

# Design and Impact of *Positive Links*: A Mobile Platform to Support People Living with HIV in Virginia

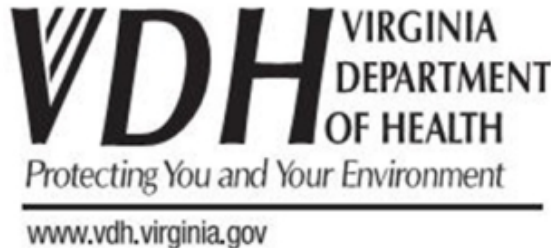
Rebecca Dillingham, MD/MPH  
Associate Professor of Medicine



# With Gratitude



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



- PL Team:
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  - *Anna Greenlee*
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# HIV Care Challenges in (Rural) VA

- Poverty

*Mobile technology (mHealth) can facilitate interventions addressing one or more challenges to living well with HIV when and where clients want and need it.*

challenges

# Perspectives on Text - Medication

- **“It feels good that I can actually talk to someone every day about it. Even if it’s a machine, its 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.”**

Ingersoll et al. JSAT. 2014; Ingersoll et al Health Psychology, Dec. 2015.

# App vs Text Interventions



A black status bar at the top of a phone screen showing icons for camera, mail, calendar, a link, Bluetooth, silent mode, 3G signal, cellular signal, battery, and the time 3:23 PM.				
<div>Home Positive Links Settings</div> <div>Appointments 31 Contacts Resources Dashboards Communities</div>				
Text		App		
<ul style="list-style-type: none"><li>• Better studied</li><li>• Phones are cheaper</li><li>• Harder to crack phone screens when dropped</li></ul>		<ul style="list-style-type: none"><li>• More secure</li><li>• Can send more messages without added cost</li><li>• Rich media views, videos and community functions</li><li>• May facilitate overcoming other barriers to engagement (smart phone)</li></ul>		

