

Mobile Health: Highlights and Future Directions

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HHS New Media Webinar Series



Before there were cell phones, there
was...

**STAR
WARS**

Who was the real hero in Star Wars?

Built-In Sensor for Environmental Scan



Talk with other computer systems and optimize performance

Store and communicate critical information





phandroid.com

The Tale of 2 Apps

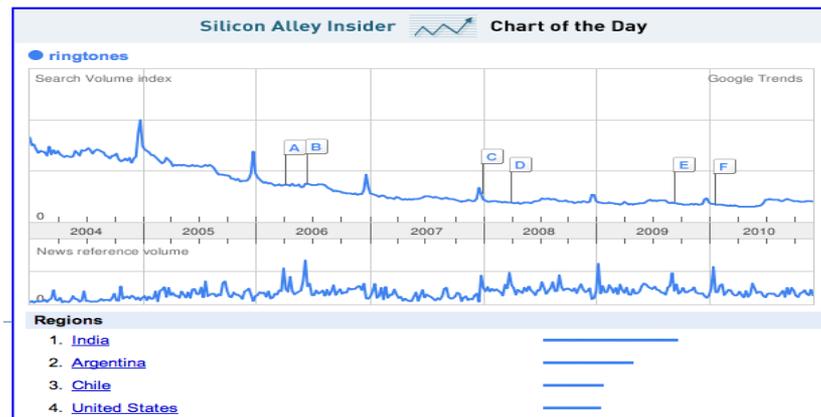
▶ Electric street lamp:

“**Electricity is not in any sense a necessity, and under no conditions is it universally used by the people of a community.** It is but a luxury enjoyed by a small proportion of the members of any municipality, and yet if the plant be owned and operated by the city, the burden of such ownership and operation must be borne by all the people through taxation. **Now, electric light is not a necessity for every member of the community.** It is not the business of any one to see that I use electricity, or gas, or oil in my house, or even that I use any form of artificial light at all.” (Oct. 24, 1905, Richmond, Virginia, *Times-Dispatch*, by Henry Anderson). <http://publicola.com/2009/12/11/the-killer-app-of-1900-2/>

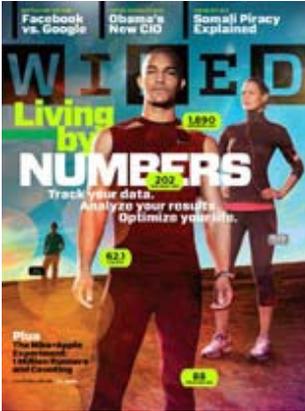
▶ Ringtones:

“Ringtones were super-hot in the middle of last decade, as everyone started to get cellphones, and have since **fallen in popularity.**”

<http://www.businessinsider.com/chart-of-the-day-remember-ringtones-2010-12>

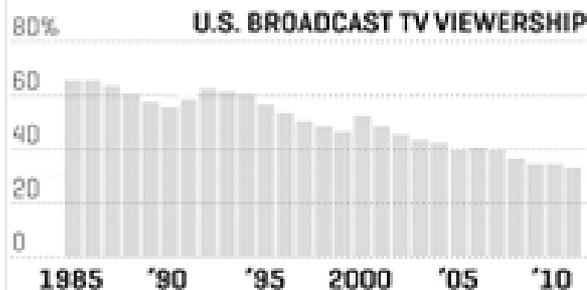


The Mobile Revolution

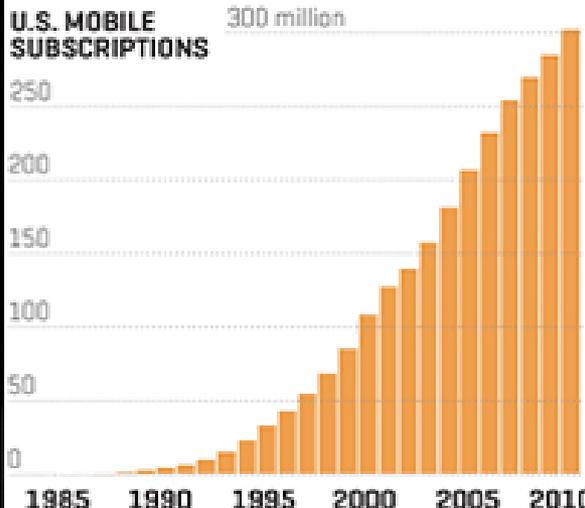


▶ Mobile technology is everywhere!!!

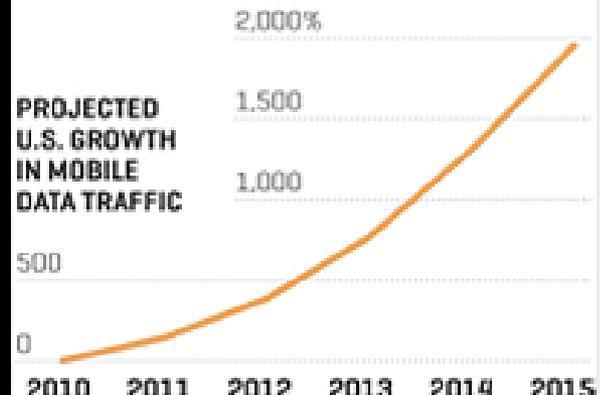
U.S. BROADCAST TV VIEWERSHIP



U.S. MOBILE SUBSCRIPTIONS



PROJECTED U.S. GROWTH IN MOBILE DATA TRAFFIC



“The trend is indisputable: Broadcast television viewership is declining, and it has been for the past two decades. But since the birth of the iPhone and the Android operating system, mobile data use has exploded. By 2015 traffic will be some 20 times its 2010 level.”

