

Measuring Engagement & Adherence to eHealth interventions

Challenges and opportunities across the healthcare continuum from prevention to diagnosis and treatment

ISRII 6th Scientific Meeting – May 2013



Many different technologies...



Credit: Video screenshot by Leslie Katz/CNET

...Many questions...

- What are the approaches to track actual usage?
- How is it reported?
- Are there standards for comparison?
- What is expected non-usage? How does this inform study design?
- Are those using ehealth interventions those who are more activated and ready?

Fleisher, et al, Journal of Health Communications, 2011

CONSORT-EHEALTH

- Literature Review
- Survey of ehealth experts and workshop
- Checklist instrument
 - 17 essential sub-items; 35 highly recommended
 - Pilot testing – revised in 2013
- Provides guidance for reporting

...But answers are emerging

Evaluation of EHealth

- Evaluation of information technology often requires a mixed methods approach
- Evaluation at both patient and system levels
- Formative or outcome research
- Little information from industry, research being done in academic institutions

Liford, Foster, Pringle, PLOS Medicine, 2009

Ponderings

1. **Describing Utilization**
 - What are the appropriate expectations of utilization across various behaviors and health care conditions?
 - What are the various ways to report utilization? What counts and in what ways?
2. **Variation in Utilization by Audiences or Platforms**
 - How does utilization vary by different subgroups?
 - By different platforms or modalities?
 - Different conditions or stages of disease?
3. **Research design**
 - How are research issues related to utilization addressed – incongruence of self-report and objective use, outcome analyses, definitions of use, tracking analysis?

Panelists

- Linda Fleisher, PhD, MPH Research Scientist, CIRP, CHOP & Associate Research Professor-Adjunct, Fox Chase Cancer Center
- Flaura Koplun Winston, MD PhD Scientific Co-Director, The Children's of Philadelphia Center for Injury Research and Prevention
- Kuang Yi Wen, PhD, Assistant Professor, Cancer Prevention & Control, Fox Chase Cancer Center

Healing Choices: A Prostate Cancer Decision Support Tool

Fleisher, Kandadai, Miller, Wen, Diefenbach, Marcus, Ropka

Web-Based Decision Aid

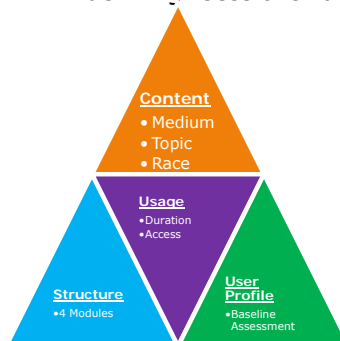
- *Healing Choices* – Used in the NCI CISRC Outcomes Study & Clinic based Pilot Study
- 4 Module Multimedia Tool (Text and Video-based)
 - **Men's Stories** – Video-based patient testimonials
 - **Library** – Text-based PC treatment information
 - **Office** – Video-based PC treatment information
 - **Notebook** – Values clarification module
- Built-in analytical tracking capability
 - .csv export option



Steps in Web Log Analysis

How to make sense of raw weblog data – How to define usage?

- Duration vs. Access
- Correcting for idle time
- Developing operational terms to standardize specific usage variables (i.e. defining "sessions" and "access")



- Analytic Framework for Content Domains
- Developed by Eirinaki & Vazirgiannis, 2003 (*Transactions on Internet Technology*)
- 4 domains of analysis

Example Querying Techniques

- Filtering out extraneous data

```
PROC SQL;  
SELECT *  
FROM tracking_study  
WHERE duration_module >= 1  
QUIT;
```

Filters out sessions < 1 min long

- Creating New Variables

```
PROC SQL;  
CREATE TABLE media_type AS  
SELECT *, time_stories + time_office AS  
video, time_library AS text  
FROM tracking_study;  
QUIT;
```

Creates two new variables 'video' and 'text' to use in additional analyses

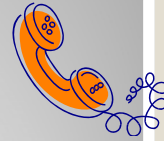
- **Clinic-Based Pilot Study**

- Tracking Primary Focus
- Additional measures – health literacy, computer facility
- Intervention provided during clinic visit
- Web only



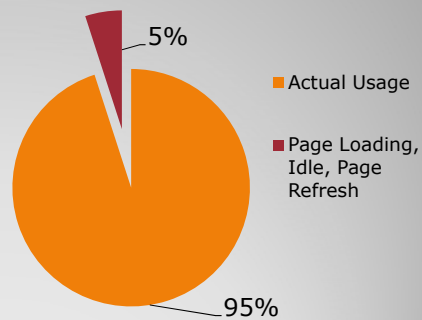
- **National Randomized Trial**

- Intervention Impact Focus
- Provided both Web and CD
- Tracking added as an additional evaluation for those using Web
- Recruited through NCI's CIS and other avenues