# Our App Development Strategies



User-based design

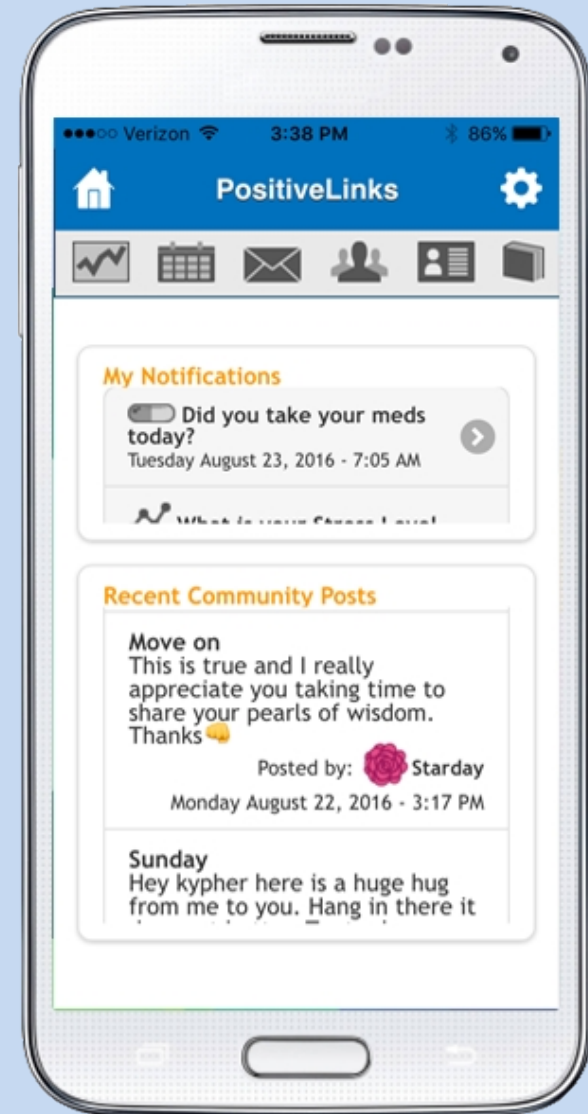


Self-monitoring



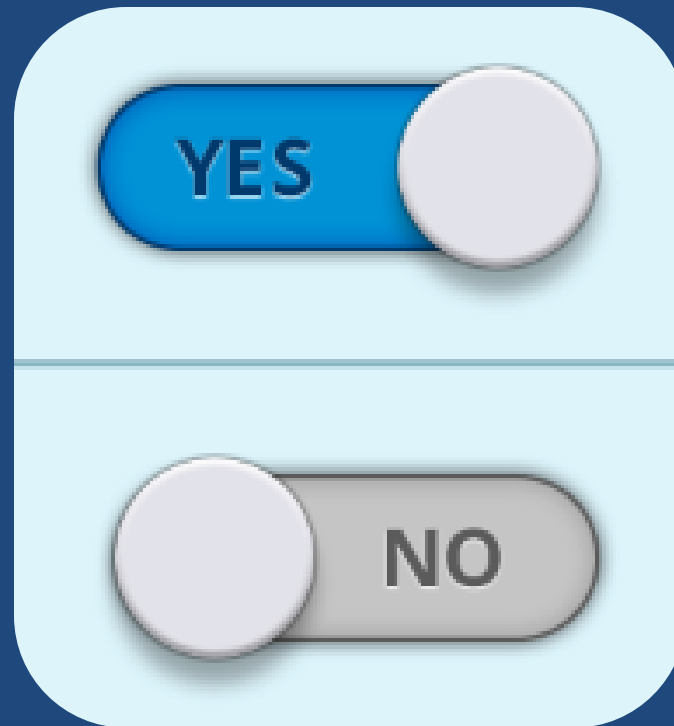
Shrink “distance”





