



# IV. World Congress on Social Media and Web 2.0 in Medicine, Health, and Biomedical Research

## Medicine 2.0<sup>®</sup>

@ Stanford University



# STANFORD SUMMIT @ MEDICINE 2.0

**DAY ONE**

**FRIDAY  
SEPT 16, 2011**

Rather than focus on the presentation of research findings and scientific data, the Summit will present forecasts from luminaries—from e-patients and bloggers to executives and industry insiders—and ignite discussions about the development and use of technologies being built by academia and industry that will shape medicine in 2011 and beyond.

**Continental Breakfast (7:30-8:20AM)**

**Introduction (8:20-8:35AM):** Larry Chu, MD, MS, Executive Director of the Stanford Summit

**Welcoming Remarks (8:35-8:40AM):** Amir Rubin, CEO of Stanford Hospital and Clinics

**Opening Keynote (8:40-9:10AM):** Abraham Verghese, MD

**Break (9:10-9:20AM)**

**The Networked Patient (9:20-10:28):**  
*Communities of Practice and Participatory Medicine*

**Moderator:** Alan Greene, MD

**Panel:** Amy Tenderich (Diabetesmine.com), Howard Rheingold (Stanford University), Paul Wicks (PatientsLikeMe.com)

**Break (10:28-10:50AM)**

**DEMO\*:** JiffPad (10:30-10:45AM)

**The Healthcare Transformers (10:50-12:15PM):**  
*Persuasion, Socially Networked Hospitals, Personalized Healthcare, and the Art of Medicine 2.0*

**Moderator:** Bryan Vartabedian (33charts)

**Panel:** Lee Aase (Mayo Clinic), Jay Parkinson (Futurewell), Wendy Sue Swanson (SeattleMamaDoc), Ron Gutman (HealthTap)

**Lunch Box (12:15-12:30PM)**

**The Knowledge Revolution (12:30-1:15PM):**  
*Innovations in Medical Education for Tomorrow's Learners*

**Moderator:** Paul Costello (Stanford University)

**Panel:** Bertalan Mesko (Webicina), David Gaba (Stanford University), Parvati Dev (Clinispace)

**Break (1:15-1:41PM)**

**DEMO\*:** Crohnology (1:20-1:35PM)

**The Interconnected Life (1:41-2:50PM):**

*Social Technologies and the Future*

**Moderator:** David Duncan (Contributing Editor, Wired Magazine)

**Panel:** Sean Handel (Epocrates), Vikram Sahai (Google), Charlie Cheever (Quora)

**Break (2:50-3:20PM)**

**DEMO\*:** Striiv (3:00-3:15PM)

**The New Scientist (3:20-4:45PM):** *Facebook for Scientists, Culture of Science on the Internet, and the Science of Sharing*

**Moderator:** Denise Silber (Basil Strategies)

**Panel:** Michael Conlon (VIVO), David Pescovitz (Boing Boing), Jan Reichelt (Mendeley), Peter Binfield (PLOS One)

**Break (4:45-5:15PM)**

**DEMO\*:** BrainBot (4:50-5:05PM)

**Closing Keynote (5:15-5:45PM):** Dennis Boyle, General Partner, Health and Wellness Practice, IDEO

**Closing Remarks (5:45-6:00PM):** Larry Chu, MD, MS Executive Director and John Stafford, MA, Associate Director.

*\*DEMO sessions are held in the DEMO Interactive pavilion in the lobby of the Paul Berg Auditorium on the second floor of the LKSC.*



