Global HIV

Structure of the Human Immunodeficiency Virus (HIV)

- Glycoproteins
- Lipid membrane
- RNA
- Capsid
- Matrix
- Reverse transcriptase

37.9 Million people globally living with HIV
1.7 Million people became newly infected in 2018
770,000 People died from AIDS-related illness in 2018

74.9 Million people have become infected with HIV since the start of the epidemic
32 Million people have died from AIDS-related illness since the start of the epidemic

Confronting an Epidemic
Expected Lifespan Increase

Life expectancy for people with HIV is now near-normal, but only for those accessing treatment.

A 20 year old person living with HIV who started treatment after 2008, can now expect to live to 78.

In a historic letter, the Centers for Disease Control and Prevention support the science behind "Undetectable Equals Untransmittable."

By Savas Abadsidis
OCTOBER 22 2017 8:25 PM EDT
HIV Care Continuum

Figure 1: Prevalence-based HIV Care Continuum, 2015

Percent of all people living with HIV

- Diagnosed: 86.0%
- Receipt Of Care: 63.0%
- Retained In Care: 49.0%
- Viral Suppression: 51.0%

Care Cascades must be improved

Hyle E, IAC 2018.

Percentage of people with disease

- HIV
- Tuberculosis
- Diabetes
- Hypertension
- Depression

Prevalent

- 100%
- 69
- 60
- 40
- 47
- 53
- 53
- 40
- 22
- 24
- 44
- 45
- 19
- 9
- 6

Diagnosed

Treated

Controlled
How do we Improve Care Engagement?

“If customers stop coming to the restaurant, the chef doesn’t ask “What’s wrong with the customers?” It’s time to improve the restaurant!”

-David Malebranche, MD MPH
Associate Professor Morehouse School of Medicine
Innovation?

Malcolm Gladwell

Steve Jobs
**Definitions of Innovation**

**Working Definition of Innovation:**
An implementation that is often disruptive of the prevailing product, process, policy, or paradigm and creates an outcome that is more effective, affordable, accessible, easier to use or deliver, and/or provides superior scalability.

An innovation implies a successful implementation and, indeed, may take a known product or process and modify or adapt it to a new use, with greatly improved outcomes...

Accompagnement

Community-Based ART Programs: Sustaining Adherence and Follow-up

Joia S. Mukherjee1,2,3, Danika Barry1,3, Robert D. Weatherford2,3, Ishan K. Desai1,2, Paul E. Farmer1,2

Accompagnement

Average visit time per house: 15-20 minutes

Health Centre

Accompagnateur Leader
Average 4-5 households

Accompagnateur

- Daily accompaniment (1-2 hours/day)
- Twice monthly for medications/training (0-4 hours/day)
- Once monthly for consult/nutrition (0-4 hours walk)
- Help as necessary

Accompagnateur

Books & Arts | Published: 29 June 2017

Medicine: Heroes of global health

Amy Maxmen

Nature 546, 598(2017) | Cite this article

Amy Maxmen assesses a documentary on medical pioneer Paul Farmer and colleagues round the world.
HIV Care Challenges Rural VA

- Stigma
- Transportation
- Poverty
- Isolation
- Alcohol/drug use
- Mental health challenges
“mHealth refers to the use of mobile communication technologies to promote health by supporting healthcare practices (e.g. health data collection, delivery of healthcare information, or patient observation and provision of care).”


**mHealth** can facilitate interventions addressing one or more challenges to living well with HIV when and where clients want and need it.
mHealth in rural Virginia?
Edit Text Messages

Schedule 1

Click to select or unselect the days messages are sent:

<table>
<thead>
<tr>
<th>Mon</th>
<th>Tues</th>
<th>Wed</th>
<th>Thurs</th>
<th>Fri</th>
<th>Sat</th>
<th>Sun</th>
</tr>
</thead>
<tbody>
<tr>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
</tbody>
</table>

Enter time and text message (160 characters or fewer):

11 : 00 AM  Get your ass up and take your 5 meds.
09 : 00 PM  Did you take your 2?

