



A Multi-Level Gaming Adherence Intervention for HIV+ Youth

Laura Whiteley, M.D.

Leandro Mena, M.D.

Larry K. Brown, M.D.

Research Supported by the National Institute of Child Health & Human Development
R01 HD074846, PI: L. Brown

Adherence 2018 • June 8-10 • Miami

Overview

#ADHERENCE2018



- This project developed and tested the preliminary efficacy of an iPhone gaming intervention to improve adherence to ART
- An electronic, portable medication dispenser measures adherence and guides game related text messages



Background

#ADHERENCE2018



- Youth living with HIV (YLWH) poor rates of retention in care and youth are more at risk than adults for being lost to follow-up
- Studies show that adherence to ARV ranges from 50-75% among YLWH, and higher adherence is needed for optimal health outcomes

Background

#ADHERENCE2018



Advantages to using a Mobile Game:

- > 90% of those 15-24 yrs own a mobile phone
- More than half of all video gaming occurs on portable devices
- A unique opportunity to deliver health education during leisure time, outside of the clinic, cost effective, scalable.

Background



- Games have been shown to be efficacious with youth in:
 - Promoting fitness
 - Improving weight management
 - Improving safer sex skills
 - Improve self-management skills for coping with chronic diseases in youth such as asthma, diabetes, and cancer

Qualitative Feedback

#ADHERENCE2018



30 YLWH (20 from Rhode Island; 10 from Mississippi)

- Desire to enhance future orientation, improve perceived social support, increase personal relevance of HIV care, reinforcement positive influences from doctors, partners, and friends

Qualitative Feedback

#ADHERENCE2018



- Desire to “fight off” or “destroy” HIV in the body with weapons
- Earn points for “taking” or “swallowing” pills
- 7 day pill organizer
- Text messages with gaming graphics to engage gamers in play