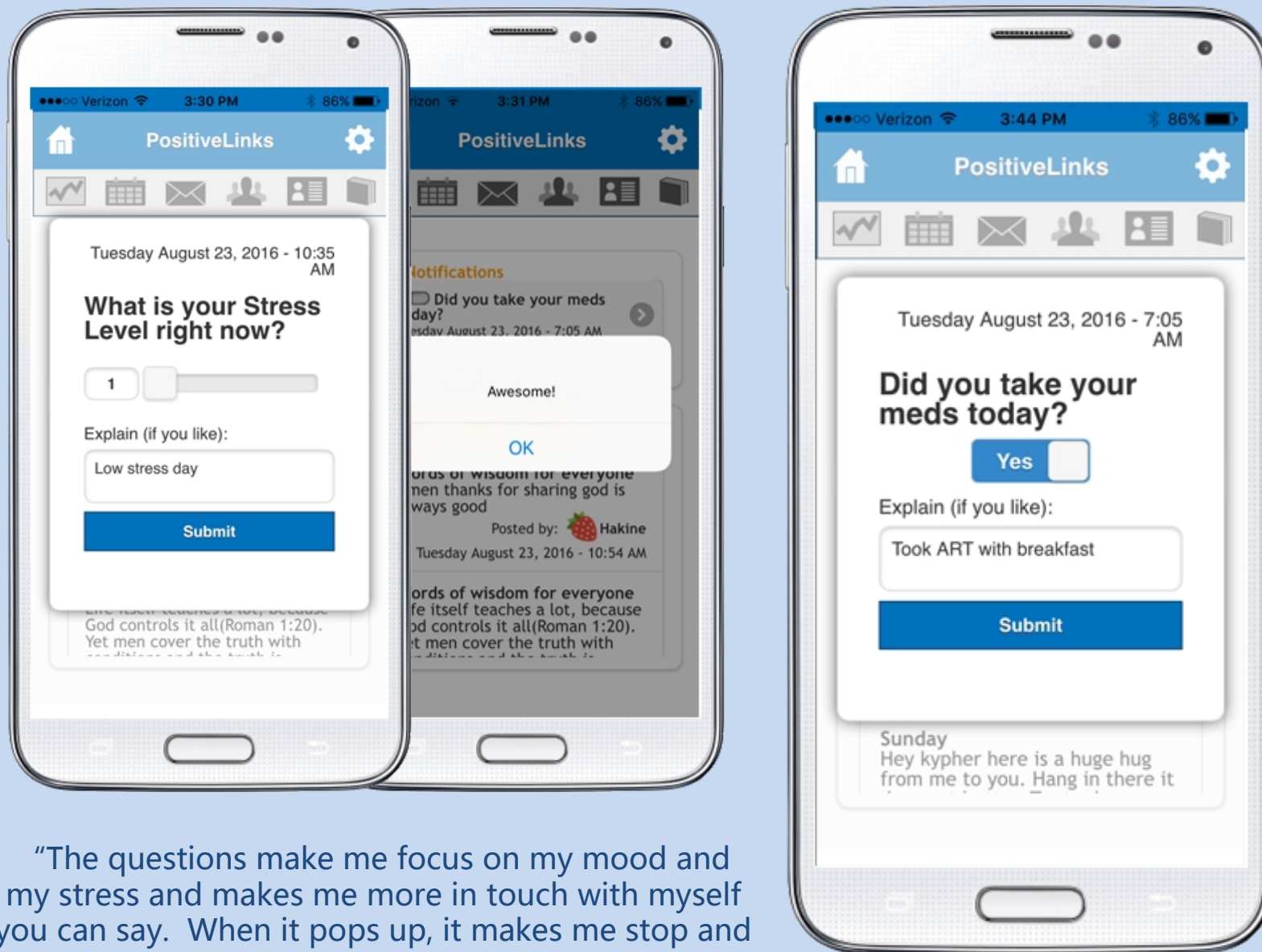


# Self-Monitoring





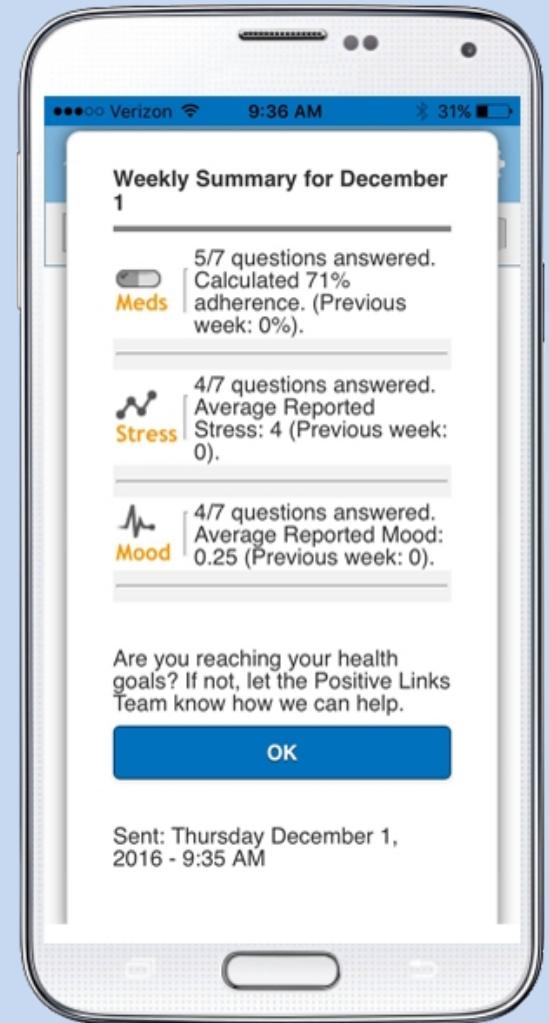
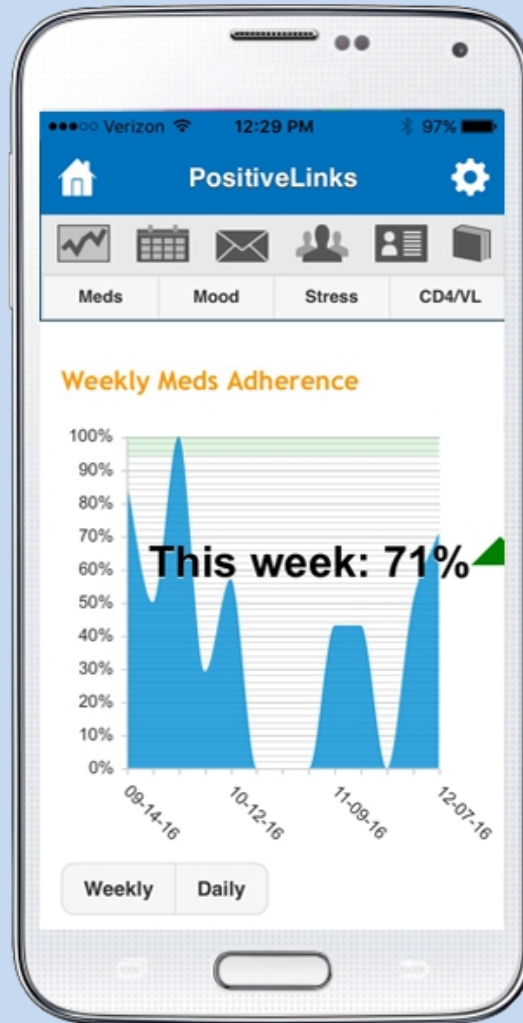
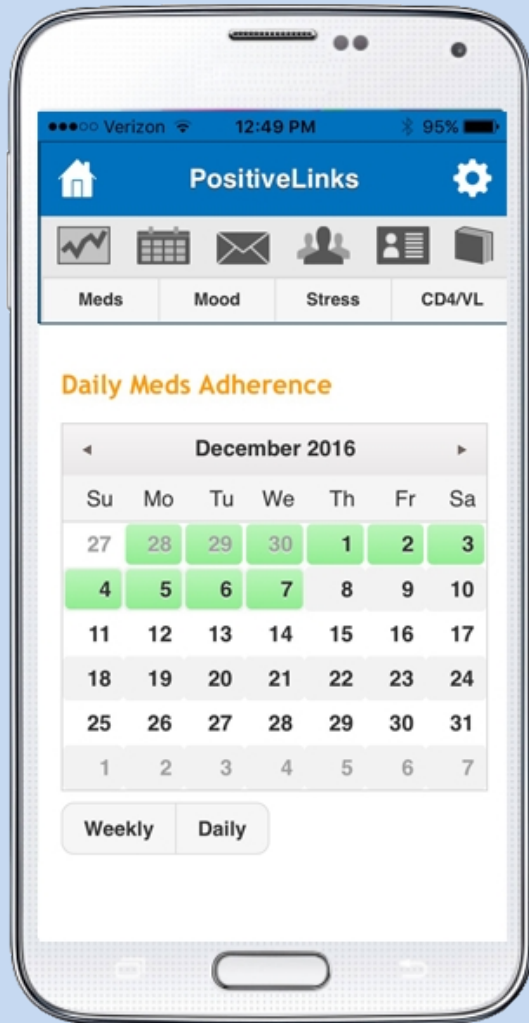
# Self-Monitoring Queries



"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."



