The Communications Revolution and Health Inequalities in the 21st Century: Promises and Pitfalls

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Institute for Health Research & Policy
University of Illinois at Chicago
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Harvard School of Public Health
Dana-Farber Cancer Institute
Dana-Farber/Harvard Cancer Center
New U.S. Research Will Aim at Flood of Digital Data

Big data refers to the rising flood of digital data from many sources, including the Web, biological and industrial sensors, video, e-mail and social network communications.

For example, if you buy a used car, your best bet is an orange one. Data scientists at Kaggle, a pattern recognition start-up ..., have matched previously separate data sets on buyers, colors and after-purchase problems. They figured out that if a car’s original owner chose an odd color, the car was most likely a means of self-expression. That self-identification raises the odds that the owner cared more than usual for the vehicle.

What Does It Take to Turn Big Data into Big Dollars?

volume of data now being produced continues to skyrocket, with something on the order of **2.7 Zettabytes (2.7 x 10^21)** of information to be produced in 2012
New platforms
Mobile Devices are on the Rise

As of 2013:
91% of Adults have a cell phone
34% have a tablet computer

http://www.pewinternet.org/Static-Pages/Trend-Data-%28Adults%29_Device-Ownership.aspx
Communication devices and their use

Percent of Adults and Teens Who Go Online 2004-2012

What do we mean by communications revolution?

Two dimensions:

• An enormous capacity to *manipulate and distribute* information across temporal, geographical and disciplinary boundaries.

• *Integration of different digital domains* – from university libraries to private data archives to research from scientific groups and labs, as well as information on people

Viswanath, 2011
The Communications Revolution

What are the consequences?

- Democratization of information whose generation and consumption at one time was limited by specialty and geography
- A shift from a command and control approach to more grass-roots, participatory models

Viswanath, 2011
Health Disparities and Communication Inequalities
Living conditions
Living conditions
U.S. cigarette smoking prevalence by education level 1980-2010
U.S. Heart Attack Prevalence by Annual Household Income 2005-2010

Source: CDC, BRFSS, 2005-2010
U.S. Diabetes Prevalence by Annual Household Income 2005-2010

Source: CDC, BRFSS, 2005-2010
U.S. Obesity Prevalence by Education Level 1991-2010

Source: CDC, BRFSS, 1991-2010
Tobacco Use by Occupation in India
Tobacco use by wealth in India

Viswanath et al., 2011
Varieties of theories and explanations

- Ecosocial theory
- Fundamental Causes
- Social determinants of health
Social determinants

- Race/ethnicity
- Living conditions
- Socioeconomic status
  - Income
  - Education
  - Occupation
- Gender
- Sexuality
- Immigration status
- Stressful life events over the lifecourse
Health Disparities: Social determinants framework

**Social Determinants**

- Socioeconomic Position
  - Education
  - Income
  - Employment
  - Occupation

- Place
  - Neighborhood
  - Urban versus rural

**Health Outcomes**

- Knowledge
- Health Beliefs
- Comprehension
- Capacity for action
- Incidence
- Health Behaviors
- Prevention
- Screening
- Treatment
- Survivorship
- End-of-life care
Structural Influence Model of Communication (SIM)

Social Determinants
- Socioeconomic Position
  - Education
  - Income
  - Employment
  - Occupation
- Place
  - Neighborhood
  - Urban versus rural

Mediating/Moderating Conditions
- Socio-Demographics
  - Age
  - Gender
  - Race/Ethnicity
- Social Capital
- Resources

Health Communication
- Media Access
- Health Media Use & Exposure
- Information seeking
- Attention
- Information Processing
- Capacity to Use Information

Health Outcomes
- Knowledge
- Health Beliefs
- Comprehension
- Capacity for action
- Incidence
- Health Behaviors
- Prevention
- Screening
- Treatment
- Survivorship
- End-of-life care
Communication Inequality...

