback:**	**Eligibility Criteria**: MSM who had taken PrEP for at least 12 weeks and were willing to continue taking PrEP for an additional 12 weeks, an SMS-capable phone or active e-mail account to receive and send messages, HIV-negative and on PrEP **Population of focus:** MSM who currently use PrEP **Sample Size**: Total: 56 **Demographics**: *Age*: 25% ≤30 years; 75% >30 years *Age, median*: 49 years; range 21-66 years *Sex*: 100% male persons *Sexual orientation*: 100% MSM *Race/Ethnicity*: 67.9% White; 12.5% African American; 8.9% other; 10.7% Hispanic persons *HIV risk factors*: NR *STD history*: NR *Substance use*: NR *Alcohol use*: NR *Mental health conditions*: NR	**How Outcomes Ascertained**: Pill count, medical records, and self-report **Intervention Duration**: 3 months **Results**: Adherence to PrEP: pill count, self-reported missed doses, or medication possession ratio Relative risk (RR) calculated for pill count and self-reported doses: relative risk reduction in missed doses before and after the intervention Pill count: clinic-based pill count, number of doses missed in each reporting period Overall (355 visits): RR: 0.50 95% CI: 0.29-0.84; p=0.008 Analysis only including visits just before and after entering the study (95 visits): RR: 0.23; 95% CI, 0.08-0.67; p=0.007 Self-report: self-reported missed days (doses) in reporting period Overall (359 visits):

Study	Intervention Characteristics	Population Characteristics	Results
	Study staff reached out to participants via phone if they responded they were not well or did not respond in 48 hours for weekly check-ins **Provision of Equipment:** No **Comparison:** Pre-intervention	*Education*: 88% completed some college *Employment*: NR *Income*: NR *Insurance*: NR	RR: 0.52; 95% CI: 0.23-1.17; p=0.11 Analysis only including visits just before and after entering the study (91 visits): RR: 0.45 95% CI: 0.19-1.06; p=0.07 Medication possession ratio: number of doses dispensed/ number of days in the reporting period Overall (357 visits): Relative change: 27.8%; 95% CI: -0.2%-63.7%; p=0.052 Analysis only including visits just before and after entering study (96 visits): Relative change: 28.4%; 95% CI: 0.2%-64.6%; p=0.048 Stratified analysis: Unadjusted analysis showed that participants< 30 years of age were more likely to say that they would use the iText support strategy if available to them (OR=14.8, 95% CI [1.66–131.4]; p=0.004) Compared with white participants, non-white participants were more likely to state that the iText support strategy was helpful (OR=7.3, 95% CI [1.4–37.5]; p=0.017) and were more likely to use the strategy if offered to them (OR=4.7, 95% CI [1.3–17.7]; p=0.024)
Author, Year: Liu et al., 2019 **Study Design**: individual RCT	**Location:** Chicago, Illinois, US **Urbanicity:** urban **Setting:** public health clinic focused on HIV prevention, care and research;	**Eligibility Criteria**: MSM 18-29 years of age, HIV-negative, English speaking, have performed one of the following risk behaviors during last 6 months: 1.Condomless anal sex 2.≥3 anal sex partners	**How Outcomes Ascertained**: Adherence, retention, HIV incidence: medical records Sexual behavior: self-report **Intervention Duration**: 9 months

