Utilization of the Internet and Online Games to Improve Health Outcomes among Adolescents and Young Adults

Laura Whiteley, M.D.

Clinical Director, Young Adult Behavioral Health Program, Rhode Island Hospital
Assistant Professor, The Warren Alpert Medical School of Brown University
Providence, Rhode Island

Research Supported by NIMH Grant: T32 MH 07878 and Lifespan/Tufts/Brown Center for AIDS Research (CFAR)
I will be describing two projects

1) A Internet Intervention assembled from existing, publicly available websites for adolescents at risk for HIV and STIs

1) Online game to Promote Adherence to ART among young persons living with HIV
HIV: The Quintessential Bio-Psycho-Social Illness

Disproportionately affects

- Racial, ethnic, sexual minorities
- Adolescents/young adults
- Patients with decreased access to medical care and information about sexual health
- Patients with psychiatric illness

Note: HIV data are estimates and do not include U.S. dependent areas.

Figure 1: New HIV Infections & U.S. Population, by Race/Ethnicity, 2010
Rates of New HIV Infections per 100,000, by Race/Ethnicity, for Adults/Adolescents, 2010

- Black: 68.9
- Latino: 27.5
- Multiple Races: 24.2
- Native Hawaiian/Pacific Islander: 19.0
- American Indian/Alaska Native: 11.0
- White: 8.7
- Asian: 8.4

U.S. Rate: 18.8

NOTE: Data are estimates for adults/adolescents aged 13 and older and do not include U.S. dependent areas.
HIV/STIs growing particularly among minority adolescents

- Young adults and teens between 13 and 29 represent 34% of new HIV infections, the largest share of any age group.

- The chlamydia rate among African American Adolescents (15-19yrs) is nearly seven times higher than among white females, among black males (20-24 yrs) the rate is eight times higher compared to white males.
Lessons Learned

Most evidence based HIV/STI Prevention Intervention are:

- Delivered by health care workers
- High financial cost
- Difficult to disseminate
Meeting youth where they are - online

- 97% of young adults ages 14-24 go online

- "digital divide" between Black/African American, Hispanic and Caucasian youth disappeared
  - Many youth access online material from phones
  - In 2011, 76% AA youth had broadband internet access at home
Project 1
Publicly Available Internet STI/HIV Prevention Resources

- Web based prevention content available
- 40 STI/HIV prevention age appropriate websites for adolescents/young adults
- Some content is culturally tailored and targets risk groups
- Some content consistent with theories of behavior change
## Authority, Interactivity, Usability, and Educational Content Scores for Sexual Health Websites for Teens