# MEDICINE 2.0

DAY TWO

SATURDAY  
SEPT 17, 2011

## OPENING KEYNOTE

## Jennifer Aaker, PhD

General Atlantic Professor  
Graduate School of Business, Stanford

A social psychologist and marketer, Jennifer Aaker is the General Atlantic Professor of Marketing and Winnick Family Faculty Fellow for 2011-2012 at Stanford University's Graduate School of Business. Her research spans time, money and happiness. She focuses on questions such as: What actually makes people happy, as opposed to what they think makes them happy? How can small acts create infectious action, and how can such effects be fueled by social media? She is widely published in the leading scholarly journals in psychology and marketing, and her work has been featured in a variety of media including The Economist, The New York Times, Wall Street Journal, Washington Post, BusinessWeek, Forbes, CBS Money Watch, NPR, Science, Inc, and Cosmopolitan. Recipient of the Distinguished Teaching Award, Citibank Best Teacher Award, George Robbins Best Teacher Award and both the Spence and Fletcher Jones Faculty Scholar Awards, she has also taught at UC Berkeley, UCLA and Columbia. Most recently she has co-authored, The Dragonfly Effect: Quick Effective Powerful Ways to Harness Social Media for Impact.

8:00-9:00	Plenary Hall	Continental Breakfast
9:00-10:30	Plenary Hall	Opening Session
9:00-9:05		Conference Opens
<b>9:05-9:25</b>		<b>Introduction</b>
9:25-9:35		Opening Remarks
9:35-9:45		Producer Remarks
<b>9:45-10:30</b>		<b>Opening Keynote</b>
10:30-11:00	Upper Lobby	Coffee Break
		Cheek Swab Event

**Larry Chu, MD, MS, Conference Organizer**

Phillip Pizzo, MD, Dean, Stanford School of Medicine  
Gunther Eysenbach, MD, MPH, Series Producer

**Jennifer Aaker, PhD**

11:00-12:30		Parallel Sessions	
Panel Session 1	Plenary Hall	Parallel Session 1 Chair: <b>Viji Kurup</b> <b>Web 2.0-based medical education and learning (1)</b>	LK120 Hall
		ePatient Chair: <b>Nick Dawson</b> <b>The Stanford ePatient Forum</b>	LK130 Hall
		Parallel Session 2 Chair: <b>Margaret Hansen</b> <b>Web 2.0 approaches for clinical practice, clinical research, quality monitoring (Internet-delivered interventions)</b>	LK005 Hall
11:00 - 11:45		699: Rhoda Weiss-Lambrou • iPhone and iPad in Medicine and Health Sciences; Experiences in Teaching and Clinical Practice	11:00-12:30
766: Michele Barry, Sangick Sunny Jeon, Nadim Mahmud, Sakti Srivastava		632: Peter Schulz Interactive Learning Objective Catalogue of The University Medical Center Mainz (ilkum) - Improving Learning in Dental and Medical Education	A <b>patient-driven session</b> focused on the perspective of epatients in the realm of Medicine 2.0.
High-Tech meets Low-Resource: Applying Innovation in a Global Health Context			Attend this session to learn about how patients are empowering their own health care through the use of social and emerging technologies.
11:45 - 12:30		529: Jiri Kofranek HumMod-Golem Edition - Large Scale Model of Physiological Systems for Web Based Medical Simulator	
765: Alex de Winter, Katherine Ku, Talya Miron-Shatz, Bassam Kadry		679: Jesse Cirimele Tablet-based Cognitive Aids Reduce Errors and Increase Coordination in Crisis Care Teams	
Digital Health-From a Concept to a Company			
			681: Nithin O. Rajan InSpire to Play (Promote Lung Assessment in Youth): Evolving the Self-Management Paradigms of Young People with Asthma
			633: Daniel Todkill Participants' Experiences of an Online Intervention and Randomized Control Trial
			547: Rik Crutzen Using Google Analytics as a Process Evaluation Method for Internet-delivered Interventions: a Commendable Example on Sexual Health
			612: Peter H.M.P. Roelofsma Combining Social Media with Virtual Coaching to Prevent and Overcome Loneliness and Break Sedentary Lifestyles in Elders

Notable Presentations • IMIA/SPC rated top 20% of abstracts, •• IMIA/SPC rated top 3% of abstracts

