The Communications Revolution and Health Inequalities in the 21st Century

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The Communications Revolution
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
Communication devices and their use

Web 2.0 - A Key Component to the Growing Media World

Growing from small number of one-way information sources to a complex multi-way exchange

- Potential for low-cost, high reach information exchange
- Facilitates new opportunities for physician communication
- Strengthens social support through online networks
- Creates a more engaging patient environment
New platforms
Web Continues to Dominate in Audience Growth

Percentage Change in Audience, 2010-2011

- Online: 17.2%
- Network TV: 4.5
- Local TV: 1.0
- Audio: 1.0
- Cable TV: 1.0
- Magazines: -0.05
- Newspapers: -4.0
Trends in news consumption

Trends in News Consumption "Yesterday"

- 57 Watched news on TV
- 35 Listened to radio news
- 34 Read a newspaper
- 29 Got news online

Years: 91, 94, 96, 98, 00, 02, 04, 06, 08
Media use

**Media Multitasking, by Medium**

Proportion of 7th–12th graders who say they use another medium “most” or “some” of the time while:

- Listening to music: 43% (most), 30% (some)
- Using a computer: 40% (most), 26% (some)
- Watching TV: 39% (most), 29% (some)
- Reading: 27% (most), 26% (some)
- Playing video games: 22% (most), 26% (some)

**Media Use Over Time**

Among all 8- to 18-year-olds, average amount of time spent with each medium in a typical day:

<table>
<thead>
<tr>
<th>Medium</th>
<th>2009</th>
<th>2004</th>
<th>1999</th>
</tr>
</thead>
<tbody>
<tr>
<td>TV content</td>
<td>4:29</td>
<td>3:51</td>
<td>3:47</td>
</tr>
<tr>
<td>Music/audio</td>
<td>2:31</td>
<td>1:44</td>
<td>1:48</td>
</tr>
<tr>
<td>Computer</td>
<td>1:29</td>
<td>1:02</td>
<td>0:27</td>
</tr>
<tr>
<td>Video games</td>
<td>1:13</td>
<td>0:49</td>
<td>0:26</td>
</tr>
<tr>
<td>Print</td>
<td>0:38</td>
<td>0:43</td>
<td>0:43</td>
</tr>
<tr>
<td>Movies</td>
<td>0:25</td>
<td>0:25</td>
<td>0:18</td>
</tr>
<tr>
<td>TOTAL MEDIA EXPOSURE</td>
<td>10:45</td>
<td>8:33</td>
<td>7:29</td>
</tr>
<tr>
<td>Multitasking proportion</td>
<td>29%</td>
<td>26%</td>
<td>16%</td>
</tr>
<tr>
<td>TOTAL MEDIA USE</td>
<td>7:38</td>
<td>6:21</td>
<td>6:19</td>
</tr>
</tbody>
</table>
What do we mean by communications revolution?

Two dimensions:

• An enormous capacity to *generate, integrate, 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
Tobacco use by wealth in India

Viswanath et al., 2011
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
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- Comprehension
- Capacity for action
- Incidence
- Health Behaviors
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VISWANATH LAB
Communication Inequality...

...is differences among social classes in the generation, 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.
Dimensions of communication inequality

Five broad dimensions

• Use/Access/Exposure
• Attention
• Information seeking
• Processing
• Communication Effects
Use/Access/Exposure
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*
Media use by location in India

Viswanath, Sorensen, Gupta & Ackerson, 2011
Mobile-cellular subscriptions per 100 inhabitants, 2001-2011*

* Estimate.
The developed/developing country classifications are based on the UN M49, see:
http://www.itu.int/ITU-D/ict/definitions/regions/index.html

Fixed (wired)-broadband subscriptions per 100 inhabitants, 2001-2011*

* Estimate.
The developed/developing country classifications are based on the UN M49, see: http://www.itu.int/ITU-D/ict/definitions/regions/index.html

Attention to Health Information
Paying a lot of attention to health in the media by race/ethnicity, (HINTS 2005)
Paying a lot of attention to health in the media by education status, 2005

![Bar chart showing odds ratio for different media sources by education status.](chart)

- **Television**
  - Less than high school: [value]
  - High school: [value]
  - Some college: [value]
  - College graduate: [value]

- **Radio**
  - Less than high school: [value]
  - High school: [value]
  - Some college: [value]
  - College graduate: [value]

- **Newspaper**
  - Less than high school: [value]
  - High school: [value]
  - Some college: [value]
  - College graduate: [value]

- **Magazines**
  - Less than high school: [value]
  - High school: [value]
  - Some college: [value]
  - College graduate: [value]

- **Internet**
  - Less than high school: [value]
  - High school: [value]
  - Some college: [value]
  - College graduate: [value]
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
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
### Likelihood of seeking

<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*
Communication Effects on Outcomes

- Knowledge gaps
  - Skin Cancer
  - Breast Cancer
  - Effects of Tobacco Use
- H1N1 Vaccination
- Light and Intermittent smoking
Risk of smoking by media use among Indian women, 2005-2006

Risk Ratio

Never
Occasionally
Weekly
Daily

Newspaper Radio Television Movie
Risk of smoking by media use among Indian men, 2005-2006
Potential solutions to address disparities: Four exemplar interventions

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

- **Planet MassCONNECT**
  - Community-based organization’s capacity building to promote adoption of evidence-based interventions

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

- **MassCONNECT**
  - 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 literacy including:

• Primary Outcomes
  ▪ Media use and exposure to health information
  ▪ Internet use
  ▪ Health information seeking and information efficacy

• Secondary Outcomes
  ▪ Health knowledge and health beliefs
Click to Connect Intervention
Web portal: First iteration
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 healthy habits 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 valentine!

Click on the "Read more..." button to learn about it.

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’s found early enough? Find out what you can do to protect yourself from this disease.

Click on the "Read more..." button to learn about it.

Learn About HIV and AIDS

There are about 30 million people living with HIV, another ten of them.
Click to Connect: Variety of Data

- Pre- and Post-intervention surveys
- Website tracking
- Monthly surveys
- ALL contact information: logs of visits, emails, calls and mail
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 one 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

@xxxxxxx 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 at least 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
Communication inequalities and public health: The future

• Communication inequality as 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 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?
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www.viswanathlab.org

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