...is differences among social classes in the manipulation, and distribution of information at the group level and differences in access to and ability to take advantage of information at the individual level.
Food Marketing

- The food and beverage industry spends approximately $2 billion per year marketing to children. 1
- The fast food industry spends more than $5 million every day marketing unhealthy foods to children. 1
- Kids watch an average of over ten food-related ads every day (nearly 4,000/year). 2
- Ad spending for interactive video games is projected to reach $1 billion by 2014, with six million 3-11 year olds visiting some form of virtual game online each month.3
- Nearly all (98 percent) of food advertisements viewed by children are for products that are high in fat, sugar or sodium. Most (79 percent) are low in fiber. 4

Eleven of the twelve fast food restaurants with the highest sales in 2009 maintained at least one Facebook account during the period we analyzed.

33 Beverage makers have Facebook pages.

Coke is number with 34 million fans; Starbucks with 25 million fans

23 beverage makers have Twitter accounts; use it as a way to engage customers and make their site participatory

From @McCafeYourDay, 05/19/09

- @xxxxxxxxx Sorry to hear that! I'd like to send you a card for a FREE McCafe if you'd like to give it another shot - send me a DM

11/12 top twelve fast food restaurants and 21 of 33 have have atleast one YouTube channel

Food Marketing and Social Media: Findings from Fast Food FACTS and Sugary Drink FACTS. Johanna Richardson, M.B.A. and Jennifer L. Harris, Ph.D., M.B.A. Rudd Center for Food Policy & Obesity at Yale University. Paper presented at American University Digital Food Marketing Conference November 5, 2011
Dimensions of communication inequality

Five broad dimensions
- Use/Access/Exposure
- Attention
- Information seeking
- Processing
- Communication Effects
Recent work

Socioeconomic Status (SES), Race and ethnicity are associated with:

- Subscription to cable or satellite TV and the Internet
- Daily readership of newspapers
- Differential *time* with different media
- *Preferences* for different media
- *Attention* to health content in different media
- Processing (confusion) of health information
- Trust in media
- *Knowledge gaps* in health
- Intermittent smoking

Viswanath, 2011; Kontos et al., 2011; Blake et al., 2010; Blake et al., 2011; Ackerson & Viswanath, 2009; Ramanadhan & Viswanath, 2006; Arora et al., 2008; Viswanath et al., 2006; Viswanath, 2006; Viswanath & Kreuter, 2007; Kontos, Bennett & Viswanath, 2007
Use/Access/Exposure
Media use by location in India

Viswanath, Sorensen, Gupta & Ackerson, 2011
Broadband use: Exemplar of Intersectionality

NTIA, 2010
Disparities by Income Level

Figure 1. Comparison of broadband access at home, cell phone ownership, and internet usage by income brackets of general population

Source: Pew Research Center’s Internet & American Life Project, August 9-September 13, 2010 Tracking Survey. N=3,001 adults and the margin of error is +/- 2.5 percentage points.
Among American adults who don’t go online in 2013, reasons for not using the internet include:

<table>
<thead>
<tr>
<th>Reason</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Relevance (not interested, waste of time)</td>
<td>34%</td>
</tr>
<tr>
<td>Usability (difficult/frustrating, don’t know how, worried about viruses)</td>
<td>32%</td>
</tr>
<tr>
<td>Price (too expensive, don’t have computer)</td>
<td>19%</td>
</tr>
<tr>
<td>Lack of availability/Access</td>
<td>7%</td>
</tr>
</tbody>
</table>

31% of cell internet users do most of their online browsing on their phones

By income:
- Less than $30K- 43%
- $30K-$50K-36%
- $50K-75K- 24%
- $75K+= 21%

By Race/Ethnicity
- 51% of African American cell users do most online browsing through their phone, compared to 24% of whites and 42% of Latinos

http://www.pewinternet.org/Presentations/2013/May/Technology-use-by-different-income-groups.aspx
# Inequalities: Global manifestation

**Globally, for every 100 inhabitants**

<table>
<thead>
<tr>
<th></th>
<th>Developed World</th>
<th>Developing World</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cell phone Subscribers</td>
<td>116</td>
<td>68</td>
</tr>
<tr>
<td>Fixed broadband subscribers</td>
<td>25</td>
<td>4</td>
</tr>
</tbody>
</table>

Viswanath et al., 2011
Mobile-cellular subscriptions per 100 inhabitants, 2001-2013*