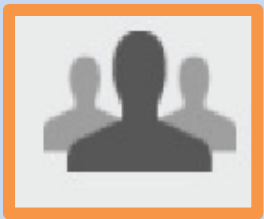
# Dashboard Medication Adherence



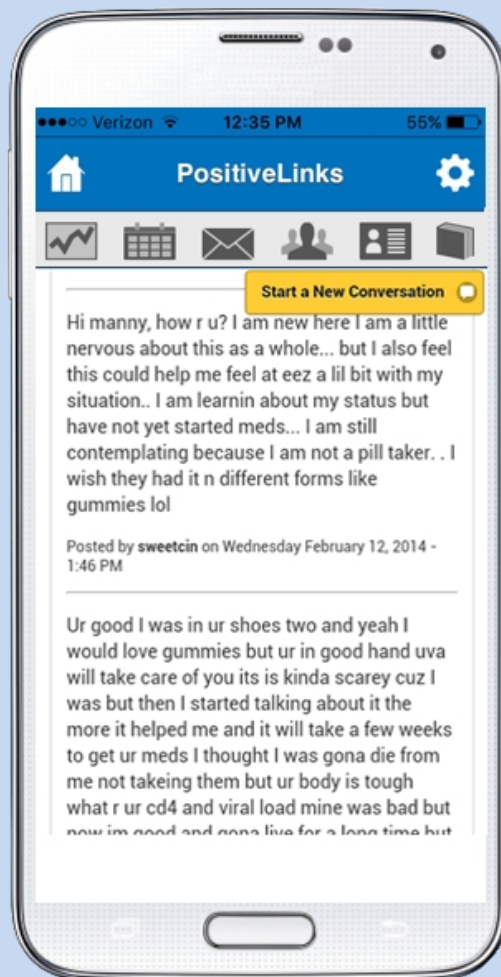
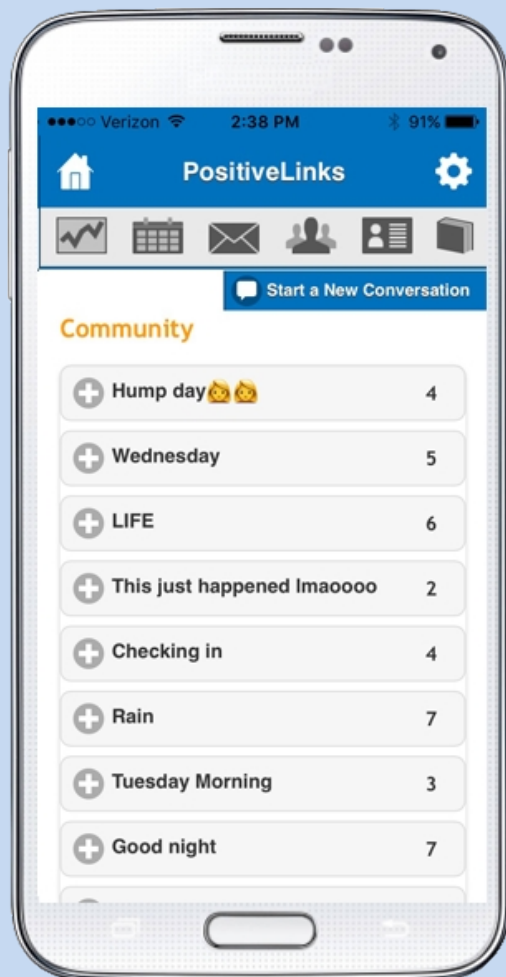


# Shrinking the “Distance”





# Community Message Board

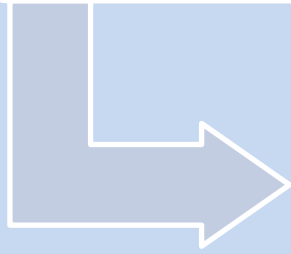


**“You get to talk to people who are going through exactly what you are going through. When you are down somebody uplifts you, when somebody else is down you can uplift them, it’s basically like one big family” (Participant 31295).**

# PL Enrollment Process

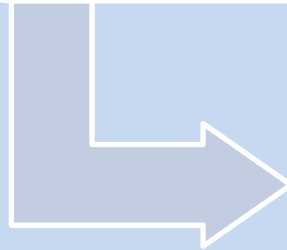
111  
Approached

- Referred by Clinic Providers; Participating ASOs; Testing sites
- Top specified reasons for disinterest: already have a cell phone; not enough time to enroll



87  
Interested

- 4 with Literacy Level below threshold
- 6 did not complete enrollment



77 Enrolled

- Provided with Android Phone and Voice/Data Plan
- Assessments at 6/12/18 months

The Positive Links Cohort was enrolled from  
9/13 - 5/15 and followed for 12 months.  
77 participants used the app.