12:30-13:30	Upper/Lower Lobbies	Lunch and Visit Posters Demo Session
12:35PM-12:50PM	605: Raymond Wu, SimCode ACLS - Online Real-time ACLS Simulation Training and Certification System •	
12:53PM-13:08PM	575: Bart J. Brandenburg, What Lies Around the Bend? Exploring Next Steps in Social Media and Primary Care	
13:10PM-13:25PM	696: Andrea A. Cortino, Public eHealth in Latin America and the Caribbean: Nurturing Innovation, Developing Communities, Improving Health Equity	
13:30-14:30	Plenary Hall Panel Session	764: Brian S. McGowan, Bryan Vartabedian, Robert Miller, Molly Wasko, The "Meaningful Use" of Social Media by Physicians

14:30-16:00 Parallel Sessions				
Panel Session 2 <i>Paul Berg Hall</i>	Parallel Session 3 <i>LK120 Hall</i> Chair: Viji Kurup <b>Web 2.0-based medical education and learning (2)</b>	Parallel Session 4 <i>LK130 Hall</i> Chair: Bassam Kadry <b>Building virtual communities and social networking applications for patients and consumers (1)</b>	Parallel Session 5 <i>LK005 Hall</i> Chair: Prajesh Chhanabhai <b>Health information on the web: supply and demand</b>	
14:30 - 15:15 621: Chris Paton, Peter Murray, Margaret Mary Hansen, Francisco Grajales <i>Using Social Media Applications in Academic Research</i>	697: Lawrence Sherman • <i>CME 2.0 Takes a Virtual Village</i>  741: Jeremy Lundberg • <i>Integrating Open Source Web 2.0 and Smartphone Technologies to Automate Academic Continuing Medical Education</i>	755: Lise Poissant <i>The Challenges of Becoming Virtual: The Experience of a Rehabilitation Community of Practice on Stroke Care</i>  627: Edward G. Feil <i>Fidelity and Monitoring of Multidimensional Treatment Foster Care Using a Multi-Media Internet-based System</i>	665: Gunther Eysenbach • <i>Infodemiology and Infoveillance</i>  670: Mark S. Boguski • <i>The Goody-Gaga Effect: Health Communication at the Nexus of Social Media &amp; Popular Culture</i>	
15:15 - 16:00 729: Lisette Van Gemert-Pijnen, Hans C. Ossebaard, Nicol Nijland <i>A Wiki for Collaborative Development in eHealth</i>	654: Panagiotis Bamidis <i>To 2.0 or to 3.0 ? Contemporary Challenges for Medical Education from the MEdicator</i>  589: Joseph Kim • <i>The Impact of Social Media in Physician Continuing Medical Education</i>	746: John Moore Wiecha •• <i>Health Education in a Virtual World: Experience with Patient and Professional Education in Second Life</i>  709: Tiago Villanueva • <i>High Level Listserver-Based Virtual Conferences for Family Medicine Residents and Young Family Physicians</i>	622: Arun Keeppanasseril <i>Medicine and Web 3.0 - a Wish List</i>  595: Lena Rosenmann • <i>Orthopedic Surgeons Are Willing to Provide an "Internet Prescription" for Their Patients</i>	

Notable Presentations • IMIA/SPC rated top 20% of abstracts, •• IMIA/SPC rated top 3% of abstracts

16:00-16:30	Upper/Lower Lobbies Coffee Break Demo Session #2 16:00-16:15 544: William Gunn, Connecting Healthcare Researchers to Information • 16:15-16:30 671: Mark Boguski, How to Experience Resounding Health •
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16:30-18:00 Parallel Sessions		
Parallel Session 6 <i>Paul Berg Hall</i> Chair: Chris Paton <b>Participatory healthcare</b>	Parallel Session 7 <i>LK120 Hall</i> Chair: Michael Halaas <b>Building virtual communities and social networking applications for patients and consumers (2)</b>	Parallel Session 8 <i>LK130 Hall</i> Chair: Prajesh Chhanabhai <b>Consumer/ patient empowerment</b>
592: Katy Plant •• <i>Cancer Thriving and Surviving: An Online Workshop That Improves Quality of Life</i>	722: Sue Ziebland • <i>Healthtalkonline</i>	750: Ross Hetherington <i>Online Patient Education for Teenagers: Disease Self-Management and Medical Decision Support</i>
731: Bertalan Mesko <i>Quality of Medical Information in Social Media: Webicina.com</i>	659: Jackie Bender • <i>What is the Role of Online Support for the Supporters?</i>	649: Maritta Anneli Välimäki <i>Consumer Empowerment: Health Information on the Web</i>
576: Thomas van de Belt <i>Social Media in European Hospitals: A Descriptive Study</i>	693: Manuel Armayones Ruiz <i>Aptic, Developing a Social Network for E-patients: Lesson Learned</i>	593: Leonid Kandel <i>Pain in the Bone - Internet Health Information among Orthopaedic Patients</i>
767: Linda Fogg-Phillips <i>Making Home the Heart of Health: Today's Tools &amp; Techniques</i>	747: Lakshmi M. Grama • <i>Leveraging a Contact Center to Support Facebook Community Management: The National Cancer Institute Experience</i>	707: Rita Morais Lirio <i>Harvard Medical School - Portugal Program - Quality Health Information for Portuguese Speaking Countries</i>