<table>
<thead>
<tr>
<th>Website</th>
<th>% Authority</th>
<th>% Interactivity</th>
<th>% Usability</th>
<th>% Educational Content</th>
</tr>
</thead>
<tbody>
<tr>
<td><a href="http://www.iwannaknow.org">www.iwannaknow.org</a></td>
<td>65.7</td>
<td>0</td>
<td>36.4</td>
<td>51.3</td>
</tr>
<tr>
<td><a href="http://www.cfoc.org">www.cfoc.org</a></td>
<td>65.7</td>
<td>7.6</td>
<td>54.5</td>
<td>14.1</td>
</tr>
<tr>
<td><a href="http://www.youngwomenhealth.org">www.youngwomenhealth.org</a></td>
<td>65.7</td>
<td>30.8</td>
<td>63.6</td>
<td>41.0</td>
</tr>
<tr>
<td><a href="http://www.kidshealth.org">www.kidshealth.org</a></td>
<td>100</td>
<td>15.4</td>
<td>45.5</td>
<td>52.6</td>
</tr>
<tr>
<td><a href="http://www.plannedparenthood.org">www.plannedparenthood.org</a></td>
<td>65.7</td>
<td>53.8</td>
<td>54.5</td>
<td>80.8</td>
</tr>
<tr>
<td><a href="http://www.spotu.org">www.spotu.org</a></td>
<td>42.8</td>
<td>23.1</td>
<td>36.4</td>
<td>5.1</td>
</tr>
<tr>
<td><a href="http://www.familydoctor.org">www.familydoctor.org</a></td>
<td>65.7</td>
<td>30.8</td>
<td>63.6</td>
<td>30.8</td>
</tr>
<tr>
<td><a href="http://www.stepthinkbesafe.org">www.stepthinkbesafe.org</a></td>
<td>42.8</td>
<td>30.8</td>
<td>54.5</td>
<td>10.3</td>
</tr>
<tr>
<td><a href="http://www.unicef.org/aids">www.unicef.org/aids</a></td>
<td>65.7</td>
<td>46.2</td>
<td>63.6</td>
<td>19.2</td>
</tr>
<tr>
<td><a href="http://www.stayteen.org">www.stayteen.org</a></td>
<td>71.4</td>
<td>46.2</td>
<td>45.5</td>
<td>28.2</td>
</tr>
<tr>
<td><a href="http://www.avert.org">www.avert.org</a></td>
<td>65.7</td>
<td>38.5</td>
<td>72.7</td>
<td>41.0</td>
</tr>
<tr>
<td><a href="http://www.teenissues.co.uk">www.teenissues.co.uk</a></td>
<td>42.8</td>
<td>15.4</td>
<td>45.5</td>
<td>24.4</td>
</tr>
<tr>
<td><a href="http://www.spiderbytes.ca">www.spiderbytes.ca</a></td>
<td>65.7</td>
<td>38.5</td>
<td>36.4</td>
<td>51.3</td>
</tr>
<tr>
<td><a href="http://www.nhs.uk.livewell">www.nhs.uk.livewell</a></td>
<td>71.4</td>
<td>61.5</td>
<td>81.8</td>
<td>42.3</td>
</tr>
<tr>
<td><a href="http://www.coolnurse.com">www.coolnurse.com</a></td>
<td>57.1</td>
<td>23.0</td>
<td>54.5</td>
<td>41.0</td>
</tr>
<tr>
<td><a href="http://www.scarleteen.com">www.scarleteen.com</a></td>
<td>71.4</td>
<td>38.5</td>
<td>54.5</td>
<td>84.6</td>
</tr>
<tr>
<td><a href="http://www.teenhealthfx.com">www.teenhealthfx.com</a></td>
<td>85.7</td>
<td>23.1</td>
<td>45.5</td>
<td>42.3</td>
</tr>
<tr>
<td><a href="http://www.itsyoursexlife.com">www.itsyoursexlife.com</a></td>
<td>71.4</td>
<td>53.8</td>
<td>54.5</td>
<td>24.3</td>
</tr>
<tr>
<td><a href="http://www.seriouslysexuality.com">www.seriouslysexuality.com</a></td>
<td>42.8</td>
<td>30.8</td>
<td>63.6</td>
<td>52.6</td>
</tr>
<tr>
<td><a href="http://www.sexetc.com">www.sexetc.com</a></td>
<td>71.4</td>
<td>46.2</td>
<td>63.6</td>
<td>41.0</td>
</tr>
</tbody>
</table>

Health Behavior Change Theory - IMB (social learning theory)

**Information:** puberty, basic anatomy, STI and HIV basics, contraception information

**Motivation:** assessing personal risk, targeting peer norms, relevance and impact of STIs on minority communities, the benefits of abstinence, benefits of protected sex

**Behavioral skills:** condom acquisition and condom skills, communication and healthy relationship skills, substance use/refusal and its relationship to sexual risk
INFORMATION
Sexually Transmitted Infections

Each picture opens up a new browser window; to find out more about each type of STI, just click on them. But first... Find out what an STI is and how as a teen, you’re one of the more vulnerable group at risk for STI.
STD INVADERS

Enter

This game requires a Flash 5 or higher Plugin. If you don't have it, go to the Macromedia Flash Player Download Center.

Copyright © 2003 Danza International Ltd. All rights reserved.

Name: Laura

Enter
You may already know something about HIV. There is no way to cure this virus, but these days, you might find anti-viral treatments to keep the disease under control. Like all STDs, the best prevention is not having sex. But condoms do help protect against HIV.
SORRY... These INVADARS got the best of you!

Next time, try to use the condom as a shield against chlamydia while you switch back and forth between weapons.
Test Your STD Knowledge

Meet Devon

I moved to Wyoming two years ago because I had some friends that live here, and they thought I would like it here, even though there isn't a large black community. It was a huge adjustment moving to a small city. I felt like I was the only black person, let alone being a gay black man. But the people at work have been great. I am out to most of them, and they seem to be supportive. I make it a point to get out of state to bigger cities at least once a month just so I can meet more people like me and have some fun. I am single and have been since I came out at 19. I play it safe and use protection for anal sex because I want to lead a healthy and long life. I get tested every six months just to be sure.

Have you been tested for hepatitis?

1. No, I never have had jaundice or stomach cramps.
2. I think I was tested for hepatitis when I had a pre-employment physical several years ago for work.
3. My doctor tested me for hepatitis when I told him that I had sex with other men. He also vaccinated me for hepatitis A and hepatitis B.
4. I never used drugs so I don’t need to be tested for hepatitis.