Participant Characteristics	Percent (n)
Male	63% (47)
MSM (Men who have sex with men)	41% (31)
Incomes below 100% FPL	74% (56)
Unemployed	44% (33)
Homeless or unstably housed	26% (19)
Food insecure	37% (28)
Poor transportation access	23% (17)



# Engagement with App

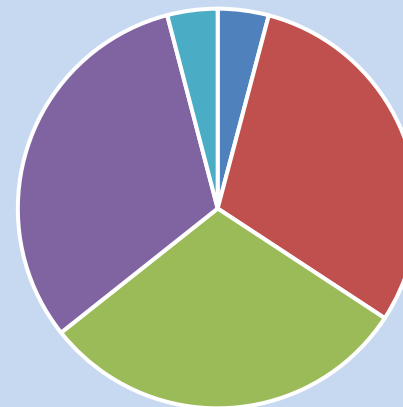
PL Participant App Utilization	6 Months		12 Months	
	<i>Mean</i>	<i>SD</i>	<i>Mean</i>	<i>SD</i>
Med query response rate	50%	36%	41%	36%
Mood query response rate	47%	36%	39%	36%
Stress query response rate	47%	36%	39%	36%
Quiz response rate	44%	34%	36%	33%
Total CMB posts	12.2	22.0	19.4	37.5
Total app screen views	189	183	328	349

App Actions =36,374

24,571 screen views/12months

Mean: 327 (SD: 347)

Median: 187



■ Quiz Responses   
 ■ Stress Responses   
 ■ Mood Responses  
■ Med Responses   
 ■ CMB Posts

# Who Uses the CMB?

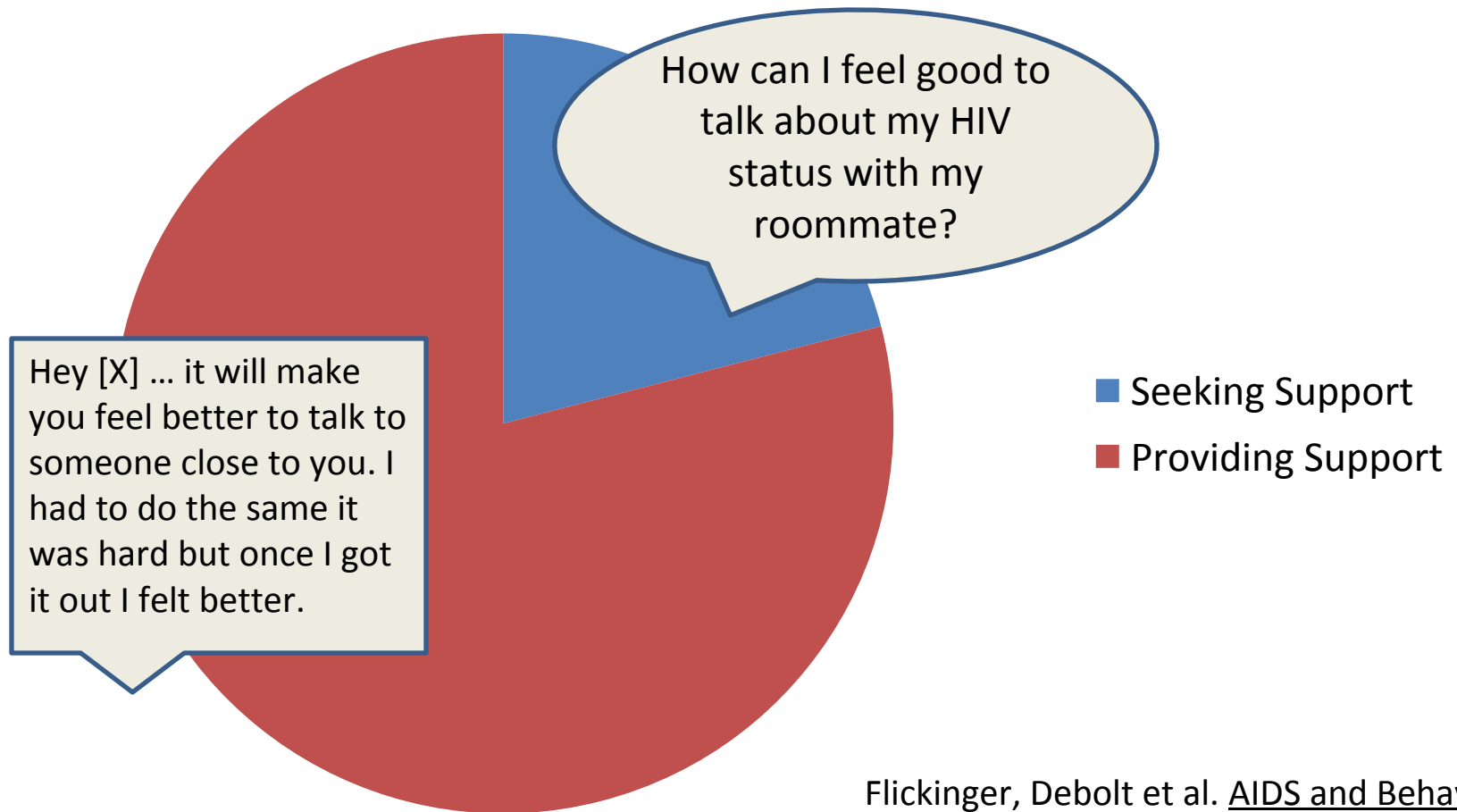
Characteristic	Odds Ratio (95% CI)	p-value
White, non-Hispanic	0.20 (0.05-0.84)	0.028*
Private Insurance	0.07 (0.01-0.41)	0.003*
Unsuppressed VL (VL>50)	5.13 (1.13-23.30)	0.034*