--Sources: FCC, Spectrumwiki, Nielsen, CTIA, National Association of Broadcasters, Cisco, Rysavy Research

Fortune Magazine, July 27, 2011

<http://tech.fortune.cnn.com/2011/07/27/spectrum-squeeze-battle-for-bandwidth/>



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A new technology news source from Joshua Topolsky and SBNation.

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- [@HilzFuld](#) i've heard! okay, will do... as a pre-holidays gift to myself about 19 hours ago
- [@HilzFuld](#) iphone4, blackberry and iPad. feel

Posted at 07:54 AM ET, 10/11/2011

Number of cellphones exceeds U.S. population: CTIA trade group

By [Cecilia Kang](#)



In this June 21, 2011 photo, the HTC Evo 3D smartphone is shown in San Francisco. (Eric Risberg - AP)

people living in the U.S., Puerto Rico, Guam and the U.S. Virgin Islands. Wireless network data traffic rose 111 percent, to 341.2 billion megabytes, during the same period

There are now more wireless devices being used in the United States than there are people, and Americans have doubled the amount of Internet data traffic they generate on smartphones, according to the trade group CTIA.

The number of mobile devices rose 9 percent in the first six months of 2011, to 327.6 million — more than the 315 million

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http://www.washingtonpost.com/blogs/post-tech/post/number-of-cell-phones-exceeds-us-population-ctia-trade-group/2011/10/11/gIQARNcEcL_blog.html?hpid=z3

50 WIRELESS QUICK FACTS

Is your curiosity satisfied yet? If not, find an even wider array of facts and figures from the world of wireless in our [50 Wireless Facts!](#)

Public Affairs Contact Info:

Tom Martin
Manager, Public Affairs
(202) 736-3891

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Wireless Quick Facts

Mid-Year Figures

Topic	Jun-11	June-06	June-01	June-96
Wireless Subscriber Connections	327.6M	219.6M	118.4M	38.2M
Wireless Penetration equals # of active units divided by the total U.S. and territorial population (Puerto Rico, Guam and the USVI)	103.9%	72.5%	40.9%	14%
Wireless-Only Households ¹ % of U.S. Households	29.7%	10.5%	N/A	N/A
Direct Carrier Jobs	243,239	238,236	196,317	73,365
Wireless Carrier Payroll ² Direct Carrier Wages	N/A	\$13.1B	\$11.3B	N/A
Annualized Total Wireless Revenues	\$164.6B	\$118.3B	\$58.7B	\$21.5B
Annualized Wireless Data Revenues	\$55.4B	\$11.3B	\$280.8M	N/A
Annualized Incremental Capital Investment	\$27.5B	\$22.7B	\$23.1B	\$5B
Annualized Minutes of Use	0.05T	1.00T	0.110B	11.1B

<http://www.ctia.org/advocacy/research/index.cfm/aid/10323>

African-Americans and Latinos lead whites in their use of mobile data applications

	All adults	White, non-Hispanic	Black, non-Hispanic	Hispanic (English-speaking)
Own a cell phone	82%	80%	87%*	87%*
% of cell owners within each group who do the following on their phones				
Take a picture	76	75	76	83*
Send/receive text messages	72	68	79*	83*
Access the internet	38	33	46*	51*
Send/receive email	34	30	41*	47*
Play a game	34	29	51*	46*
Record a video	34	29	48*	45*
Play music	33	26	52*	49*
Send/receive instant messages	30	23	44*	49*
Use a social networking site	23	19	33*	36*
Watch a video	20	15	27*	33*
Post a photo or video online	15	13	20*	25*
Purchase a product	11	10	13	18
Use a status update service	10	8	13	15
Mean number of cell activities	4.3	3.8	5.4	5.8

Source: Pew Research Center's Internet & American Life Project, April 29-May 30, 2010 Tracking Survey. N=2,252 adults 18 and older, including 1,917 cell phone users. * = statistically significant difference compared with whites



Young adults lead the way in the use of mobile data applications

	18-29	30-49	50-64	65+
Own a cell phone	90%**	88%**	82%*	57%
% of cell owners within each group who do the following on their phones				
Send/receive text messages	95***	82**	57*	19
Take a picture	93***	83**	67*	34
Access the internet	65***	43**	18*	10
Play music	64***	36**	13*	6
Play a game	60***	37**	17*	9
Record a video	60***	39**	14*	5
Send/receive email	52***	37**	22*	11
Use a social networking site	48***	23**	8*	3
Send/receive instant messages	46***	35**	17*	10
Watch a video	40***	20**	6	4
Post a photo or video online	33***	15**	5	2
Use a status update service	21***	9**	3	2
Make a purchase	20***	11**	4	5
Mean number of cell activities	6.9	4.7	2.5	1.2

Source: Pew Research Center's Internet & American Life Project, April 29-May 30, 2010 Tracking Survey. N=2,252 adults 18 and older, including 1,917 cell phone users. *** = significant difference compared with all other age groups; ** = significant difference compared with 50-64 and 65+; * = significant difference compared with 65+; n/a = sample size too small to analyze



Old-age dependency ratios

Number of people aged 65 and over
As % of labour force (aged 15-64), forecasts



Used cell phone to look up health information

Percentage of cell phone users in each group who have used their phone to look up health or medical information

Total cell phone users	17%
Gender	
Male	17
Female	16
Race	
White	15
Black	19
Hispanic	25*
Age (at time of survey)	
18-29	29*
30-49	18*
50-64	7
65+	8
Education	
Some high school	16
High school graduate	12
Some college	21*
College graduate or more	20*
Household Income	
< \$30,000	15
\$30,000 - \$49,999	17
\$50,000 - \$74,999	17
\$75,000+	22*
Language	
English	17
Spanish	14
Community Type	
Rural	11
Suburban	16
Urban	21*

* indicates a significant difference

Source: Pew Research Center's Internet & American Life Project, August 9-September 13, 2010 Tracking Survey. N=3,001 adults and N for cell phone users=2,485. The margin of error is +/- 2.5 percentage points for all adults and 3 points for cell phone users.

http://www.pewinternet.org/~media/Files/Reports/2010/PIP_Mobile_Health_2010.pdf



“...57% of American adults have a wireless connection and use a laptop or a cell phone to access the internet...78% of wireless internet users have looked online for health information...”