Study	Intervention Characteristics	Population Characteristics	Results
Suitability of Design: Greatest **Quality of Execution**: Good	study visits occurred within public health clinic or research clinic **Intervention Name:** PrEPmate **Type of Digital Health Intervention:** text plus website **Digital Health Services:** Adherence tracking: NR Counseling: NR Information and education: a password-protected website with key info about PrEP; videos and testimonials Reminder for taking pills: daily, customized text messages; fun facts and trivia in addition to reminder Support group: online support forum moderated by study staff providing confidential space to discuss PrEP-related issues with other participants **Frequency of Communication:** Daily pill taking reminders Weekly check-in to ask how PrEP is going **Provision of Feedback:** Bidirectional, 2-way communication between participants and project director Study staff reached out to participants who indicated they needed assistance via text or phone call and provided tailored support **Provision of Equipment:** No **Comparison:** Standard of care: risk assessment, PrEP education, and brief adherence and	3.Self-reported new STI 4. Known HIV-infected partner Regular access to a computer and or smart phone and willingness to initiate PrEP **Population of focus:** MSM and individuals who are self-described as gender fluid between 18 and 29 years of age **Sample Size**: Intervention: 81 Control: 40 Total: 121 **Demographics**: *Age, mean*: 24.3 years *Sex*: 95.0% male persons; 5.0% TGW *Sexual orientation*: 100% MSM *Race/Ethnicity*: 25.2% White; 27.7% African American; 6.7% Asian; 36.1% Hispanic; 4.2% other persons *HIV risk factors*: median of 4 anal sex partners in past 3 months; 65% had condomless anal sex in past 3 months; 45% had condomless receptive anal sex in past 3 months *STD history*: 21% had any type of STI at study baseline *Substance use*: 64% any recreational drug use *Alcohol use*: 73% binge drinking in past 3 months *Mental health conditions*: 29% with depressive symptoms, scored ≥2 on PHQ-2 *Education*: 1% <HS; 23% HS graduate; 76% some college or higher *Employment*: 47% full time; 33% part time; 20% not employed *Income*: 59% <$20K; 41% ≥$20K	**Results**: Adherence: Good adherence: have a visit completed, and TFV-DP ≥700 fmol/punch, equivalent to 4 or more doses of PrEP in the past week Overall: Intervention: 72% Control: 57.0% Absolute difference: 15.0 percentage points Relative difference: 26.3% Unadjusted OR: 1.05; 95% CI, 1.06-3.94; p=0.03 Adjusted OR: 2.06; 95% CI, 1.07-3.99; p=0.03 Adjusted for baseline differences in depression Week 4: Intervention: 90% Control: 77.0% Absolute difference: 13.0 percentage points Relative difference: 16.9% Week 12: Intervention: 76% Control: 66.0% Absolute difference: 10.0 percentage points Relative difference: 15.2% Week 24: Intervention: 67% Control: 46.0% Absolute difference: 21.0 percentage points Relative difference: 45.7% Week 36: Intervention: 56% Control: 40.0%

Study	Intervention Characteristics	Population Characteristics	Results
	risk-reduction counseling, all conducted by a health educator; clinical evaluation, medical management, and PrEP dispensation by a study clinician; access to a pager to reach a clinician whenever needed All participants shown a video explaining how PrEP works in the body All participants received reminders for clinic visits via phone calls per the local clinic standard	*Insurance*: 78% insured	Absolute difference: 16.0 percentage points Relative difference: 40.0% Retention: have a PrEP study visit completed at all check points Overall: Intervention: 86% Control: 71.0% Absolute difference: 15.0 percentage points Relative difference: 21.1% Unadjusted OR: 2.62; 95%CI, 1.24-5.54; p=0.01 Adjusted OR: 2.73; 95%CI, 1.30-5.74; p=0.008 Week 4: Intervention: 96% Control: 88.0% Absolute difference: 8.0 percentage points Relative difference: 9.1% Week 12: Intervention: 86% Control: 75.0% Absolute difference: 11.0 percentage points Relative difference: 14.7% Week 24: Intervention: 81% Control: 65.0% Absolute difference: 16.0 percentage points Relative difference: 24.6% Week 36: Intervention: 80% Control: 57.0% Absolute difference: 23.0 percentage points Relative difference: 40.4%

Study	Intervention Characteristics	Population Characteristics	Results
			Sexual behavior: mean number of anal sex partners, proportion reporting condomless anal sex, and proportion with a diagnosed STI all declined from baseline during follow-up (all P < .05) and did not differ by intervention arms HIV incidence: no HIV seroconversions occurred over 74.3 person-years of follow-up, with an incidence rate 0.0 per 100 person years (95% CI 0.0–5.0) The daily and weekly text messages were the most frequently used components and were also ranked most highly
Author, Year: Mitchell et al., 2018 **Study Design**: Pre-post **Suitability of Design**: Least **Quality of Execution**: Fair	**Location:** Durham, North Carolina, US **Urbanicity:** Urban **Setting:** Large university medical clinic **Intervention Name:** mSMART **Type of Digital Health Intervention:** App only **Digital Health Services:** Adherence tracking: participants entered dose of PrEP about to take or taken, which activated a camera-based medication event-monitoring tool Counseling: NR Information and education: information conveyed through an interactive daily question and answer format for PrEP and HIV knowledge and self-assessments of general medication adherence difficulties	**Eligibility Criteria**: Male at birth, aged 18-30 years, self-reported having sex with men in last 6 months, self-reported being currently prescribed and taking PrEP for HIV prevention; English speaking and own an Android or an iPhone compatible with the mSMART smartphone app Participants excluded if they had significant medical or psychiatric conditions that may interfere with study participation (e.g., suicidality) or being unable to attend both study visits **Population of focus:** MSM **Sample Size**: Intervention: 5 Control: 5 Total: 10	**How Outcomes Ascertained**: medical records **Intervention Duration**: 1 month **Results**: Adherence: Excellent adherence: proportion of participants with excellent adherence Intervention: 30% Control: 10% Absolute difference: 20 percentage points Relative difference: 200% Good adherence: proportion of participants with good adherence Intervention: 100% Control: 90% Absolute difference: 10 percentage points Relative difference: 11.1%