Non-white, uninsured PLWH who have *detectable* viral loads are statistically most likely to post on the community message board. Literacy level, socioeconomic status, and HIV risk factor were not significant predictors.

Flickinger et al. Telemed and E-Health.  
Sept. 2016.

# Social Support on the CMB

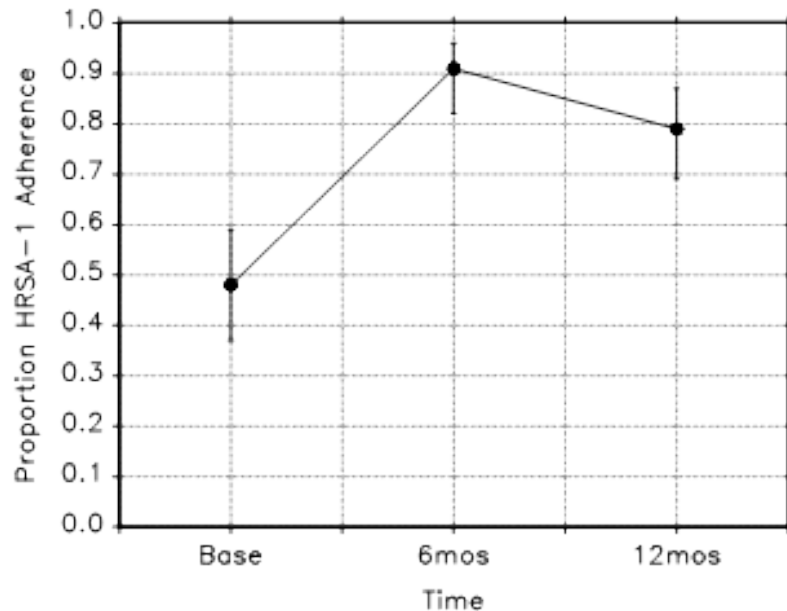
## Distribution of CMB Posts Seeking and Providing Support



Flickinger, Debolt et al. AIDS and Behavior  
Nov. 2016

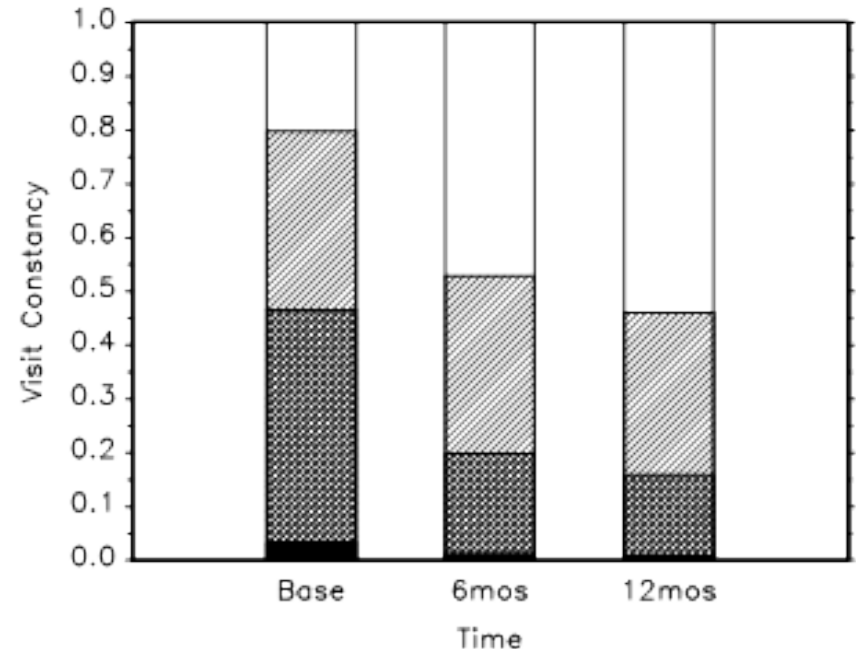
# Participation in PL Improved Engagement in Care