Add another message

Clear Schedule
“Yeah, it did everything leading up to my decision to get back involved in my life. Take my meds on time, stop drinking, stop using drugs, be more accountable. It did everything because I’m like, ‘that #$%^& phone gonna blow up (ring)’ ‘cause I know it’s getting ready to, you know?”
**Step 1:** System sends automatic EMA queries for mood twice/day and medications at time of dosing.

**Step 2:** Patient responds with keyword and answer.

**Step 3:** Patient-designed responses automatically sent by system.

Ingersoll et al. JSAT. 2014.
“It feels good that I can actually talk to someone every day about it. Even if it’s a machine, it feels great to know that there's someone there to affirm to me that this is a good and right thing. “congratulations” sounds good, you know?”

“It gave me more positive feeling about myself that I’ve done something good that day for me. Having somebody at your back is a positive thing.”
<table>
<thead>
<tr>
<th>Text</th>
<th>App</th>
</tr>
</thead>
<tbody>
<tr>
<td>Better studied</td>
<td>Consumer demand</td>
</tr>
<tr>
<td>Phones are cheaper</td>
<td>Rich media views, videos and community functions</td>
</tr>
<tr>
<td>Harder to crack phone screens when dropped</td>
<td>More secure</td>
</tr>
<tr>
<td></td>
<td>Can send more messages without added cost</td>
</tr>
</tbody>
</table>
The “Smartphone-Dependent” Population: 7% of Americans Rely Heavily on a Smartphone for Online Access

- 13% of low income households (<$30K) are smartphone dependent vs. 1% of households earning $75K.
- 12% of African Americans vs 4% of Whites.

Recent literature underscores the importance of access to consistent communication. Those who experienced a change in phone number during the past year were significantly more likely to be not engaged in care.
App Development Strategies

- User-centered design
- Self-monitoring
- Shrinking the distance
- Expanding Connections
- Addressing existing clinic needs

Colleen Laurence
Erin Wispelwey
Erin Plews-Ogan
PL App Components

- Self-Monitoring and Management
- Care Coordination
- Educational Resources
- Social Support
Self-monitoring Check-Ins

“The questions make me focus on my mood and my stress and makes me more in touch with myself you can say. When it pops up, it makes me stop and think. I usually don’t think about that kind of thing.”

- PL Participant
“You get to talk to people who are going through exactly what you are going through. When you are down somebody uplifts you, when somebody else is down you can uplift them, it’s basically like one big family”

- PL Member
• Significant *increases* in engagement in care (top) and in HIV viral load suppression (bottom) over one year of follow-up (n=77)

• **Stigma** scores are improved with increased used of the community message board.*

• **Social support** is sought and provided regularly. **

• In app patient-provier messaging is a mechanism to build *rapport*. ***
Linkage to, Retention in, and Re-engagement in HIV Care (LRC) Chapter

This chapter of the Compendium categorizes the best practices in promoting Linkage to, Retention in, and Re-engagement in HIV Care among people living with HIV, one of the priorities outlined in the U.S. National HIV/AIDS Strategy. Additional details about the LRC Chapter or the Prevention Research Synthesis (PRS) Project can be obtained by contacting PRS.

POSITIVELINKS
Evidence-Informed for Retention in Care

INTERVENTION DESCRIPTION

Goal of Intervention
- Improve retention in HIV care
- Improve HIV viral suppression
- Decrease HIV viral load

Target Population
- Clinic patients

Brief Description
PositiveLinks (PL) is a clinic-based smartphone app that features tailored educational resources; daily queries of stress, mood and medication adherence; weekly quizzes; appointment reminders; and a community message board (CMB). The educational resources include an orientation to the clinic, information on HIV and health, and stress reduction techniques. For the CMB, participants select user names to protect anonymity and can start new conversations or respond to older conversations. The PL team intermittently introduces new conversation topics on HIV or general well-being, and the team can communicate with the participants privately to address technical issues and assist with care coordination on the CMB. Contact information for the clinic-affiliated PL team is also included in the app. Participants were given smartphones with the PositiveLinks app installed.
In-house Development

Nimble

Responsive

Embedded with clinical staff

Patient-Centered Design

Freddie Jin
Jason Schwendinger
Pravalika Donthineni
Hi, lol just wanna give my homiegirl a shout out bc I don’t see you when I come up there...I enjoyed our trip and I still show our pics off and you have a lovely family thank you for that experience.