BattleViro

#ADHERENCE2018



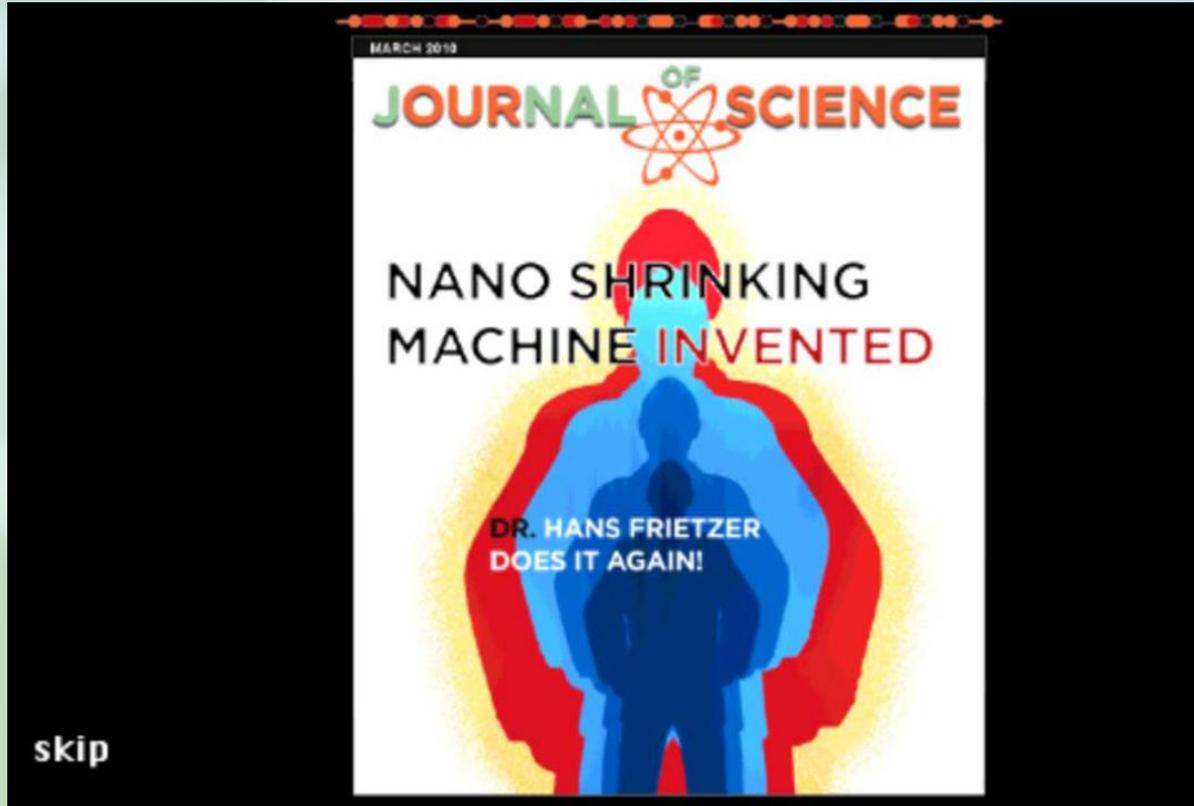
BattleViro

#ADHERENCE2018



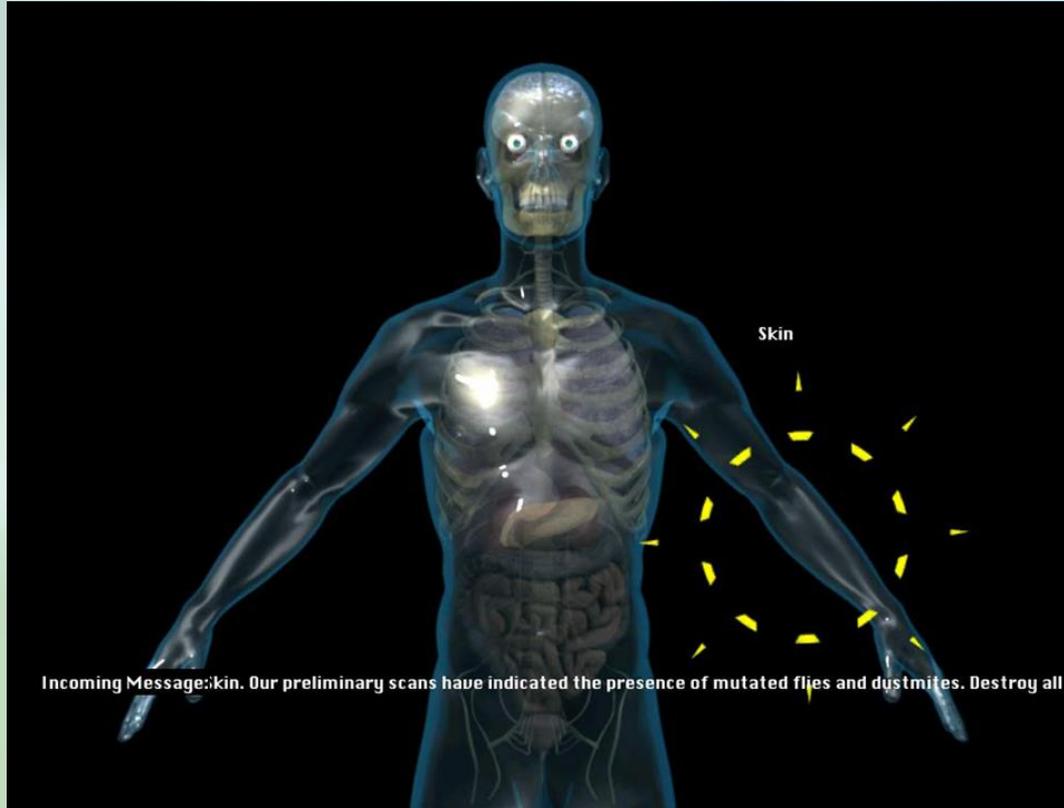
BattleViro

#ADHERENCE2018



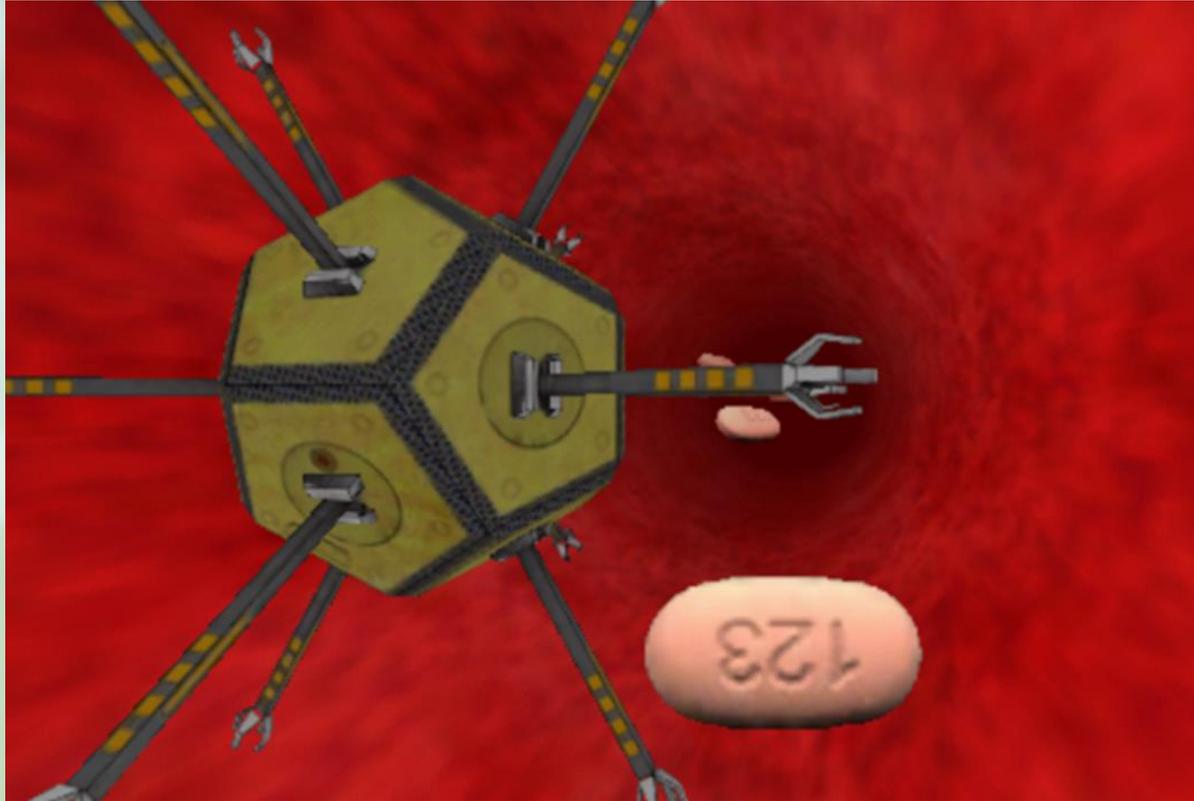
BattleViro

#ADHERENCE2018



BattleViro

#ADHERENCE2018



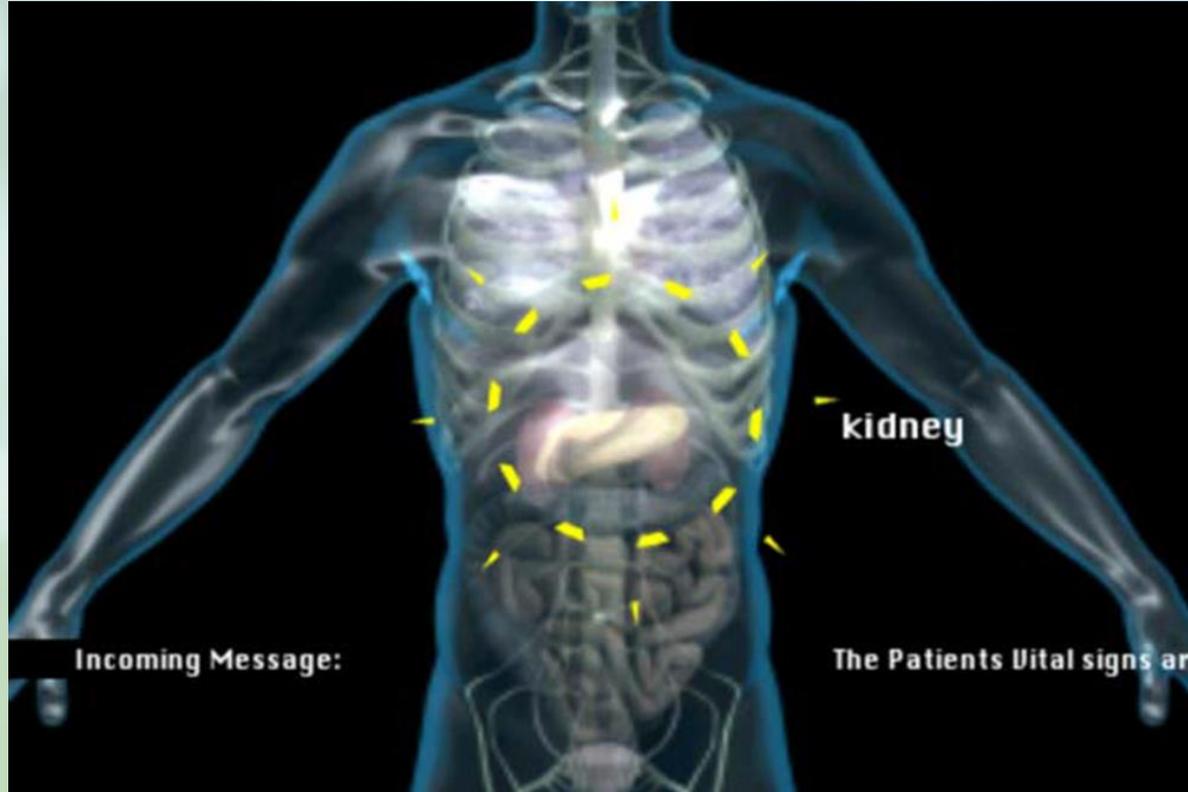
BattleViro

#ADHERENCE2018



BattleViro

#ADHERENCE2018



BattleViro

#ADHERENCE2018



BattleViro

#ADHERENCE2018



BattleViro

#ADHERENCE2018



BattleViro

#ADHERENCE2018