Study	Intervention Characteristics	Population Characteristics	Results
	Reminder for taking pills: daily text, participants missing dose entry prompted a notification Support group: NR Other: Contingency management in form of monetary incentives for daily PrEP adherence based on adherence assessment using camera medication event monitoring tool **Frequency of Communication:** Daily pill taking reminders; participants were able to set up their preferred time to receive medication reminders **Provision of Feedback:** Bidirectional, automated feedback Automated responses based on adherence and responses to brief daily surveys; participants received feedback about overall PrEP adherence in form of percentage of days logged in a dose within the 2-hr window **Provision of Equipment:** No **Comparison:** Usual care not specified	**Demographics**: *Age, mean*: 24.1 years; SD, 2.4 *Sex*: 100% male persons *Sexual orientation*: 100% MSM *Race/Ethnicity*: 70% White; 20% Asian; 10% multiple races *HIV risk factors*: 100% exceeded cutoff score for PrEP prescription, based on MSM Risk Index Score *STD history*: NR *Substance use*: 30% with low drug use, determined by DAST-10 *Alcohol use*: 100% with low risk for alcohol use disorder, determined by AUDIT *Mental health conditions*: 10% with mild depressive symptoms, scored 6 on PHQ-9 *Education*: 10% HS graduate; 20% partial college; 50% college graduate; 20% postgraduate studies *Employment*: 30% full time employed; 20% part time employed; 10% unemployed; 30% dependent or student; 10% NR *Income*: 30% $0-$10,000; 30% $10,001-$25,000; 20% $50,001-$75,000; 10% >$75,000; 10% NR *Insurance*: NR	At the end of the 4-week period, participants indicated acceptable ratings of satisfaction, usability and willingness to recommend mSMART to others. No technical difficulties associated with smartphone compatibility or user misunderstandings about mSMART features that interfered with daily use
Author, Year: Moore et al., 2018 **Study Design**: Individual RCT **Suitability of Design**: Greatest **Quality of Execution**:	**Location:** San Diego, California, US **Urbanicity:** Urban **Setting:** Four Southern California medical centers that include hospital clinic and public health clinic **Intervention Name:** iTab **Type of Digital Health Intervention:** Text only	**Eligibility Criteria**: MSM and TGW; >18 years old; English or Spanish speaking; HIV-negative; acceptable lab value in the past 30 days; had a persistent elevated risk of HIV infection determinate as: 1.≥1 partner with HIV for ≥4 weeks, 2.Condomless anal intercourse with ≥3 male partners who were HIV-positive or with unknown status in prior 3 months, or	**How Outcomes Ascertained**: medical records **Intervention Duration**: 12 months **Results**: Adherence: Good adherence: proportion of participants with DBS TFV-DP ≥719 fmol/punch, equivalent to four or more doses of TDF in the past week