Mobile health apps

Percentage of cell phone users in each group who have a software application or "app" on their phone to help them track or manage their health

Total cell phone users	9%
Gender	
Male	10
Female	8
Race	
White	7
Black	15*
Hispanic	11
Age (at time of survey)	
18-29	15*
30-49	8
50-64	6
65+	5
Education	
Some high school	9
High school graduate	6
Some college	13*
College graduate or more	9
Household Income	
< \$30,000	7
\$30,000 - \$49,999	8
\$50,000 - \$74,999	12
\$75,000+	11
Language	
English	9*
Spanish	1
Community Type	
Rural	4
Suburban	9
Urban	12*

* indicates a significant difference

Source: Pew Research Center's Internet & American Life Project, August 9-September 13, 2010 Tracking Survey. N=3,001 adults and N for cell phone users=2,485. The margin of error is +/- 2.5 percentage points for all adults and 3 points for cell phone users.

www.pewinternet.org/~media/Files/.../2010/PIP_Mobile_Health_2010.pdf



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FROM THE FOUNDATION

Hospitals Benefit from Sharing

Mobile Health

Friday, October 21, 2011

Report: 26% of Adults Use Mobile Phones To Access Health Data

About 26% of U.S. adults used their mobile phones to access health information in 2011, up from 12% who reported doing so in 2010, according to a recent Manhattan Research report, *MobiHealthNews* reports.

The Cybercitizen Health report is based on a Q3 2011 phone and online survey of 8,745 U.S. adults.

According to the report, looking up health information and reading health-related news continues to be the most popular health-related use of mobile phones (Gullo, *MobiHealthNews*, 10/19).

However, the report did find an increase in consumers' use of mobile phones to manage their care or treatment. For example, about 8% of adults used mobile phone prescription drug refill or reminder services in 2011, up from 3% in 2010 (Manhattan Research release, 10/19).

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<http://www.ihealthbeat.org/articles/2011/10/21/report-26-of-adults-use-mobile-phones-to-access-health-data.aspx>