The screenshot shows the BattleViro app interface. On the left, a cartoon doctor icon is surrounded by yellow virus particles. In the center is a 3D anatomical model of a human body with a glowing virus in the chest. On the right, a quiz question is displayed in a black box with a red border: "It's OK to skip your medicine once in awhile." Below the question are two buttons: "1 TRUE" and "2 FALSE". A mouse cursor is pointing at the "TRUE" button. Below the buttons, red text reads: "ALERT: The correct answer is FALSE" and "Skipping your medicine will make the virus stronger." In the bottom left corner, the text "Incoming Message:" is visible.

It's OK to skip your medicine once in awhile.

1 TRUE 2 FALSE

ALERT: The correct answer is FALSE

Skipping your medicine will make the virus stronger.

Incoming Message:

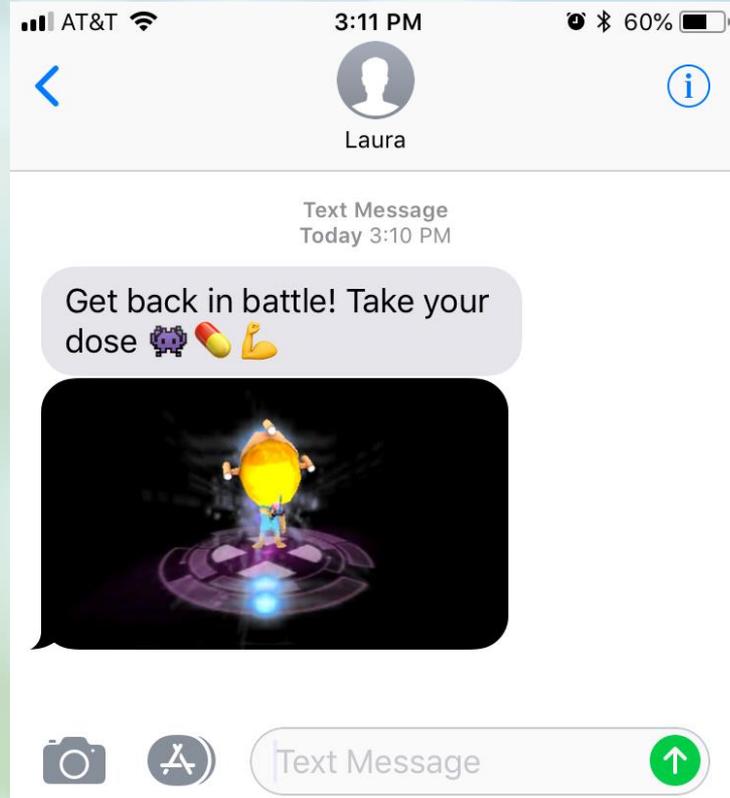
BattleViro

#ADHERENCE2018





Adherence Related Text Messages



RCT Phase

#ADHERENCE2018



RCT was done in Jackson, MS due to high rate of HIV infection and included 61 YLWH

Examined the preliminary efficacy of BattleViro ($n=31$) compared to a non-HIV related game ($n=30$) on improving:

- Information, motivation, behavioral skills for ART
- Adherence measured by an electronic pill monitoring cap (Wisepill)
- Plasma viral load



RCT: Demographic Characteristics

Variable	Total Sample (<i>n</i> =61)
Age (years)	22
Gender - % Male	79%
Race - % African American	97%
Sexual Orientation - % Non-heterosexual	74%
Started ARV in past 3 months - % Yes	36%
Gaming Status - % Daily or almost daily	36%

RCT Results

#ADHERENCE2018



- Outcomes were not significantly different between conditions at post test (16 weeks)
- However, effect size differences between conditions indicated sizable improvements for the intervention in HIV-related knowledge ($d=0.50$), ART knowledge ($d=0.42$), and social support ($d=0.62$)

RCT Results (continued)

#ADHERENCE2018



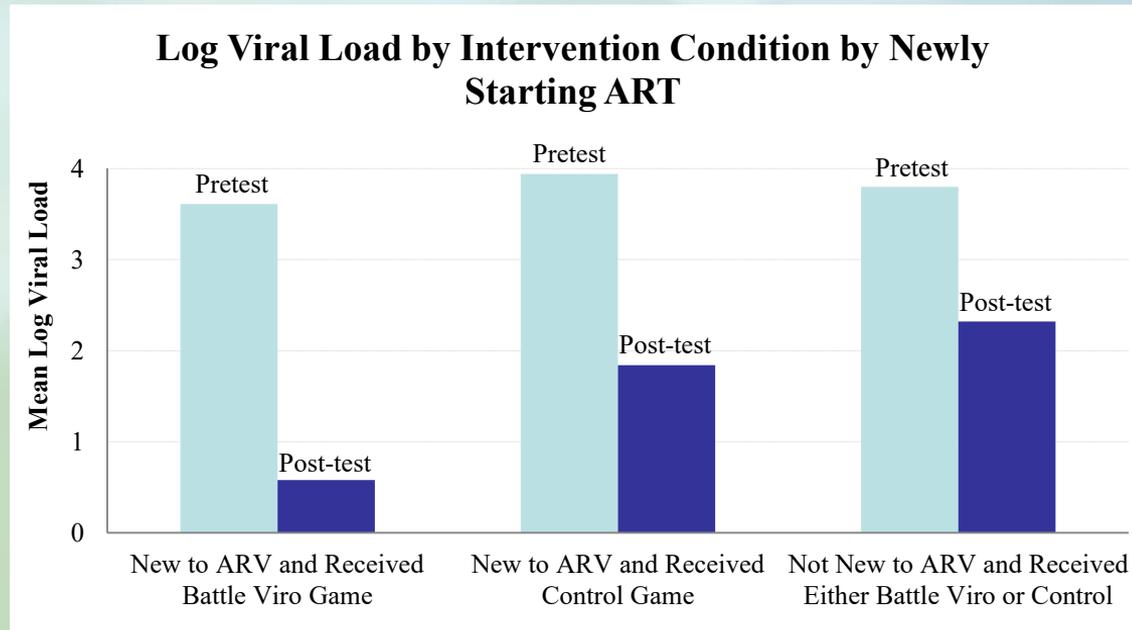
- **Moderator Analyses**: we explored the interaction between various factors and intervention condition in separate ANCOVAs, controlling for baseline scores. Factors included gender, sexual orientation, age, newly starting ART, and gaming frequency
- Only time on ART (participants newly starting ART, in last 3 mos) showed interaction effects

Moderator Results

#ADHERENCE2018



Those in BattleViro arm experienced a **0.96 log greater decrease in viral load** compared to those in the control (F=4.33, p=0.04 for the interaction, entire sample)



RCT Results (continued)