Answer 1  Answer 2  Answer 3  Answer 4
PROTECT

Preventing Pregnancy

WHAT WORKS
- Abstinence
- Condom
- The Pill
- The Shot
- Diaphragm
- Cervical Cap
- The Patch
- The Ring
- IUD
- Implant
- Emergency Contraceptive

WHAT DOESN'T WORK
- Well
- At All

COMPARE SIDE BY SIDE: Method » Success Rate » Groovy Part » Drag Factor » How to Get it »

Imagery provided by BEDSIDEE
Female Condom

The female condom is inserted into the vagina before sexual activity. It is inserted in a similar manner to a tampon. It is made of polyurethane and has a flexible ring at each end. One ring is inserted into the vagina, and the other ring is placed against the cervix. The female condom provides barrier protection and can be used with spermicides to increase contraceptive effectiveness.

Male Condom

A male condom is a thin sheath made of latex or polyurethane that is worn over the erect penis during sexual activity. It is lubricated with spermicide to prevent sperm from entering the female reproductive tract. The condom is rolled on to the erect penis and is left on until after ejaculation.

How Does It Work?

Condoms work by preventing sperm from entering the female reproductive tract. They provide a physical barrier to sperm motility and prevent the sperm from reaching the egg. Condoms also provide additional protection against STIs.

What is it for?

Condoms are a barrier method of contraception. They work by preventing sperm from entering the female reproductive tract. A female condom is a thin sheath made of polyurethane that is worn in the vagina. A male condom is a thin sheath made of latex that is worn on the penis. A female condom is more expensive than a male condom, but it may be more comfortable for some women.

Interactions

Condoms are generally safe to use with all types of medications. However, some medications may reduce the effectiveness of condoms. If you are using any medications, talk to your healthcare provider before using condoms.

Conditions

Condoms are generally safe for all women. However, some women may experience discomfort or irritation with condoms. If you experience any discomfort or irritation, stop using condoms and talk to your healthcare provider.
Do you think you know all there is to know about condoms? Test your knowledge with our fun Condom Game. To complete the game you’ll need skill, quick thinking and a good grasp of the facts. The more you play our Condom Game, the more you will learn.

See how well you do compared to other players and if you’re lucky, you might even make it onto the Hi-scores table.
4. Check the expiration date.

5. Open the package carefully and remove the condom.

6. Orgasm, ejaculation, and partner’s orgasm. Hold to the base of condom and pull out.

7. Make sure the condom tip is pointing up so that it can easily roll down the penis.

8. Pinch the tip of the condom to squeeze the air out.

9. Carefully remove the condom from the penis making sure none of the semen drips out by tying a knot.

10. Place the condom on an erect penis and roll it down all the way.

11. Throw it away, never reuse a condom.
MYTH MONSTERS

Look out! Powerful myth monsters are infecting your friends with bad information about sex, birth control, and avoiding pregnancy. Stop them before it's too late!

INVASION OF THE MYTH MONSTERS

CRAFT YOUR CHARACTER

SELECT GENDER

Let's Do This

SHARE
MOTIVATION
Think you can tell if we have HIV?
Some of us are HIV positive and some are negative.
All of us want to challenge your assumptions about HIV.
Play the game and see if you can tell who is Pos or Not.

START
Fortunata, 37

When I Found Out:
In 1997, during my first prenatal visit with my first child. That was the test that saved my child's life and mine.

Christopher, 30

When I Found Out:
7 years ago. I was taught about condoms, but never took it seriously enough to put it into practice when I became of age to do so.
Steven, 32

What I Want You to Know:
I get tested twice a year. I take the proper precautions; I feel it's better to be in the know for the sake of both my physical and mental health.
Meet Thomas

Hey, I'm Thomas, I'm 17 and I'm really into basketball. A lot of what I've learned about sex has come from the locker room at school. It seems like everyone on the team is doing it, but I get the feeling that even though a lot of the guys say they're doing it, a lot of them aren't. I know that most of the stuff I hear from the guys on my team isn't real, so I talk to my mom, Josh to get the feel of what's going on.

Personally, I haven't really had time for a serious girlfriend but I've gone out with a couple of girls. I think Maria is pretty cool, and I want to ask her out. The thing is, I feel a little weird because she knows so much about sex and I'm still a virgin.