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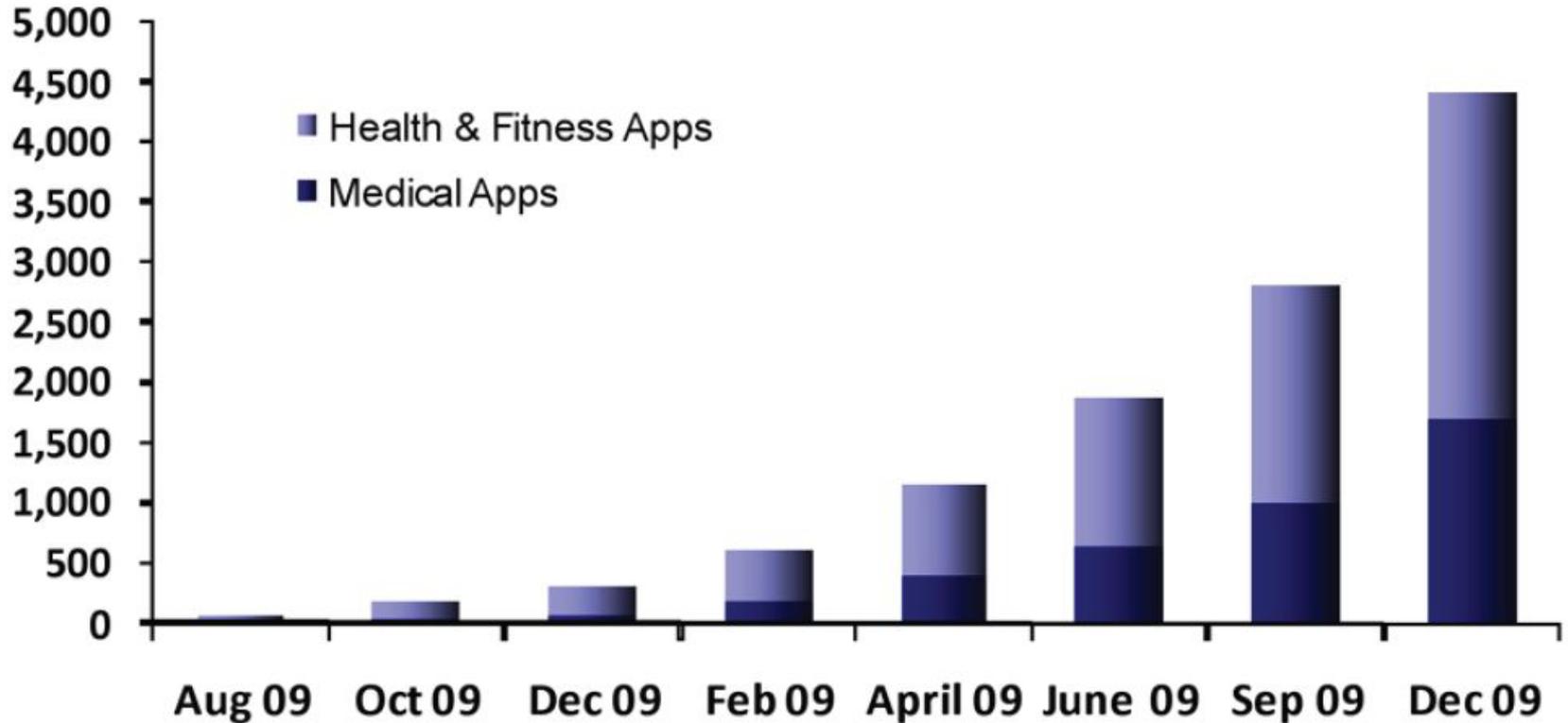
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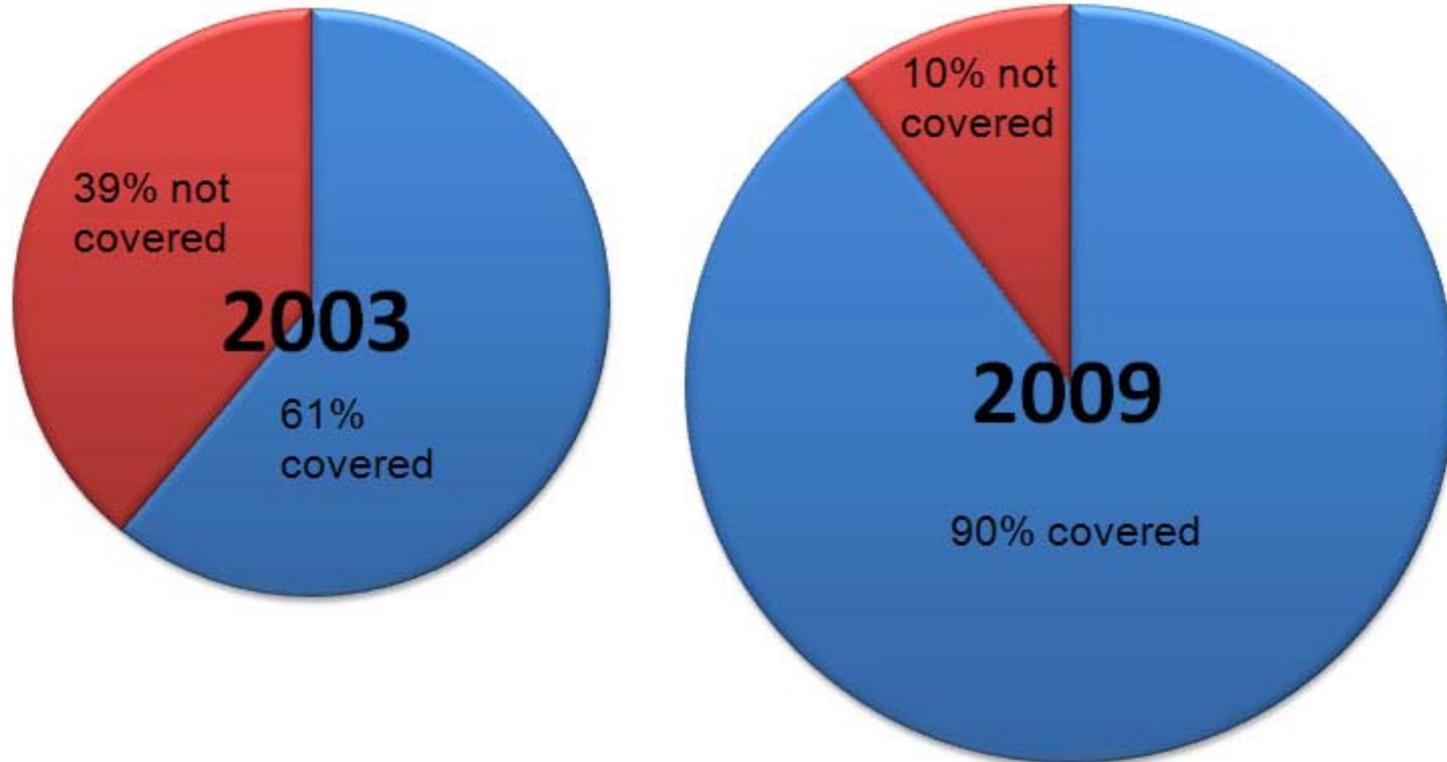
[Florida, N.Y. Recognized](#)

iTunes App Store Medical and Health & Fitness App Availability



Source: Parks Associates
© 2009-2010 Parks Associates

Percentage of the world's population covered by a mobile cellular signal, 2003 compared to 2009



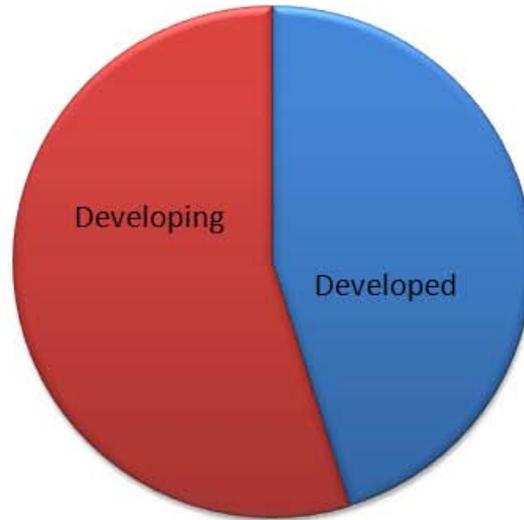
Mobile cellular subscriptions, by level of development