I am so glad that you are back in the PL family. I missed you! Take care of yourself.

PS – Dr. misses you too! Please call and schedule an appointment when you can.

I’m glad you got in and got the shot. It takes approximately 7 days to completely treat so you should abstain from sex during that time – that’s taking into account that your sexual partners have been appropriately treated as well – if not you’ll just get re-infected. Your urine GC and chlamydia and syphilis were all negative. You are scheduled to see me this Friday 7/15 but I think there’s an old appointment, just remember to reschedule for 3 months
PL Provider Portal Summary

Upcoming Appointments with PL Members

Documents recently shared with or by Members

Recent Messages from or to Members

Cohort Mood and Stress graphs for past 90 days

Recent Messages

Recent Documents

Statistics

90 Days Mood

90 Days Stress

PL Provider App

MENU
Members
Messages
Appointments
Resources
Questions?
Logout
What do our most at-risk users say about messaging?

These users find messaging to be one of the most useful features of the app—more useful than medication tracking!

“I can contact [my provider] more frequently now. I like to have that option.”

“It’s convenient to be able to talk with doctors and nurses... it’s kind of made me care more about wanting to continue in care.”
Labs Redesign

Before

After
Community of Practice

- PL Expansion
- Clinic Processes
- LMS and Certification
- WHT

- Ava Lena Waldman
- Michelle Hilgart
- Ben Elliott
- Helen Boyd
Public – Academic Partnership

Scaling PL to other clinics with a turn key system
Ethics of Data Safety and Equity of Access

Mobile Medical Apps and mHealth Devices: A Framework to Build Medical Apps and mHealth Devices in an Ethical Manner to Promote Safer Use – A Literature Review

Mary SHARP1 and Declan O’SULLIVAN2
1School of Computer Science and Statistics, Trinity College, Dublin 2

EDITORIAL

Bridging the digital health divide: toward equitable global access to mobile health interventions for people living with HIV

Breanna R. Campbell 1, Karen S. Ingersoll 2, Tabor E. Flickinger 1 and Rebecca Dillingham 1

1Department of Medicine, University of Virginia School of Medicine, Charlottesville, VA, USA; 2Department of Psychiatry and Neurobehavioral Sciences, University of Virginia School of Medicine, Charlottesville, VA, USA

ARTICLE HISTORY Received 17 October 2018; Accepted 1 February 2019

KEYWORDS Mhealth; mobile applications; text messaging; HIV; smartphone; internet; digital divide; telemedicine
Social Support in a Virtual Community: Analysis of a Clinic-Affiliated Online Support Group for Persons Living with HIV/AIDS

Wendy Cohn, Julie Schexnayder, Mahlatse Modipane

Behavioral and Psychological Research

PosedLinks: A Mobile Health Intervention for Retention in HIV Care and Clinical Outcomes with 12-Month Follow-Up
Rebecca Olomoye, MD MPH, Yasser Mostafa, MPH, Tuan Tran, MD, MPH

Technology Use Among Patients in a Nonurban Southern U.S. HIV Clinic in 2015

Addressing Stigma Through a Virtual Community for People Living with HIV: Mixed Methods Study of the PosedLinks Mobile Health Intervention
Nana A. Robinson, Ogechi Nwanneke, MD, PhD, Megan K. White, MPH, Prince Nwosu, MPH, Jumoke Adebowale, MPH, Ernest A. Berland, MD, MPH

Security Messaging Through Patient-Centric Communication in a Clinic-Affiliated Living with HIV

Original Research

Toward understanding the impact of mHealth features for people with HIV: A latent class analysis of PosedLinks usage

Original Research

Julie Schexnayder

Wendy Cohn

Mahlatse Modipane
Where we are

Irkutsk, Russia
Tugela Ferry, South Africa
Fairfax, VA
Charlottesville, VA
Lynchburg, VA
Greenville, SC
San Antonio, TX