HRSA-1: % With at least 2 visits separated by 90 days within one year

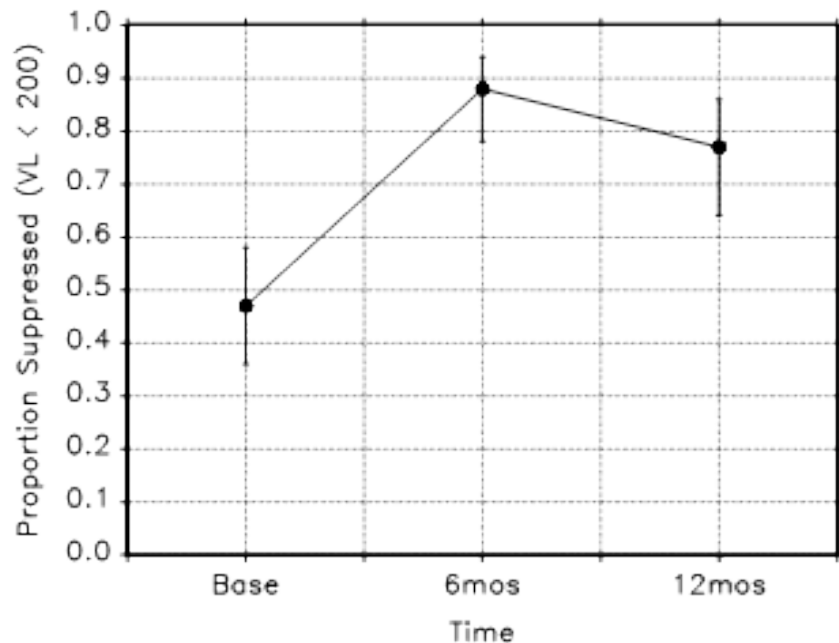
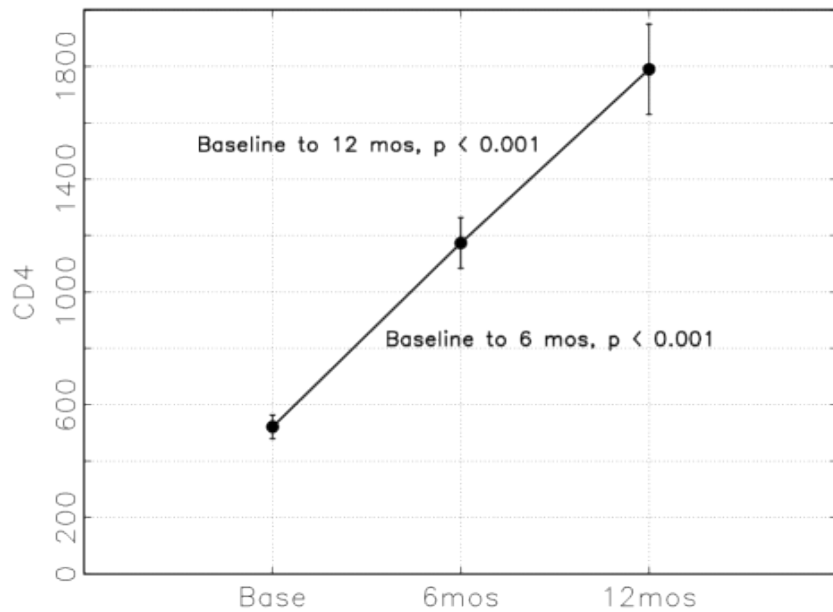


$P < 0.001$  (McNemar's)

Visit Constancy (per 4 month period)



- No visits
- 1 visit
- 2 visits
- 3 visits



The Positive Links Program resulted in significant *increases* in CD4 count (top) and in HIV viral load suppression (bottom) over one year of follow-up. (n=56)

# PL Recipe for *Warm Technology*



- **Design Strategies**
  - **Secure!**
  - **Evidence-based**
  - **User-based design and participant ownership**
  - **Anticipated low literacy**
  - **Rigorous Evaluation**
- **Main Features**
  - **Coordination of Care**
  - **Self-monitoring**
  - **Social Support**







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)**



## What is PositiveLinks?


PositiveLinks is a clinic-centered engagement in care program that employs a tailored smartphone app with an embedded private social network to support people living with HIV and their care goals.