Notable Presentations • IMIA/SPC rated top 20% of abstracts, •• IMIA/SPC rated top 3% of abstracts

**18:00-19:00 Dean's Lawn Welcome Cocktail Reception (Complimentary cocktails and social mixer)**

# MEDICINE 2.0

**DAY THREE****SUNDAY  
SEPT 18, 2011****OPENING KEYNOTE****BJ Fogg, PhD**

Director, Persuasive Technology Lab  
Stanford University

Dr. BJ Fogg directs the Persuasive Tech Lab at Stanford University. A psychologist and innovator, he devotes half of his time to industry projects. His work empowers people to think clearly about the psychology of persuasion — and then to convert those insights into real-world outcomes.

BJ has created a new model of human behavior change, which guides research and design. Drawing on these principles, his students created Facebook Apps that motivated over 16 million user installations in 10 weeks.

He is the author of *Persuasive Technology: Using Computers to Change What We Think and Do*, a book that explains how computers can motivate and influence people. BJ is also the co-editor of *Mobile Persuasion*, as well as *Texting 4 Health*. His upcoming book is entitled *The Psychology of Facebook*.

Fortune Magazine selected BJ Fogg as one of the "10 New Gurus You Should Know".

**CLOSING KEYNOTE****Susannah Fox**

Associate Director, Digital Strategy  
Pew Internet & American Life Project

Susannah Fox studies the cultural shifts taking place at the intersection of technology and health care.

Her research has documented the social life of health information, the concept of peer-to-peer healthcare, and the role of the Internet among people living with chronic disease.

Fox contributes to a health care blog, *e-patients.net*, and you can follow her on Twitter: @SusannahFox.

Fox is the former editor of the website for U.S. News & World Report. She has also worked as a researcher for RealNetworks and for The Harwood Group. Fox graduated from Wesleyan University with a degree in anthropology.

8:00-9:00 Upper/Lower Lobbies Continental Breakfast  
 9:00-10:00 Paul Berg Hall Opening Session  
**9:00-9:10 Introduction Larry Chu, MD, MS, Conference Organizer**  
**9:10-9:55 Keynote Speech BJ Fogg, PhD**  
 9:55-10:30 Coffee Break  
 Demo Session #3  
 9:58AM-10:13AM 673: Mark Casselman, *A Mobile Phone-Based Self-Management System for Adolescents with Type I Diabetes*  
 10:15AM-10:30AM 718: Damon Ramsey, Matt Smith, *The Official Launch of Healthism.com: A Social App for Health and Wellness Goals*