Study	Intervention Characteristics	Population Characteristics	Results
Good	**Digital Health Services:** Adherence tracking: NR Counseling: brief HIV prevention and adherence counseling with provision of study drug by study staff, consistent with CDC guideline; provided to both intervention and control groups Information and education: NR Reminder for taking pills: daily, customized text with a mix of health promotion and factoid messages Support group: NR **Frequency of Communication:** Daily pill taking reminders **Provision of Feedback:** Customized text reminders Bidirectional interaction for counseling **Provision of Equipment:** No **Comparison:** Brief HIV prevention and adherence counseling with provision of study drug by study staff, consistent with CDC guidelines	3.Condomless anal sex with ≥1 male partner who had a STI in prior 3 months **Population of focus:** MSM and TGW **Sample Size**: Intervention: 200 Control: 198 Total: 398 **Demographics**: *Age, mean*: 35.2 years *Sex*: 99.2% male persons; 1.0% TGW *Sexual orientation*: NR *Race/Ethnicity*: 76.0% White; 13.3% African American; 3.1% Asian American; 30.1% Hispanic; 1.8% other persons; 6.2% multiple racial groups *HIV risk factors*: 50% with ≥1 partners with HIV infection for >4 weeks; 69.3% had condomless sex with ≥3 partners with HIV infection or unknown HIV status in past 3 months; 16.6% with condomless sex with ≥1 partners with HIV infection or unknown HIV status in past 6 months *STD history*: 26% with any STI at study baseline *Substance use*: 72.4% any substance use (not marijuana) in past 3 months Using DAST-10 to screen for drug use: 62.6% no or low drug use; 30.2% moderate use; 6.3% substantial use *Alcohol use*: NR *Mental health conditions*: NR *Education*: 1% <HS; 7.8% HS graduate; 37.4% some college; 33.2%	Overall (visits at weeks 12, 24, 36, and 48): Intervention: 72.0% Control: 69.2% Absolute difference: 2.8 percentage points Relative difference: 4.1% Adjusted OR: 1.37; 95% CI, 0.87-2.17; p=0.18 Week 12: Intervention: 91.7% Control: 85.6% Absolute difference: 6.1 percentage points Relative difference: 7.1% Week 48: Intervention: 83.4% Control: 81.6% Absolute difference: 1.8 percentage points Relative difference: 2.2% Excellent adherence: DBS TFV-DP ≥1,246 fmol/punch, equivalent to seven doses of TDF in the past week Overall (visits at weeks 12, 24, 36, and 48): Intervention: 33.5% Control: 24.7% Absolute difference: 8.8 percentage points Relative difference: 35.4% Adjusted OR: 1.56; 95% CI, 1.00-2.42; p=0.06 Week 12: Intervention: 50.8% Control: 43.9%

Study	Intervention Characteristics	Population Characteristics	Results
		bachelor's degree; 4.8% some postgraduate; 15.8% advanced degree *Employment*: NR *Income*: 21.3% <$2,000 per month or $24,000 per year; 62.6% ≥$2,000 per month; 16.1% refused to answer *Insurance*: NR	Absolute difference: 6.9 percentage points Relative difference: 15.7% Week 48: Intervention: 51.0% Control: 37.4% Absolute difference: 13.6 percentage points Relative difference: 36.4%
Author, Year: van den Elshout et al., 2021 **Study Design**: Individual RCT **Suitability of Design**: Greatest **Quality of Execution**: Good	**Location:** Amsterdam, The Netherlands **Urbanicity:** Urban **Setting:** Public health clinic **Intervention Name:** Extended AMPrEP **Type of Digital Health Intervention:** App plus visualized feedback **Digital Health Services:** Adherence tracking: opportunity for participants to register on daily basis whether they've taken PrEP; provided to both intervention and control groups Counseling: NR Information and education: NR Reminder for taking pills: automated messages at random intervals, usually monthly, with additional motivational text when participants have taken more than 90% of their doses; provided to both intervention and control group Support group: NR **Frequency of Communication:** Monthly or daily if no PrEP taken was recorded in app	**Eligibility Criteria**: MSM and TGW participating in an open-label demonstration study, AMPrEP, an app for PrEP adherence; must be using daily PrEP and intended to continue PrEP use; must use the AMPrEP app **Population of focus:** MSM and TGW who were HIV negative and had substantial likelihood of to acquire HIV **Sample Size**: Intervention:83 Control: 83 Total: 166 **Demographics**: *Age, median*: 39 years Sex: 99% male persons; 1% TGW Sexual orientation: 100% MSM *Race/Ethnicity*: 88% White persons *HIV risk factors*: median 20 sex partners in past 3 months; median 12 condom-less anal sex with casual partners in past 3 months; 43% had chemsex (use of y-hydroxybutyrate, y-Butyrolactone, methamphetamine or mephedrone prior to or during sex)	**How Outcomes Ascertained**: medical records **Intervention Duration**: 24 months **Results**: Adherence: median TFV-DP blood level 12 months follow-up Intervention (graphic feedback): median 1,391 fmol/punch; IQR, 1,158-1,782 Control (no graphic feedback): median 1,265 fmol/punch; IQR, 1,010-1,544 Absolute difference: 126 fmol/punch Relative difference: 10.0% 24 months follow-up Intervention (graphic feedback): median 1,349 fmol/punch; IQR, 1,005-1,654 Control (no graphic feedback): median 1,202 fmol/punch; IQR, 989-1,512 Absolute difference: 147 fmol/punch Relative difference: 12.2% Excellent adherence: proportion of participants with excellent adherence at both 12 and 24 months Intervention: 48% Control: 31% Absolute difference: 17 percentage points