2000



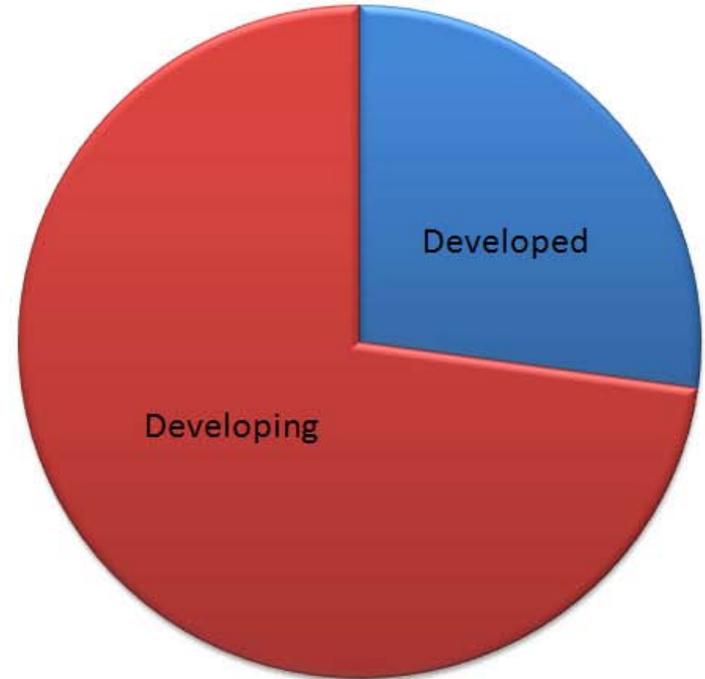
Total 719 million

2005



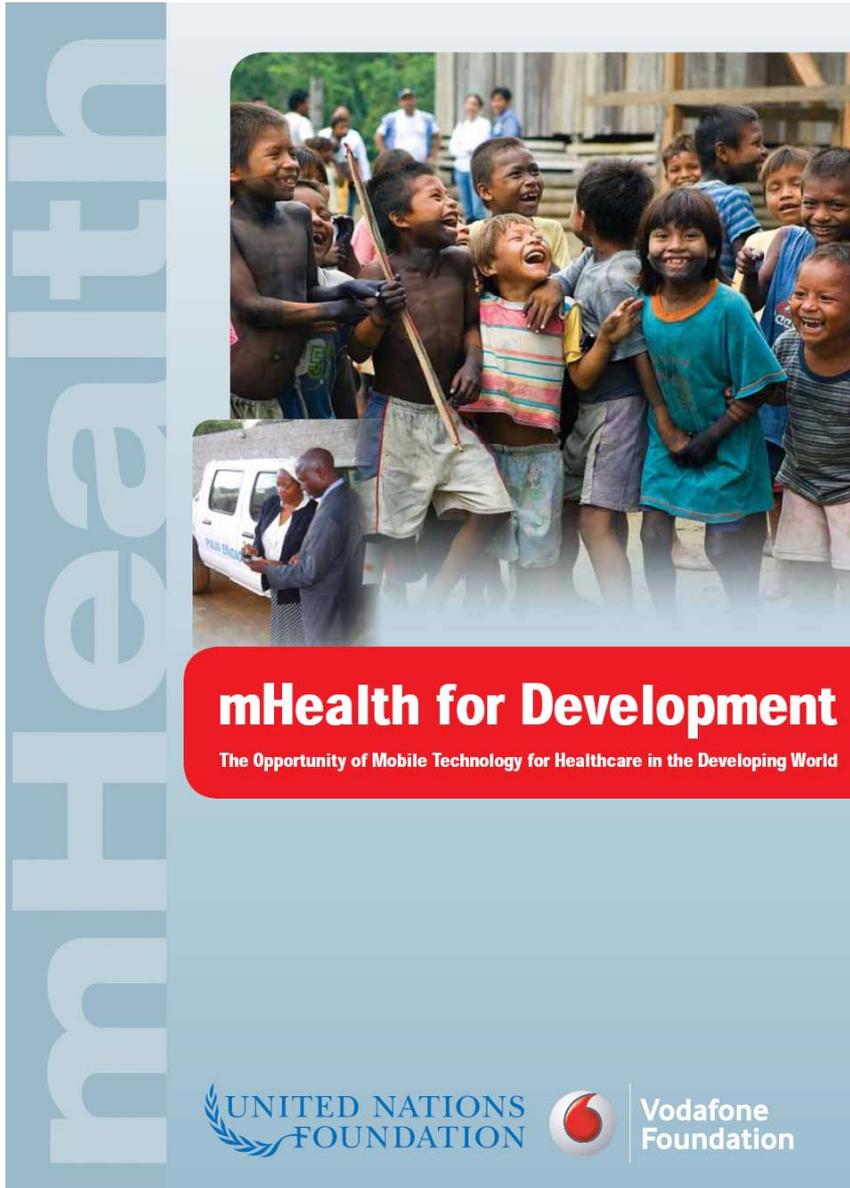
Total 2.2 billion

2010*



Total 5.3 billion

*Estimates
Source: ITU World Telecommunication/ICT
Indicators database



50+ Case Studies Described

▶ <http://www.unfoundation.org/global-issues/technology/mhealth-report.html>



Developed Countries

Developing Countries

Remember 2007...



June 2007, first iPhones released
October 2008, first Android phone released

In less than 5 years, iPhones and Android phones have become prolific

2009: 1.5 Trillion Text Messages Sent in US
4.1 billion SMS messages sent daily
Game Changer!

Consumer Centered & Driven Change



What is mHealth?



mobile.
ESM
connected
telemedicine
real-time
ubiquitous
MHEALTH
EMA
technology
apps
remote
telehealth
eHealth

Definitions – Helpful???