10:30-12:00 Parallel Sessions		
Panel Session 3 <i>Paul Berg Hall</i>	Parallel Session 9 <i>LK120 Hall</i> Chair: Bassam Kadry <b>Physician-patient interaction online</b>	Parallel Session 10 <i>LK130 Hall</i> Chair: Francisco Grajales <b>Social Networks</b>
10:30 - 11:15 686: Stephanie Habif, Ramin Bastani, Nicholas Grosskopf  <i>Behavior Change and Mobile Health Technology Panel: a Triecta Strategy for Successful Design</i>	730: Michael Sanchez • <i>Cancer Control P.L.A.N.E.T.: Moving Research into Practice</i>  602: Chris Paton •• <i>The Health InnoVation Exchange (HIVE) - Bringing Together Government, Clinicians, Academia and Industry to Foster Health Innovation in New Zealand</i>	720: Samuel Alan Stewart <i>Using Social Network Analysis To Understand Web 2.0 Communications</i>  623: Iiris Riippa <i>Measuring the Effects of eHealth Applications on Efficiency: a Systematic Literature Review</i>
11:15 - 12:00 581: Robyn Whittaker, Barbara Mittleman, Wendy Nilsen  <i>Issues in Mobile Health</i>	745: Austin Kelly <i>Medstr.com</i>  539: Bassam Kadry <i>Analysis of 4999 Online Physician-Reviews Indicates That Most Patients Give Physicians a Favorable Rating</i>	674: Lisa N. Gualtieri <i>Communicating the Experience of Illness through Patient Blogs</i>  768: Enoch Choi <i>Social Media Use by Health Care Providers: Professional Benefits and Social Challenges</i>

Notable Presentations • IMIA/SPC rated top 20% of abstracts, •• IMIA/SPC rated top 3% of abstracts

12:00-13:00 Lunch and Visit Posters  
 Demo Session #4  
 12:05PM-12:20PM 611: Cornelia Van Uden-Kraan,  
*OncoCompass: an E-health Management Platform to Facilitate Supportive Cancer Care*  
 12:23PM-12:38PM 564: William Jordan,  
*Locarto: Promoting Mobile Vending of Fresh Produce through Location-Based Text Messaging*  
 12:41PM-12:56PM 726: Katherina Martin Abello, *A Visual Screening Instrument: Assessment for Common Mental Disorders and Suicidal Ideation. Easy, Fast, and Accessible for Everyone*

13:00-14:30 Parallel Sessions		
Parallel Session 11 <i>Paul Berg Hall</i> Chair: Jennifer Shine Dyer <b>Mobile health and digital learning for adherence</b>	Parallel Session 12 <i>LK120 Hall</i> Chair: Francisco Grajales <b>Public eHealth and health policy</b>	Parallel Session 13 <i>LK130 Hall</i> Chair: Peter Murray <b>Personal health records and patient portals</b>
756: Raymond L. Ownby • <i>Development of a Computer-Based Tailored Information Application to Improve HIV-Related Treatment Adherence</i>	666: Brigitte Piniewski <i>Crowd Accelerated Health Intelligence: Impact on Policy Making</i>	721: Wilma Kuijpers • <i>Evaluation of a Personalized Information Website ("Voorlichting Op Maat"): User Experiences and Future Needs</i>
631: Rachel Fournier <i>Montre à La Cigarette C'est Qui Le Boss! Using Highly Tailored Text Messages to Help Young Adults Quit Smoking</i>	643: David Hale <i>From Data to Wisdom: Baking Knowledge and Expertise into Government Health Data</i>	660: Thomas Milton Jones <i>Taking Personal Health Records to a New Level; Establishing a Platform for Allowing for Consumer Control of Interoperable Health Care Information</i>
711: Vineet Singal • <i>Utilizing the Power of Text-messaging (SMS) Technology to Increase Patient Compliance with Medication and Adherence to Physician Recommendations and Educational Interventions in Free Clinics</i>	688: Simone Karp <i>A Platform that Supports Continuous Performance Improvement by Integrating Performance Assessment Metric-focused Interventions, Incentives and Community to Improve Health Care Quality.</i>	734: Richard Moser <i>Wiki Approaches to Enhance Reach and Breadth of Stakeholder Involvement in Identification of Practical Patient-Reported Measures for Primary Care</i>
530: Kevin A. Clauson • <i>Impact of Texting and Predictive Potential of Health Literacy on Medication Adherence in T2DM</i>	573: Anna Merla <i>Drug-selling Websites: A New Scenario in Public Health? A Systematic Review</i>	662: Monica Murero <i>Alice Gets Sick in Facebookland: Challenges in Digital Literacy for Health 2.0</i>

Notable Presentations • IMIA/SPC rated top 20% of abstracts, •• IMIA/SPC rated top 3% of abstracts





# Medicine 2.0 '12 Boston, USA

5th World Congress on Social Media, Mobile Apps, and Internet/Web 2.0 in Medicine, Health & Biomedical Research. Sept 15-16, 2012.