My parents need me to believe that sex should wait until marriage. Honestly, I just don't think I'm ready to have sex, not yet anyway. Getting someone pregnant really freaks me out, plus I don't want to take a chance on getting an STD. I'm scared I would mess up my future and I don't want to look stupid in front of Maria, either. I just seem better off to wait to have sex right now.

Learn more about abstinence
visit Thomas YourSpace page

Meet Kimberly

Hey, I'm Kimberly and I moved to Boston a few years ago after my parents split up. I started dating Josh when I moved here and he's really great. We fight sometimes, but what couple doesn't?

We just started having sex and we use condoms, but not all of the time. I know I should use them all of the time, but I don't really like them. I know I need to get on birth control soon, since I've had to take emergency contraception twice and it was kind of scary to think that I could have gotten pregnant. My parents would totally freak.
BEHAVIORAL SKILLS
drugs + HIV: learn the link
Learn the link between drug abuse and the spread of HIV infection in the United States.

WEBISODES: part 5: 4 real?

How did she get HIV?

Just then, Monica realizes that getting high and hooking up can lead to HIV.
Debi Nova: How to Talk to Your Partner About STD Testing

Debi Nova provides five easy steps to talking about STDS, HIV, and testing with your partner.

You are not logged in. Log In or Sign Up to post a comment.
Think you've got what it takes to build a healthy relationship? Create your ideal boyfriend and see how you respond to some challenging situations in your relationship.

Play My Paper Boyfriend and try to keep your relationship strong or the two of you will break up!

Want to know more? Check out our Relationships section for more information about what it takes to build a strong and healthy relationship.

WHAT OTHER TEENS ARE SAYING:

ON APRIL 26, 2011 AT 5:42 PM, ANONYMOUS SAID:

[Content of the tweet is not visible in the image.]
YOU CHOSE: ANSWER B  (2 PTS)
Ask Ryan if he wants to meet somewhere. It'll be easier to talk with him about your feelings if you're not alone in a room together.
Laura: Do you have a condom?
John: No I told you, I hate those things. I thought you said you were going on the pill.
2011 NATIONAL DAY TO PREVENT TEEN PREGNANCIES

IF YOU WERE LAURA, WHAT WOULD YOU SAY?

A.  

B.  

C.  

PLAY
You want to make a change. But how do you stick with it until you reach your goal?

You make a plan!

This feature guides you through the specific steps needed to plan for your individual goal. When you've finished, you'll be able to print out a personalized sheet designed just for your goal. The whole process should take about 10 minutes.

Open the journal to begin.
Online STI/HIV Intervention for AA Adolescents

Assembled an Internet Intervention from free, existing, publicly available online sources-utilizing content consistent with IMB/social learning theory

RCT with 60 Black/Hispanic adolescents (14-21 yrs, mean age 19)

30 received Internet intervention

30 assessment only

1/3 of sample identified as MSM
## Characteristics of Sample Population

<table>
<thead>
<tr>
<th></th>
<th>Mean (S.D.)</th>
<th>Total ($n = 60$)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Age</strong></td>
<td>18.6 (2.3)</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>$n$</th>
<th>(%)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Gender</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>37</td>
<td>(61.7%)</td>
</tr>
<tr>
<td>Female</td>
<td>23</td>
<td>(38.3%)</td>
</tr>
</tbody>
</table>

| **Ethnicity**   |      |      |
| Hispanic        | 21   | (36.2%) |
| Non-Hispanic    | 37   | (63.8%) |

| **Race**        |      |      |
| White           | 2    | (3.6%) |
| Black           | 29   | (51.8%) |
| Mixed           | 17   | (30.4%) |
| Other           | 8    | (13.8%) |

| **Sexual Orientation** |      |      |
| Heterosexual          | 32   | (53.3%) |
| Homosexual            | 10   | (16.7%) |
| Bisexual              | 10   | (16.7%) |
| Undecided             | 8    | (13.3%) |

| **Arrested**         |      |      |
| Yes                 | 14   | (23.3%) |
| No                  | 46   | (76.7%) |
Hello
This week, read about puberty and get to know your body. Here are the links to the websites you will look at.

http://teenadvice.about.com/od/yourbody/tp/female_puberty_and_male_puberty.htm


http://teenadvice.about.com/od/yourbody/tp/signs_of_puberty_in_boys.htm
60 participants recruited
60 participants consented and given baseline assessment

31 participants given the Internet Intervention
29 participants in control (intervention given after they complete the study)

8 weeks (participants in the intervention arm were sent the intervention/quizzes)

29 Participants came in for their T2 assessment
25 Participants came in for their T2 assessment

2 participants were unable to be reached for follow-up
4 participants were unable to be reached for follow-up