Available in English, Spanish, Russian, and isiZulu
PositiveLinks Irkutsk

Открыть и Главная

Главная/Домашняя
Для самоконтроля, ежедневно просматривайте вопросы о приёме медикаментов, стрессе и настроении

Анализы
Позволяет видеть результаты анализов на количество CD4 и вирусную нагрузку

Приёмы
Список предстоящий приёмы у докторов

Документы
Просматривайте, добавляйте и отправляйте документы своим докторам

Вопросы?
Найдите ответы на вопросы, часто задаваемые людьми, живущими с ВИЧ

профиль
Здесь можно установить или изменить аватар пользователя, а также увидеть значения достижений

Как я?
Ответы на ежедневные вопросы о медикаментах, стрессе и настроении в календарном виде

Сообщество/Чат
Станьте участником сообщества МОСТ, частной анонимной социальной сети. Читайте и отвечайте на сообщения других участников

Сообщения
Отправляйте личные сообщения команде докторов, используя защищенную связь

Контакты
Доступ к контактной информации докторов

Ресурсы
Доступ к аудио, видео и интернет-ресурсам для поддержки людей, живущих с ВИЧ
PositiveLinks Spanish

Lunes 18 de junio
¿Cómo se siente?

5 (Muy Feliz)
me siento bien

Lunes 18 de junio
¿Cuál es su nivel de estrés ahora mismo?

1 (Bajo)
da un día sin preocupaciones
Next Steps

- Predictive Analytics
- Push Engagement
- Feedback to Clinics
- Ongoing Analysis

Julie Schexnayder

Wendy Cohn
Adaptations

Pre-exposure prophylaxis (PrEP)

- PrEP uptake and adherence are essential for HIV prevention, and often remain low.
- Prep’d is designed with and by users to support PrEP clients and candidates in uptake and maintenance of PrEP.
- The app is currently being piloted, examining acceptability and feasibility and initial effects of the app.

We partnered with Greg Gerling, UVA Associate Professor of Engineering Systems & Environment for student collaboration on app design.

Sylvia Coffey
Sarah Knight
Opioid Use Disorder

• Opioid use disorder is an urgent public health concern. Avoiding relapse is essential to successful recovery.
• HOPE is designed to support individuals in recovery through self-monitoring tools, social support “get hope, get help”, and informational resources.
• The app is under development with a pilot planned for up to three sites in Virginia.
Components of Success

- **PL SUCCESS**

**USAGE**
- High and Long term usage

**EVIDENCE**
- Clinically Significant impact

**IMPACT**
- Impact Related to usage

**WARMTH**
- Users Feel supported

**ENTHUSIASM**
- From users, team, and collaborators

**PROCESS**
- User-centered design

**R&D**
- Ongoing research to improve
Facilitators

**UVA Collaborative Environment**
Across schools, departments, areas of expertise

**Public – Private Partnerships**
Expand reach

**Involvement of Patients**
Patient ‘users’ involved in every step

**Ryan White Clinic**
Unique care environment, improve practice

**Evolving Funders**
UVA-SON, NIH, AIDS United, M.A.C. AIDS, VDH, WHT

**Clinicians**
Inform clinical improvements, provide warmth

**Students**
Train next generation; science, clinic, public health

**Public Health-Academic Partnerships**
Substantial UVA-VDH partnerships

**Global Scale**
Expansion in Russian, Spanish, IsiZulu languages
Innovations

Product

Process

Policy

Paradigm

Innovation Effectiveness
A New Paradigm of Care

Trying to Engage in Care

Facilitated Care

- Self-monitoring
- Care Coordination
- Social Support
- Educational Resources
Benefits of a new paradigm of care

“I don’t know if many of you realize it, but each and every one of us who uses this app is making a difference in someone else’s life battling every day of this new journey... We all are making a difference together one day, one app, and one click at a time.”

- PL Participant
With Thanks

To the patients, staff, and providers at the UVa Ryan White Clinic for inspiring and supporting this work.

Photo Credit: Dan Addison, University Communications, UVA Today