* Estimate.
The developed/developing country classifications are based on the UN M49, see:
http://www.itu.int/ITU-D/ict/definitions/regions/index.html
Source: ITU World Telecommunication /ICT Indicators database
Fixed (wired)-broadband subscriptions per 100 inhabitants, 2001-2013*

Per 100 inhabitants

- Developed
- World
- Developing

Recently there has been an increased emphasis on

- Patients gathering information
- Carefully weighing evidence
- Taking into account their personal preferences and values in order to fully participate in clinical decisions
Online Health Information Seeking by Income, 2012

- Under $30K
- $30K-$50K
- $50K-$75K
- Over $75K

Online Health Information Seeking

- **Most** likely to seek health information online
  - Caregivers
  - Women
  - Whites
  - Age 18-49
  - At least some college education
  - Higher income

- **Least** likely to seek health information online
  - African Americans
  - Latinos
  - Disabled
  - Age 65 and older
  - High school education or less
  - Lower income

Types of information sought by education

Galarce, Ramanadhan, Weeks, Schneider, Gray, Viswanath, 2011
Participants seeking work/finance information by level of wealth

Galarce, Ramanadhan, Weeks, Schneider, Gray, Viswanath, 2011
Likelihood of seeking

<table>
<thead>
<tr>
<th>Treatment Information</th>
<th>Self-Care Management</th>
</tr>
</thead>
<tbody>
<tr>
<td>Higher Education</td>
<td>Higher Education</td>
</tr>
<tr>
<td>Younger Age</td>
<td>Breast Cancer</td>
</tr>
</tbody>
</table>

Galarce, Ramanadhan, Weeks, Schneider, Gray, Viswanath, 2011
<table>
<thead>
<tr>
<th>Health Services (Pre-Treatment) Information</th>
<th>Work and Finance Information</th>
</tr>
</thead>
<tbody>
<tr>
<td>Higher Education</td>
<td>Younger Age</td>
</tr>
<tr>
<td></td>
<td>Lower Wealth Index</td>
</tr>
<tr>
<td></td>
<td>Higher Debt</td>
</tr>
</tbody>
</table>

Galarce, Ramanadhan, Weeks, Schneider, Gray, Viswanath, 2011
Information Avoidance

- Information avoiders actively and purposefully avoid information
  - Different from non-seeking behavior
- Avoidance may be linked to many factors
  - Fear
  - Confusing information
  - Limiting unpleasant information
- Our work explores structural factors to information avoidance
  - Based on a sample of cancer survivors
## Cancer Information Avoiders by Income and Debt

<table>
<thead>
<tr>
<th>Income</th>
<th>Non-avoider (%)</th>
<th>Avoider (%)</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>=&lt; $29,999</td>
<td>62.5</td>
<td>37.5</td>
<td>&lt;0.1</td>
</tr>
<tr>
<td>$30,000-$49,999</td>
<td>78.6</td>
<td>21.4</td>
<td></td>
</tr>
<tr>
<td>$50,000-$74,999</td>
<td>72.7</td>
<td>27.3</td>
<td></td>
</tr>
<tr>
<td>$&gt;= $75,000</td>
<td>61.2</td>
<td>38.8</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Debt</th>
<th>Non-avoider (%)</th>
<th>Avoider (%)</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>$1,999</td>
<td>74.0</td>
<td>26.0</td>
<td>&lt;0.05</td>
</tr>
<tr>
<td>$2,000-$4,999</td>
<td>59.6</td>
<td>40.4</td>
<td></td>
</tr>
<tr>
<td>$5,000-$9,999</td>
<td>56.5</td>
<td>43.5</td>
<td></td>
</tr>
<tr>
<td>$10,000-$19,999</td>
<td>54.2</td>
<td>45.8</td>
<td></td>
</tr>
<tr>
<td>$20,000-$49,999</td>
<td>65.2</td>
<td>34.8</td>
<td></td>
</tr>
<tr>
<td>$&gt;= $50,000</td>
<td>54.1</td>
<td>45.9</td>
<td></td>
</tr>
</tbody>
</table>