27 participants came in for their T3 assessment
24 participants came in for their T3 assessment

12 weeks

4 participants were unable to be reached for follow-up
5 participants were unable to be reached for follow-up
# Outcomes at 3 months

## Post-Intervention

<table>
<thead>
<tr>
<th></th>
<th>Intervention</th>
<th>Control</th>
<th>p-Value</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Knowledge</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mean (SD)</td>
<td>13.8 (4.1)</td>
<td>13.6 (4.1)</td>
<td>0.446</td>
</tr>
<tr>
<td><strong>HIV Self-efficacy</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mean (SD)</td>
<td>44.8 (4.5)</td>
<td>42.6 (6.1)</td>
<td>0.021*</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>Intervention</th>
<th>Control</th>
<th>p-Value</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>n (%)</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Unprotected vaginal or anal sex(^a)</td>
<td>3/24 (12.5)</td>
<td>10/21 (47.6)</td>
<td>0.021*</td>
</tr>
<tr>
<td>Alcohol and drug use before sex(^a)</td>
<td>6/27 (22.2)</td>
<td>11/24 (45.8)</td>
<td>0.348</td>
</tr>
</tbody>
</table>

*\(p\)-Values statistically significant (\(p < 0.05\), ANCOVA).

\(^a\) in the past three months
HIV Self-efficacy

Estimated Marginal Means of MEASURE_1

Intervention/Control
- intervention
- control
Conclusions

The brief online intervention with a very small sample resulted in:

1) Improved HIV self efficacy 3mos post
2) Reduced unprotected sex 3 mos post
3) Other measures moved in the correct direction but were not significant
Limitations

- Small number of participants
- Self report measures only
- Unknown fidelity and dosage
- 3 mos follow-up only
- Rapidly changing nature of online material
- Rapidly changing technology \( \rightarrow \) rapidly can become obsolete
Project 2
Goal: To develop and test an absorbing, action-oriented game that increases information about health (e.g. knowledge about HIV), improve motivation (e.g. action-figures experience health benefits of adherence), and build skills (utilizing social and medical supports) for adolescents and young adults living with HIV.

Adherence information from the electronic, portable medication dispenser will be integrated into the iPhone app/game and will translate into enhanced play.
Youth living with HIV (YLWH) have poorer rates of retention in care than adults and youth are more at risk for being lost to follow-up (17, 18).

Furthermore, the percentage of prescribed doses of ARV taken by YLWH ranges from 50-75% in the US (19,20).

There is a need for empirical and rigorous research on the efficacy of adherence interventions for HIV-infected persons.
There is more data available on adherence strategies for adults.

Studies have examined the effects of a variety of technological aids in improving adherence in adults such as handheld devices, two-way pagers, and alarmed vials (8, 24-31).

Reminder devices and alarms, without informational or motivational components, are minimally effective in enhancing sustained adherence (18, 27, 30, 39).

Devices that record pill cap opening events for individual patients and providers have been more useful for measuring, rather than improving adherence (32,37,38).
These adherence-measuring technologies, unfortunately, do not impact the underlying causes of non-adherence such as (40-42, 47):

- Poor information about HIV and its consequences
- Inconsistent motivation
- Lack of skills needed for ideal adherence behaviors
Advantages to using an iPhone App/Game

- Gaming is popular among youth
- Adolescents and young adults in the United States (male and female) spend on average 1.13 hours per day playing interactive phone and computer games
- More than half of all video gaming occurs on portable devices: a handheld player (29%) or a cell phone (23%).
- A unique opportunity to deliver health education during leisure time, outside of the clinic, cost effective, scalable.

(54, 55, 61, 60)
Two Major Phases of Research

- **A Development Phase** during which we conducted formative research to guide the development of the Gaming Adherence Intervention for YLWH.

- **A small, pilot Controlled Trial Phase** in which we will evaluate the acceptability and preliminary efficacy of the IMB Gaming Adherence Intervention compared to a comparison condition (n=60).
Goal: To examine the impact of the IMB Gaming Adherence Intervention:

- Improving treatment adherence (measured by Vitality Cap openings, number of doctor’s visits attended, self-report)
- Biological measures (HIV-1 viral levels)
- Impact on HIV treatment knowledge, attitudes, and self-efficacy for adherence
- Information Motivation Behavioral Skills
Conclusions

- Internet and online games are a new channel to address health disparities
- Online content can be used to provide evidence based health and prevention programming to under-studied underserved communities
- Cost effective, easily updated and easily disseminated
References