WATCH THIS SPACE:  
<https://www.positivelinks4ric.com/>



# Next Steps and Challenges

- Development of Provider App
- Co-deployment with telemedicine care
- Translation
- Document upload
- Replication/Adaptation
- Keeping it fresh
- Preserving the feel and functionality
- Scaling
- Evaluation at Scale
- Sustainability



Questions? Suggestions?  
Comments?

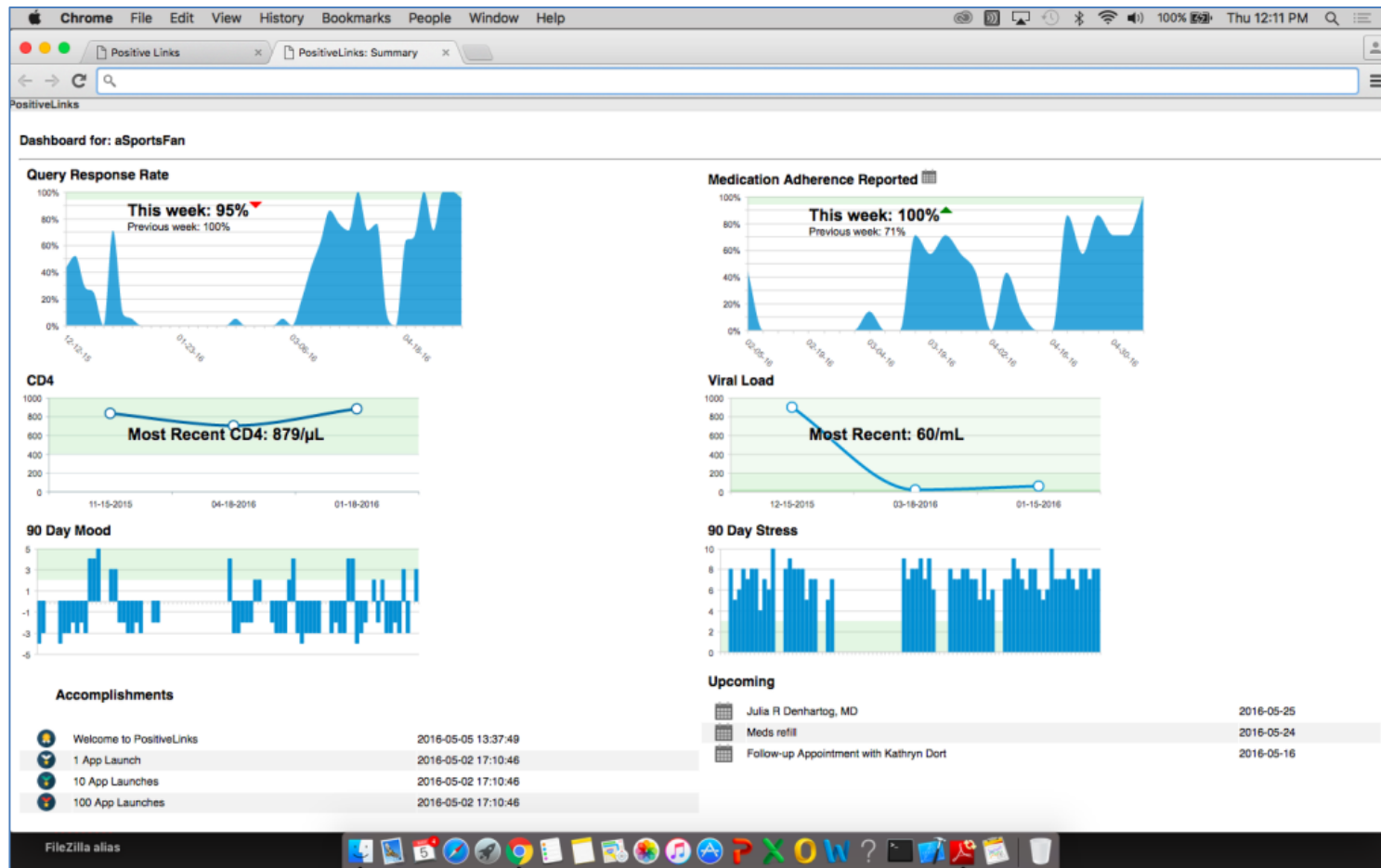
rd8v@Virginia.edu

WATCH THIS SPACE:  
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# Provider Portal: Member Dashboard



# Economic Analysis

Location	Number of clients seen	Cost analysis (Societal perspective)	Cost per client (Societal perspective)	Cost-saving threshold	Cost-effective threshold
University of Virginia (UVA) (12 months)	54 clients 33,216 contacts	\$170,635	\$3,160	0.48 transmissions	1.71 QALYs
The Open Door (12 months)	27 clients 405 contacts	\$47,919	\$1,775	0.14 transmissions	0.48 QALYs
Christie's Place (6 months)	103 clients 2,696 contacts	\$162,620	\$1,579	0.45 transmissions	1.63 QALYs