*McCloud et al., 2013*
## Factors Influencing Information Avoidance-Males

<table>
<thead>
<tr>
<th></th>
<th>OR</th>
<th>95% CI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td>0.418</td>
<td>0.181-0.969</td>
</tr>
<tr>
<td>High School or Less</td>
<td>1.0</td>
<td></td>
</tr>
<tr>
<td>College</td>
<td>0.064</td>
<td>0.005-0.758</td>
</tr>
<tr>
<td>Lung Cancer</td>
<td>100.868</td>
<td>1.221-8335.396</td>
</tr>
<tr>
<td>Information Utilization Barriers</td>
<td>5.515</td>
<td>2.077-14.643</td>
</tr>
</tbody>
</table>

McCloud et al., 2013
### Factors Influencing Information Avoidance - Females

<table>
<thead>
<tr>
<th>Factor</th>
<th>OR</th>
<th>95% CI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Income</td>
<td></td>
<td></td>
</tr>
<tr>
<td>$\leq$ 29,999</td>
<td>1.0</td>
<td></td>
</tr>
<tr>
<td>$50,000 - 74,999</td>
<td>0.334</td>
<td>0.109 - 1.028</td>
</tr>
<tr>
<td>Debt</td>
<td></td>
<td></td>
</tr>
<tr>
<td>&lt;$2,000</td>
<td>1.0</td>
<td></td>
</tr>
<tr>
<td>$2,000 - 4,999</td>
<td>0.473</td>
<td>0.201 - 1.116</td>
</tr>
<tr>
<td>Information</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Information</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Utilization</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Barriers</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Information</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Utilization</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Barriers</td>
<td>1.438</td>
<td>1.053 - 1.964</td>
</tr>
</tbody>
</table>

McCloud et al., 2013
For both men and women, the probability of information avoidance behavior increased when they had difficulty understanding or using cancer-related information.

McCloud et al., 2013
## Odds of Reporting Low Self-Rated Health

<table>
<thead>
<tr>
<th></th>
<th>OR</th>
<th>95% CI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total avoidance (without family’s</td>
<td>7.68</td>
<td>1.35-43.56</td>
</tr>
<tr>
<td>seeking)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Indirect avoidance (family’s seeking)</td>
<td>2.70</td>
<td>0.89-8.17</td>
</tr>
<tr>
<td>Non-avoidance (information seeker)</td>
<td>1.0</td>
<td></td>
</tr>
</tbody>
</table>

Total information avoiders (survivors didn’t look for information and their family also did not look for information) were more likely to report low self-rated health than non-avoiders

Jung et al., 2013
Communication Effects on Outcomes

- **Knowledge gaps**
  - Skin Cancer
  - Breast Cancer
  - Effects of Tobacco Use

- **H1N1 Vaccination**

- **Light and Intermittent smoking**
Potential solutions to address disparities:
Four exemplar interventions

• **Click to Connect (C2C)**
  – *Individual* capacity building to promote internet literacy among the underserved

• **Planet MassCONECT**
  – *Community-based organizations’* capacity building to promote adoption of evidence-based interventions

• **Project IMPACT**
  – Transform *public agenda* about health disparities by influencing *Media agenda*

• **MassCONECT**
  – Build *community capacity* to address disparities though *intersectoral mobilization* in three Massachusetts Communities
Much of this work is informed by the principles of Community-based Participatory Research (CBPR)
Variety of methods to examine and address inequalities

• **Click to Connect (RCT)**
  - Pre-post test surveys
  - Usability tests
  - Focus groups
  - Process data
  - Web tracking data

• **Project IMPACT**
  - Content analyses of media
  - Focus groups
  - Key Informant interviews
  - Public opinion surveys
  - Community Leadership Surveys
Variety of methods to examine and address inequalities

- **PLANET MassCONECT**
  - Census of health-related CBOs
  - Key Informant Interviews
  - Analyses of Implementation – Grant proposals

- **MassCONECT**
  - Social Network Analyses
  - Surveys
  - Key Informant Interviews
  - Focus groups
MassCONECT: Social Network Analysis

Connections among 38 MassCONECT members at network inception (panel A) and Year 4 (panel B).

Key:

- **CBO**
- **Researcher**
- **Philanthropic**
- **Policy**
- **Provider**
- **Public Sector**

Ramanadhan et al., 2012
Does improving access and ability to use the Internet among low literacy, low SEP individuals lead to changes in several factors that comprise health communication and health outcomes?
Click to Connect Intervention
Web portal: First iteration

[Image of the Click to Connect web portal]

October is Breast Cancer Awareness Month!