- ▶ **mHealth:** Using mobile communications—such as PDAs and mobile phones—for health services and information ([UN Foundation](http://www.unfoundation.org/global-issues/technology/mhealth-report.html); <http://www.unfoundation.org/global-issues/technology/mhealth-report.html>)
- ▶ **mHealth** stands for mobile-based or mobile-enhanced health solutions, or the idea that global wireless networks and mobile devices (cellphones, smartphones, mobile-enabled diagnostic devices) are powerful vehicles for delivering innovative medical and health services to the farthest reaches of the globe ([mHealth Alliance](http://www.mhealthalliance.org/about/frequently-asked-questions), <http://www.mhealthalliance.org/about/frequently-asked-questions>)
- ▶ **mHealth:** emerging mobile communications and network technologies for healthcare ([Istepanian et al. 2005](#))
- ▶ **(Mobile-HEALTH)** An umbrella term for wireless devices that are used in healthcare. It includes mobile monitors worn by patients as well as smartphones that physicians and nurses use to obtain and disseminate information. ([PC Magazine](#); http://www.pcmag.com/encyclopedia_term/0,2542,t=mHealth&i=61665,00.asp)
- ▶ **Mobile health** decouples time and space to assure the best state of health for the individual and the population ([Group 4AM Session](#); <http://www.scribd.com>)

No consensus!!

Eric Dishman on mHealth

Concepts like "home health" and "wireless" and "smart phone" and "telehealth" are being bandied about as if they are all the same thing, under the rubric of "mHealth," without much distinction between these very different capabilities, value propositions, and markets. Methinks we doth proclaim too much!

I am becoming worried that we don't really know what each other is talking about when we say "mHealth."

If "mHealth" is all of these things and more....if "mHealth" is *everything...then it is nothing*. The phrase has become so slippery, so ubiquitous as to become almost useless. We must be more careful in defining and aligning what we're talking about, and I encourage these various workshops and organizers to spend some time clarifying and specifying what's at play here.

The critical aspects of mobile health is
the use of **MOBILE** technology

“not all mobile health is wireless” and “not all wireless
health is mobile”.

Don Jones, Vice President, Business Development,
Health & Life Sciences at Qualcomm,

<http://mobihealthnews.com/8997/2010-operators-payers-finally-interested-in-mhealth/>

mHealth tools include:

- ▶ Health Text Messaging (feature & smart phones)
- ▶ Smart Phone Apps/ Tablet Apps
 - ▶ Native App, Web-Based App, vs. Hybrid App
- ▶ Mobile Web
- ▶ Ambulatory Monitoring
 - ▶ Heart Rate, Blood Pressure, GSR, Glucose
- ▶ Motion Sensors
 - ▶ Pedometers, Accelerometers, Gyroscopes
- ▶ Body Area Networks
- ▶ Global Positioning Systems
- ▶ Portable Point of Care Diagnostic Devices
- ▶ Mobile Games for Health



HHS Highlights: mHealth Activities



HHS Text4Health Task Force formed in November 2010

Health Text Messaging Recommendations to the Secretary

Written by the U.S. Department of Health and Human Services (HHS) Text4Health Task Force



See - <http://www.hhs.gov/open/initiatives/mhealth/recommendations.html>

Health Text Messaging (examples)

- ▶ CDC Mobile Tips & Alerts
 - ▶ <http://www.cdc.gov/mobile/>
- ▶ CDC NHANES Text Message Pilot
- ▶ NCI SmokeFreeTxt
 - ▶ <http://smokefree.gov/smokefreetxt/>
- ▶ NIH funded research
 - ▶ e.g., mDiet (PI: Kevin Patrick)
- ▶ 'text4baby' program
 - ▶ <http://www.text4baby.org>



SmokefreeTXT



HHS Mobile Apps (examples)

- ▶ **AHRQ Electronic Preventive Services Selector-ePSS**
 - ▶ <http://itunes.apple.com/us/app/ahrq-epss/id311852560?mt=8>
- ▶ **HRSA Find a Health Clinic**
 - ▶ <http://www.hrsa.gov/about/mobile/>
- ▶ **NICHD/NLM - Embryo**
 - ▶ <http://itunes.apple.com/app/embryo/id422337604>
- ▶ **NIH - My Dietary Supplements (MyDS)**
 - ▶ <http://ods.od.nih.gov/about/mobile/aboutmyds.aspx>
- ▶ **NLM Mobile Apps**
 - ▶ <http://www.nlm.nih.gov/mobile/>
- ▶ **SAMHSA Treatment Locator**
 - ▶ <http://apps.usa.gov/samhsa-treatment-locator/>



HHS Mobile Web (examples)

- ▶ AIDS.gov Mobile
 - ▶ <http://m.aids.gov/>
- ▶ CDC Mobile - Hurricane Recovery
 - ▶ <http://www.bt.cdc.gov/mobile.asp>
- ▶ HRSA Find a Health Clinic
 - ▶ <http://www.hrsa.gov/mobile/map.html>
- ▶ NCI Breast Cancer Risk Assessment Tool for Mobile
 - ▶ <http://www.cancer.gov/bcrisktoolmobile/>
- ▶ NLM Medline Plus Mobile
 - ▶ <http://m.medlineplus.gov/>