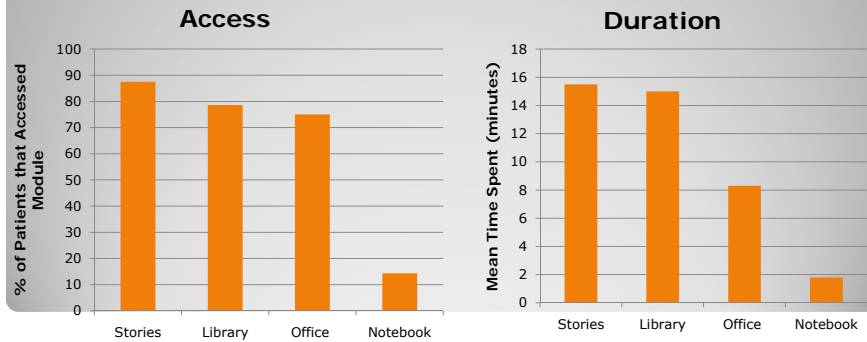
Clinic Based Pilot (N=56)

- ~32 hours of data
- 25% logged on for additional session
- Mean time spent per participant = 34 min

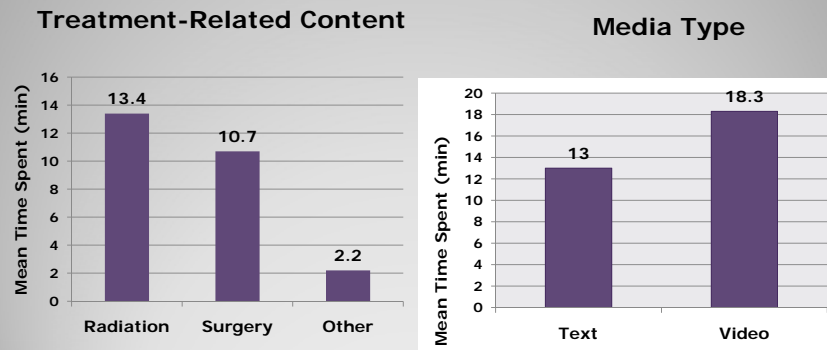


Key Findings

Almost 90% of the men accessed the Men's Stories and spent the most time in this module. The second highly used module was the Library. The Doctor's Office was the third most highly used module, but only a small proportion used the values clarification (Notebook)



Web Site Usage



Exploratory Analyses with Background Characteristics and Usage

HEALTH LITERACY

(min)	<i>Inadequate</i>		<i>Low Adequate</i>		<i>High Adequate</i>		*P
	N	M (SD)	N	M (SD)	N	M (SD)	
Overall Time	5	35.8 (13.4)	11	30.0 (10.2)	39	35.0 (10.2)	0.359
Time Library	5	9.5 (10.3)	11	6.2 (8.2)	39	13.8 (11.7)	0.122
Time Stories	5	19.3 (14.6)	11	14.9 (9.3)	39	12.7 (12.3)	0.484
Time Office	5	6.2 (7.3)	11	7.8 (8.0)	39	5.9 (9.4)	0.824
Time Text	5	9.8 (10.3)	11	6.3 (8.2)	39	15.5 (12.5)	0.063
Time Video	5	23.7 (13.0)	11	21.4 (11.9)	39	17.1 (13.2)	0.411
Time Surgery	5	18.6 (12.9)	11	11.0 (9.8)	39	11.3 (8.0)	0.532
Time Radiation	5	17.0 (9.9)	11	13.7 (8.6)	39	13.3 (9.9)	0.716

COMPUTER FACILITY

(min)	<i>Low Facility</i>		<i>Med Facility</i>		<i>High Facility</i>		*P
	N	M (SD)	N	M (SD)	N	M (SD)	
Overall Time	17	30.5 (9.1)	17	33.6 (13.1)	22	36.1 (10.0)	0.281
Time Library	17	6.1 (6.7)	17	13.3 (11.1)	22	15.1 (12.7)	0.033
Time Stories	17	15.0 (9.9)	17	10.8 (12.7)	22	14.6 (12.8)	0.521
Time Office	17	7.3 (7.4)	17	6.7 (12.6)	22	4.8 (6.0)	0.665
Time Text	17	7.5 (8.3)	17	14.8 (12.0)	22	15.9 (13.2)	0.069
Time Video	17	20.5 (10.0)	17	16.2 (14.7)	22	18.2 (14.0)	0.627
Time Surgery	17	10.2 (9.3)	17	8.9 (7.5)	22	12.4 (9.1)	0.45
Time Radiation	17	11.6 (9.5)	17	12.7 (8.9)	22	15.5 (10.2)	0.431

* Non-parametric Kruskal-Wallis Test

- Many participants used the CD which was not tracked – more than expected
- We have tracking data on 32 men who used the Web-based version of the Intervention
 - 59% logged in more than once
 - Ave time spent was 39 minutes for 1st login
 - Almost all logged into the library, but the most time was spent in patient stories & doctor's office
 - About 40% accessed the notebook – spent on average 13 minutes

CIS Research Consortium – Web Tracking

Challenges

- Engagement may be dependent on personal characteristics such as health literacy or computer facility
- Tediousness of coding and analyzing the data
- Less usage than anticipated – how to address during implementation & analysis
- Are there differences in usage based on the setting and recruitment – e.g. notebook

Opportunities

- Design – more awareness of key components, user interface, health literacy
- Defining appropriate usage upfront – how much is the “necessary dosage”
- Examining multiple logins over time – in context of objectives
- Monitor in real time – make adjustments

Implications