Prostate Cancer Awareness from Click to Connect

Walk for Breast Cancer

Share Your Story!
Web portal: Final iteration

Click to Connect

February is American Heart Month
Heart disease is the number-one killer of people in the United States today. But there are many ways to take control and help keep your heart healthy. Having a healthy lifestyle means you will be less likely to have heart disease or a heart attack. Find out what you can do to stay healthy for yourself - and for your children!

Cervical Health Awareness
Did you know that cervical cancer is often caused by HPV, a sexually transmitted disease? Did you know that cervical cancer can be prevented - and can be treated if it is found early enough? Find out what you can do to protect yourself from this disease!

Learn About HIV and AIDS
There are about 20 million people living with HIV - another type of sexually transmitted disease.
<table>
<thead>
<tr>
<th>Income</th>
<th>Click to Connect (325)</th>
<th>U.S. Census 2010 (311,591,917)</th>
<th>HINTS 2007 (7,674)</th>
<th>PEW Tracking Survey 2011 (7,325)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Less than $10,000</td>
<td>35%</td>
<td>8%</td>
<td>31% (&lt;$35K)</td>
<td>9%</td>
</tr>
<tr>
<td>$10,000-$14,999</td>
<td>13%</td>
<td>6%</td>
<td></td>
<td>40% ($10-49K)</td>
</tr>
<tr>
<td>$15,000-$24,999</td>
<td>28%</td>
<td>12%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>$25,000-$34,999</td>
<td>8%</td>
<td>11%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>$35,000-$49,999</td>
<td>5%</td>
<td>14%</td>
<td>13%</td>
<td></td>
</tr>
<tr>
<td>$50,000-$74,999</td>
<td>3%</td>
<td>18%</td>
<td>17%</td>
<td>11%</td>
</tr>
<tr>
<td>$75,000+</td>
<td>1%</td>
<td>32%</td>
<td>29%</td>
<td>15%</td>
</tr>
</tbody>
</table>

Viswanath et al., 2013
Tracking data: Top 10 domains by total hits

Viswanath et al., 2013
Tracking data: Top 10 domains by hours

Top 10 Domains by Total Time Hours
(Web Activity)

![Bar chart showing total time hours for top 10 domains]

- aol.com
- yahoo.com
- msn.com
- clicktoconne
- ct.org
- zynga.com
- alot.com
- live.com
- youtube.com
- talk4free.com
- mspace.com

Viswanath et al., 2013
## Top 10 domains by gender of the participant from the household

<table>
<thead>
<tr>
<th>Men</th>
<th>Women</th>
</tr>
</thead>
<tbody>
<tr>
<td>myspace.com</td>
<td>myspace.com</td>
</tr>
<tr>
<td>google.com</td>
<td>hi5.com</td>
</tr>
<tr>
<td>yahoo.com</td>
<td>facebook.com</td>
</tr>
<tr>
<td>stardoll.com</td>
<td>yahoo.com</td>
</tr>
<tr>
<td>tomassoto.com</td>
<td>freerice.com</td>
</tr>
<tr>
<td>facebook.com</td>
<td>google.com</td>
</tr>
<tr>
<td>craigslist.com</td>
<td>kibagames.com</td>
</tr>
<tr>
<td>youtube.com</td>
<td>craigslist.org</td>
</tr>
<tr>
<td>hi5.com</td>
<td>pbskids.org</td>
</tr>
<tr>
<td>migente.com</td>
<td>tagged.com</td>
</tr>
</tbody>
</table>

Viswanath et al., 2013
### Top website categories by race of participant household