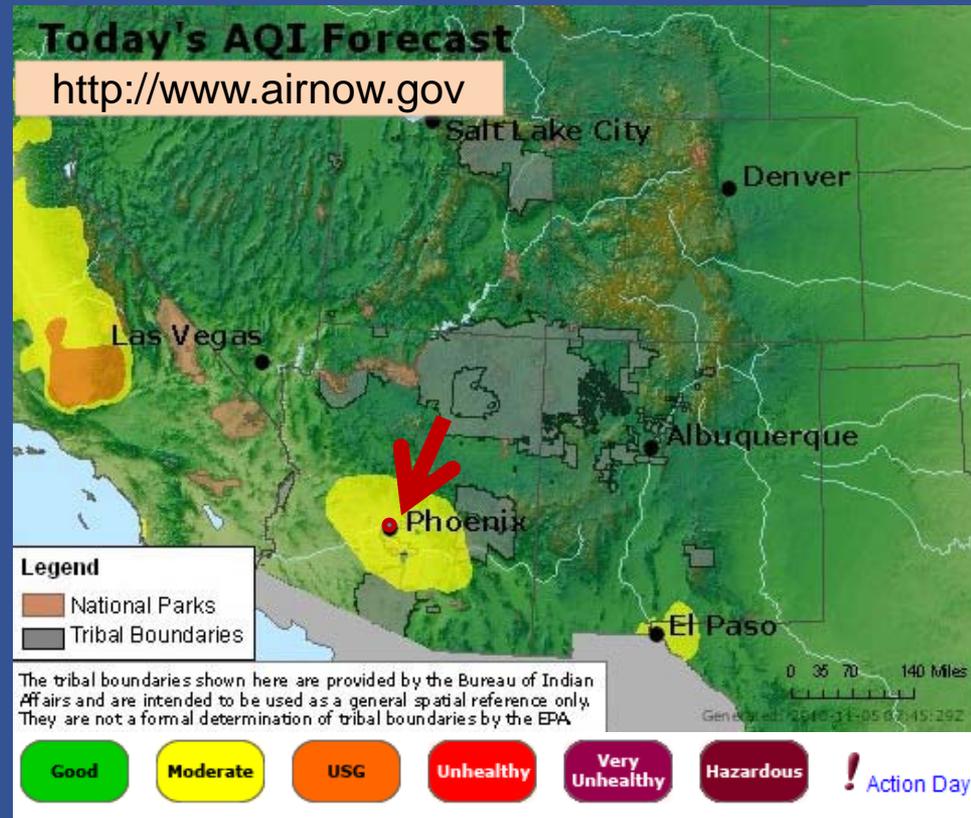
Point-of-Care Diagnostics Tools (Examples)



A Wearable Chemical Sensor System for Personal Exposure Assessment

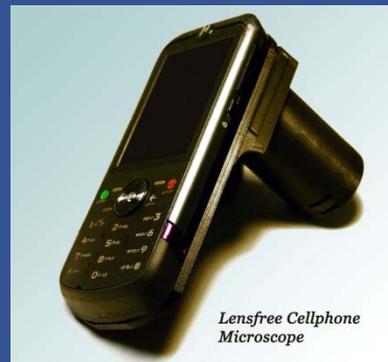
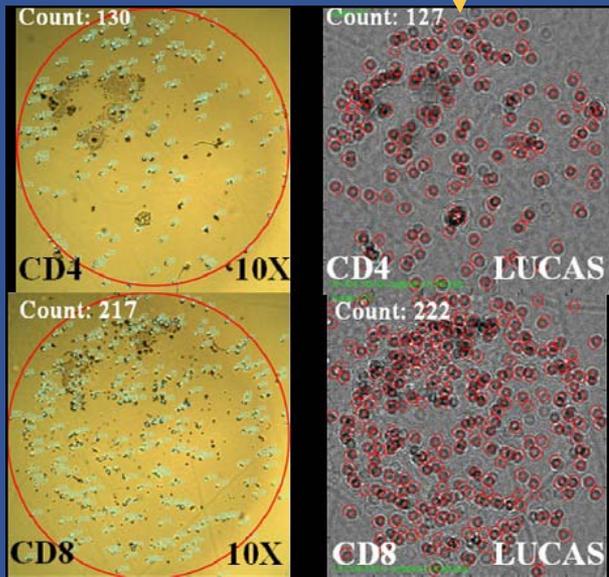


- Selective detection of VOCs (hydrocarbon and acid vapors)
- Sensitive: ppb – ppm
- Real-time: sec. – min.
- Spatially resolved
- Wearable: cell phone size
- Cell phone based interface





Lens-free microscope (LUCAS) for surveillance and diagnosis of infectious diseases in resource-limited settings