#ADHERENCE2018

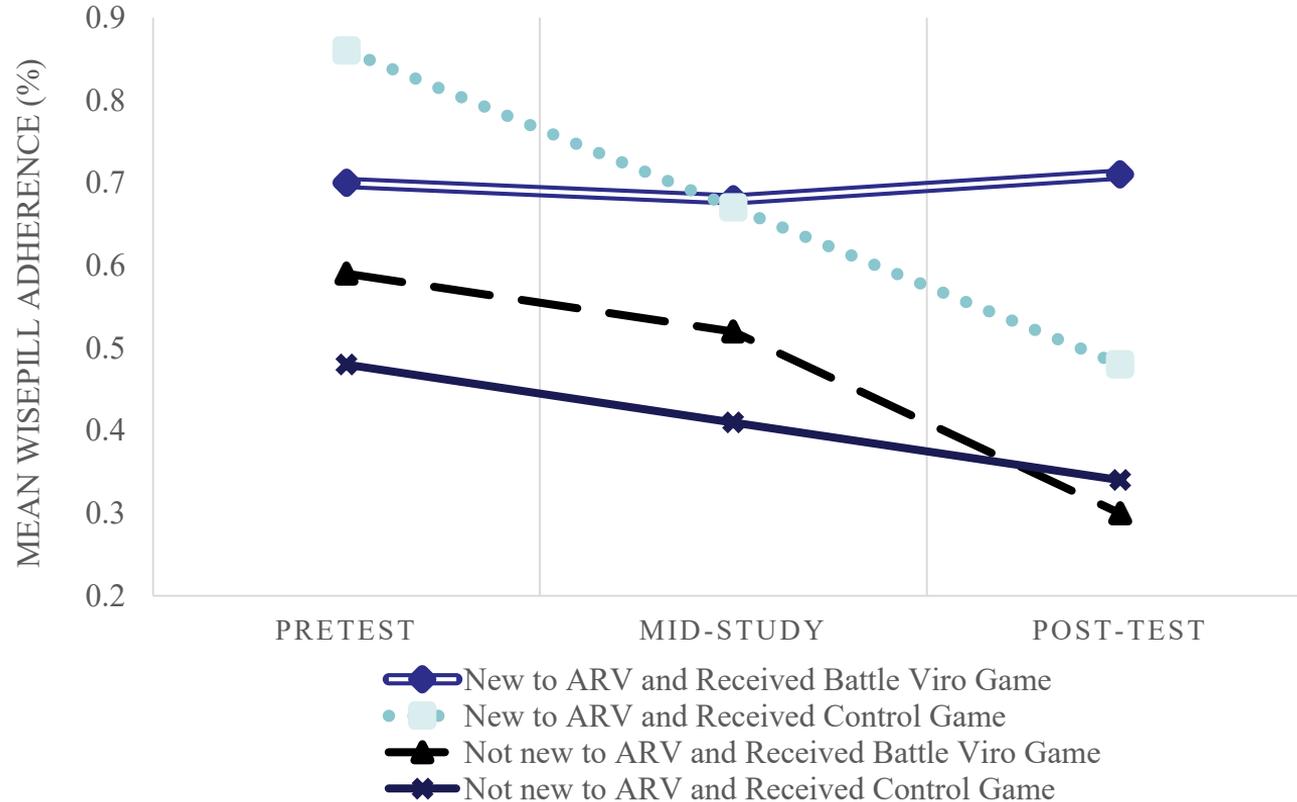


Those newly starting ART in BattleViro condition had **Better adherence** as measured by Wisepill, than those in control

At posttest adherence in Battle Viro was 71% compared to 48% in control ($d=1.18$,; $F=3.20$, $p=0.05$ for the interaction)



WISEPILL ADHERENCE (PAST 7-DAY) BY INTERVENTION CONDITION BY NEWLY STARTING ART



RCT Results (continued)

#ADHERENCE2018



Among those newly starting ART, BattleViro also demonstrated improved:

- HIV-related knowledge (effect size difference of 0.90)
- ART-related knowledge (effect size difference of 0.72)



Conclusions

These findings suggest that the intervention was most effective with those new to ART:

- Decreasing Viral load
- Sustaining medication adherence
- Improving HIV knowledge, ART knowledge

A larger trial is needed to verify and further explore these findings.

Discussion

#ADHERENCE2018



So, why was the game most effective for those newly starting ART?

- Clinical period of ART initiation could be a critical teachable moment
- Opportunity to build initial skills and maintain skills, rather than correcting sub-optimal adherence
- Fighting off HIV (gamification) could be empowering for a group adjusting to new diagnosis
- Barriers for those new to ART may be easier to intervene upon using a game (e.g. HIV/ART knowledge may be learned in a game and most needed for those newly starting ART).

Our data suggests that building motivation and knowledge for self-care at this early transition point can be leveraged to increase the effectiveness of adherence interventions for YLWH



Thank you:

Larry K. Brown MD

Leandro Mena MD



National Institute of Child Health & Human Development
National Institute of Mental Health