#### C2C TRACKING DATA
Top Website Categories by Time and Race

**HISPANIC**

<table>
<thead>
<tr>
<th>Rank</th>
<th>Category</th>
<th>Time</th>
</tr>
</thead>
<tbody>
<tr>
<td>#1</td>
<td>Internet Portals</td>
<td>34,007 hrs</td>
</tr>
<tr>
<td>#2</td>
<td>Social Networking</td>
<td>11,144 hrs</td>
</tr>
<tr>
<td>#3</td>
<td>News &amp; Media</td>
<td>6,257 hrs</td>
</tr>
<tr>
<td>#4</td>
<td>Streaming Media</td>
<td>5,188 hrs</td>
</tr>
<tr>
<td>#5</td>
<td>Entertainment &amp; Arts</td>
<td>4,016 hrs</td>
</tr>
<tr>
<td>#34</td>
<td>Health &amp; Medicine</td>
<td>179 hrs</td>
</tr>
</tbody>
</table>

**BLACK**

<table>
<thead>
<tr>
<th>Rank</th>
<th>Category</th>
<th>Time</th>
</tr>
</thead>
<tbody>
<tr>
<td>#1</td>
<td>Internet Portals</td>
<td>205,761 hrs</td>
</tr>
<tr>
<td>#2</td>
<td>News &amp; Media</td>
<td>42,130 hrs</td>
</tr>
<tr>
<td>#3</td>
<td>Shareware &amp; Freeware</td>
<td>40,603 hrs</td>
</tr>
<tr>
<td>#4</td>
<td>Social Networking</td>
<td>25,088 hrs</td>
</tr>
<tr>
<td>#5</td>
<td>Entertainment &amp; Arts</td>
<td>16,414 hrs</td>
</tr>
<tr>
<td>#29</td>
<td>Health &amp; Medicine</td>
<td>1,890 hrs</td>
</tr>
</tbody>
</table>

**WHITE**

<table>
<thead>
<tr>
<th>Rank</th>
<th>Category</th>
<th>Time</th>
</tr>
</thead>
<tbody>
<tr>
<td>#1</td>
<td>Games</td>
<td>43,168 hrs</td>
</tr>
<tr>
<td>#2</td>
<td>Internet Portals</td>
<td>10,107 hrs</td>
</tr>
<tr>
<td>#3</td>
<td>Social Networking</td>
<td>8,026 hrs</td>
</tr>
<tr>
<td>#4</td>
<td>Shareware &amp; Freeware</td>
<td>7,884 hrs</td>
</tr>
<tr>
<td>#5</td>
<td>News &amp; Media</td>
<td>4,148 hrs</td>
</tr>
<tr>
<td>#25</td>
<td>Health &amp; Medicine</td>
<td>88 hrs</td>
</tr>
</tbody>
</table>

Viswanath et al., 2013
# C2C Process Data- IT Helpline Calls

<table>
<thead>
<tr>
<th>Technical Support Issue</th>
<th>N</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Internet (<a href="#">Refers to inability to access the Internet</a>)</td>
<td>1,088</td>
<td>44.2</td>
</tr>
<tr>
<td>Computer (<a href="#">Refers to higher-level system problems</a>)</td>
<td>647</td>
<td>26.3</td>
</tr>
<tr>
<td>Spyware/viruses (<a href="#">Refers to a nonworking or limited functionality computer due to the presence of spyware, malware, or viruses</a>)</td>
<td>273</td>
<td>11.1</td>
</tr>
<tr>
<td>Study software (<a href="#">Refers to issues related to the tracking software, which was installed on every computer as part of the evaluation process for the study</a>)</td>
<td>216</td>
<td>8.7</td>
</tr>
<tr>
<td>Other (<a href="#">Refers to all other technical support issues</a>)</td>
<td>147</td>
<td>6.0</td>
</tr>
<tr>
<td>Printer (<a href="#">Refers to any printer-related issues</a>)</td>
<td>88</td>
<td>3.6</td>
</tr>
</tbody>
</table>

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*Note: N = 2,459*
Communication inequalities and public health: The future

- Communication inequality is ONE important determinant of health disparities
- Need more work on causal pathways from communication inequality to health disparities
- Inequalities are only likely to increase as ICTs evolve
- How do we involve the end-user in the designing of our systems?
- How do we engage CBOs and institutions in Intervening on Communications?
- What kind of policies do we need to ensure that these inequalities are not exacerbated?
Acknowledgments

- National Institutes of Health (NIH)
- Centers For Disease Control and Prevention (CDC)
- Livestrong Foundation
- Goldman Sachs Gives
- Dana-Farber/Harvard Cancer Center

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