Cell phone transmits image



Computer software automatically interprets images at remote site

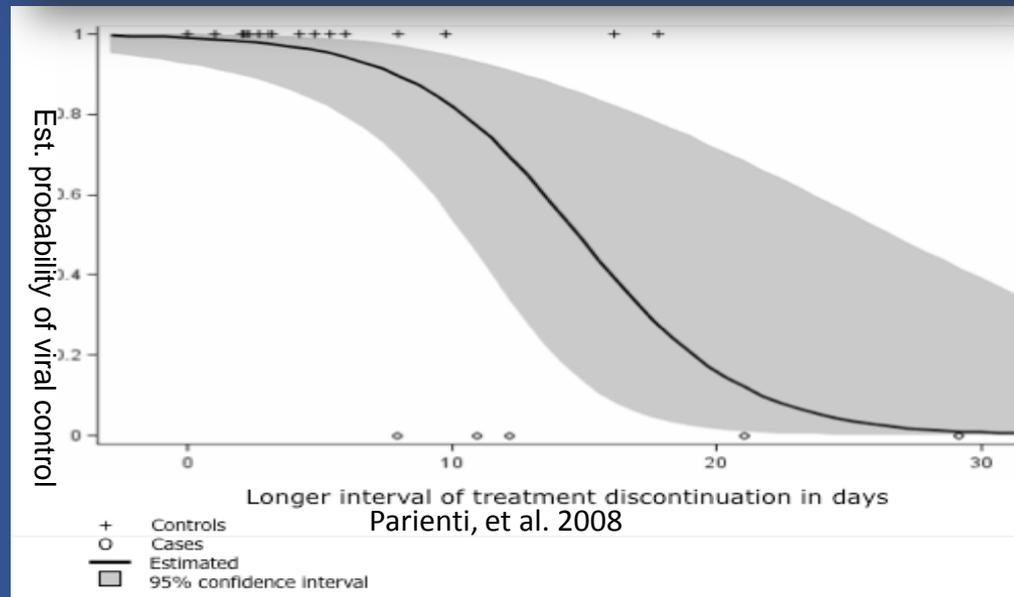
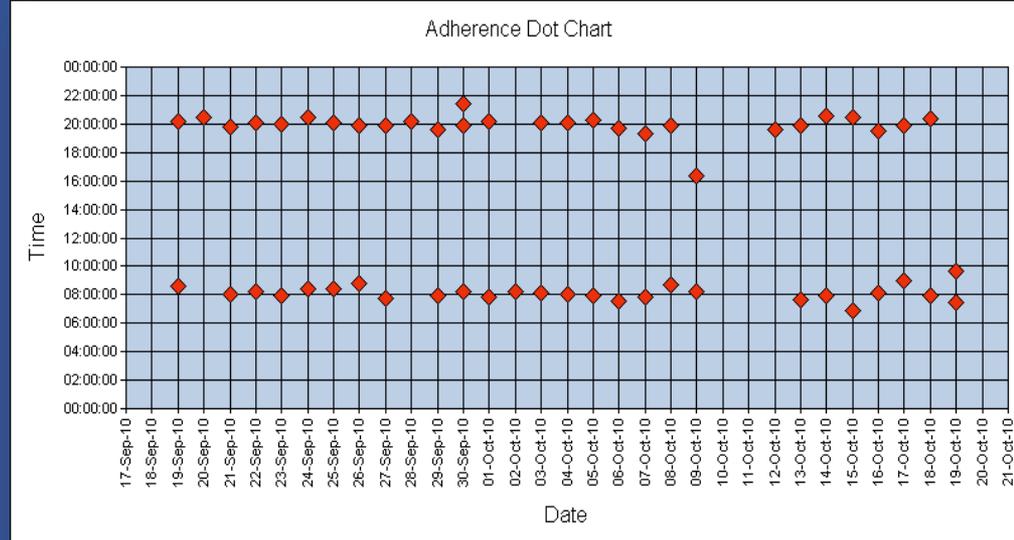
LUCAS images of CD4+ and CD8+ T cells compared to a regular microscope image..

Photos from Karin Nielsen and Aydogan Ozcan

Karin Nielsen, UCLA multidisciplinary training program

Real-time Adherence Monitoring for HIV Antiretroviral Therapy in Uganda

David Bangsberg, Massachusetts General Hospital



Future Directions



Important questions remain

- ▶ Defining mHealth: How do we reach consensus?
- ▶ How do we scale up promising pilot studies?
- ▶ CER: what do we compare mHealth against?
- ▶ How do we optimize both innovation and safety?
- ▶ What are the business models for sustainability?
- ▶ What roles should the government play?
- ▶ What mechanisms are best for funding mHealth initiatives?
 - ▶ Grants/Contracts
 - ▶ SBIR/STTR
 - ▶ Challenges





Home » U.S. Department of Health and Human Services » Apps Against Abuse

Apps Against Abuse

Take the challenge! This challenge charges developers to create innovative apps to empower young adults to prevent abuse and violence. Be creative, be innovative, make an impact!

- [Details](#)
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From: [U.S. Department of Health and Human Services](#)
 Category: Health
 Partners: White House Office of Science and Technology Policy

Detailed description

Background: Young women face the highest rates of dating violence and sexual assault. Nineteen percent of women (nearly 1 in 5) report experiencing sexual assault while in college. Many of these assaults occur when the offender, often an acquaintance, has targeted and isolated a young woman in vulnerable circumstances. "Bystander" campaigns teach peers how to identify these circumstances and intervene before an assault occurs. Dating violence

Winners tbd
7 days left

294
supporters

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Other important issues for future mHealth development

- ▶ FDA – Regulation of mobile medical applications
 - ▶ Guidance (draft): <http://www.fda.gov/medicaldevices/productsandmedicalprocedures/ucm255978.htm>
- ▶ HIPAA
 - ▶ Proposed changes: <http://www.hhs.gov/news/press/2011pres/05/20110531c.html>
- ▶ Consumer Privacy & Security requirements:
 - ▶ FTC: <http://business.ftc.gov/privacy-and-security>
- ▶ Section 508 compliance
 - ▶ 508 refresh (draft): <http://www.access-board.gov/sec508/update-index.htm>



HHS mHealth Groups – Get Involved!

- ▶ HHS mHealth Community of Practice
 - ▶ https://list.nih.gov/cgi-bin/wa.exe?SUBED1=HHS_MHEALTH_COP
- ▶ NIH mHealth Inter-Institute Interest Group
- ▶ SAMHSA Mobile Working Group
- ▶ HRSA ‘text4baby’ Evaluation Technical Advisory Group

- ▶ Wireless Medical Technologies Working Group (led by NIBIB)
- ▶ Federal mHealth Collaborative (led by ONC & HRSA)
- ▶ Cross-Agency Telehealth Work Group
- ▶ Mobile-Gov Community of Practice (led by GSA)



THANK YOU

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