Study	Intervention Characteristics	Population Characteristics	Results
	Provision of Feedback: Bidirectional, automated, visualized feedback in forms of graphs depicting trends in pill use and number of sex partners per week and per month; provide bar charts indicating the proportion of days in past month when PrEP was used and proportion of sex acts covered by PrEP, condoms or both **Provision of Equipment:** No **Comparison:** Adherence tracking and reminder mentioned above are basic functions of the app and provided to both intervention and control groups; visualized feedback is provided to intervention group only	during 3 months prior to inclusion in AMPrEP study *STD history*: 40% with STI in 6 months prior to inclusion in AMPrEP study Substance use: 40% with drug use disorder, scored 8 or more on DUDIT Alcohol use: 29% with alcohol use disorder, scored 8 or more on AUDIT Mental health conditions: 13% with depression or anxiety symptoms, scored <60 on MHI5; 22% with sexual compulsivity, scored ≥24 on sexual compulsivity scale Education: 25% no college/university; 75% college/university Employment: 82% employed; 3% unemployed; 15% other (retired, volunteer, disabled, student); 1.8% missing data *Income*: net monthly income in Euros 22% ≤€1,700 = $23,888 per year 49% €1,702-2,950 = $23,916-41,453 per year 28% >€2950 = >$41,448 per year *Insurance*: universal coverage in the Netherlands	Relative difference: 55% Unadjusted OR: 2.0; 95% CI, 1.1-3.8 Poor adherence: proportion of participants with poor adherence at both 12 and 24 months Intervention: 11% Control: 16% Absolute difference: -5 percentage points Relative difference: -31% Unadjusted OR: 1.5; 95% CI, 0.61-3.8)
Author, Year: Whiteley 2021 **Study Design**: individual RCT **Suitability of Design**: Greatest **Quality of Execution**: Fair	**Location:** Jackson, Mississippi, US **Urbanicity:** Urban **Setting:** PrEP clinic in the greater Jackson, MS **Intervention Name:** ViralCombat (iPhone gaming for PrEP adherence) **Type of Digital Health Intervention:** App plus text	**Eligibility Criteria**: Cis-gendered MSM initiating PrEP between the ages of 18 and 35 years were eligible if: (1) English speaking, (2) aware of their HIV status, (3) not enrolled in another PrEP-related study, (4) able to give consent or assent, and (5) not impaired by cognitive or medical limitations as per clinical assessment **Population of focus:** Young MSM	**How Outcomes Ascertained**: Medical records **Intervention Duration**: 6 months **Results**: Adherence: Excellent adherence: proportion of participants with excellent adherence (7 doses per week) Week 12 Intervention: 16.1%

Study	Intervention Characteristics	Population Characteristics	Results
	Digital Health Services: Adherence tracking: NR Counseling: NR Information and education: game takes place inside and on the human body, with participants fighting off HIV and earn points by swallowing pills, which lead to more strength, health, and artillery Reminder for taking pills: weekly messages in app Support group: NR **Frequency of Communication:** Weekly **Provision of Feedback:** NR **Provision of Equipment:** smartphone provided by study **Comparison:** Treatment as usual plus non-PrEP related mobile game on a smart phone provide by the study	**Sample Size**: Intervention: NR Control: NR Total: 69 **Demographics**: *Age, mean*: 25.1 years; SD, 4.2 *Sex*: 96.0% male persons *Sexual orientation*: 68.1% homosexual; 30.4% bisexual persons *Race/Ethnicity*: 85.5% African American; 6% Hispanic persons *Substance use*: NR *Alcohol use*: NR *Mental health conditions*: NR *Education*: 43.1% at least some college; 30.8% graduated from college *Employment*: NR *Income*: NR *Insurance*: 90% public or private; just under 50% reported receiving PrEP payment assistance	Control: 21.9% Absolute difference: -5.8 percentage points Relative difference: -26.5% Week 24 Intervention: 29.6% Control: 17.9% Absolute difference: 11.7 percentage points Relative difference: 65.4% Good adherence: proportion of participants with good adherence (4 or more doses per week) Week 12 Intervention: 58.1% Control: 43.8% Absolute difference: 14.3 percentage points Relative difference: 32.6% Adjusted OR: 1.78; 95% CI, 0.55-4.83) Week 24 Intervention: 55.6% Control: 25.0% Absolute difference: 30.6 percentage points Relative difference: 122.4% Adjusted OR: 3.75; 95% CI, 1.2-11.77