*The Joseph B. Martin Conference Center at Harvard Medical School*

Abstract/Speaker Proposal Submission Deadline:  
March 7th, 2012

- New additional themes and tutorials: Mobile Apps; Social Media Analytics; Social Media & Apps for Public Health, and much more!
- Gadget Exhibition & Demos of apps & sites for patients and health professionals
- Internationally renowned keynote speakers & panelists
- Practice, business, and research presentations
- Live and on-demand streaming on the web (registration required)

Please login at <http://www.medicine20congress.com> and check your notification preferences for Medicine 2.0'12 to receive notifications for this conference. For sponsorship opportunities and proposals please contact [geysenba@gmail.com](mailto:geysenba@gmail.com)

14:30-15:00 Upper/ Lower Lobbies  
Coffee Break  
Demo Session #5  
14:35PM-14:50PM **772:** Leslie Wu, Scott Klemmer, Stu Card, Kyle Harrison, Larry Chu, Large Screen and Tablet-based Interactive Cognitive Aids for Crisis Care

Notable Presentations • IMIA/SPC rated top 20% of abstracts, •• IMIA/SPC rated top 3% of abstracts

15:00-16:30 Parallel Sessions			
Panel Session 4 <i>Paul Berg Hall</i> <b>Quantified Self and Self-Tracking Devices Panel and Demonstration</b>	Parallel Session 14 <i>LK120 Hall</i> <b>Chair: Kevin Clauson</b> <b>Mobile health applications for management</b>	Parallel Session 15 <i>LK130 Hall</i> <b>Chair: Margaret Hansen</b> <b>Ethical and legal considerations</b>	Parallel Session 16 <i>LK101/102</i> <b>Chair: Bassam Kadry</b> <b>Physicians, internet use, and social networking</b>
15:00-15:40 <b>769:</b> Gary Wolf, Paul Abramson, <b>Basis</b> CEO Jef Holove, <b>BodyMedia</b> CEO Christine Robins, <b>BodyTrack</b> Anne Wright, Ben Rubin, <b>Zeo</b> Co-Founder and CTO  <i>Quantified Self and the Self-tracking Patient</i>	<b>762:</b> David H. Gustafson • <i>Smartphone Application to Prevent Alcohol Relapse: a Clinical Trial</i>  <b>583:</b> Taridzo Fred Chomutare • <i>Review of iPhone Applications for Diabetes Self-Management</i>	<b>759:</b> Carl Hanson • <i>Protecting Health in a Social Media World: Healthcare and Human Service Responses to Online Threats</i>  <b>546:</b> Carol S. Bond <i>Online Discussion Boards as Research Data; Exploring the Ethical Issues</i>	<b>542:</b> Sivan Rapaport • <i>The Effect of Social Networks on Clinical Case-Based Reasoning</i>  <b>584:</b> Richard Booth <i>A Systematic Review of Published Accounts of Social Media Use within Nursing: Where Practice Outpaces Research</i>
15:40-16:30 <b>770:</b> Basis, BodyMedia, BodyTrack, Zeo, Striiv  <i>Self-tracking Devices Live Demos</i>	<b>754:</b> Wendy Nilsen • <i>Using Mobile Technologies in Health Research at NIH</i>  <b>637:</b> Joseph Cafazzo <i>Mobile Phone-Based Remote Patient Monitoring for Heart Failure Management: a Randomized Controlled Trial</i>	<b>625:</b> Francisco Lupiáñez-Villanueva •• <i>Health-related Information as Personal Data in Europe: Results from a Representative Survey in Eu27</i>  <b>550:</b> Shannon Hughes <i>Challenges to Scientific Validity in Researching the Anonymous Online User</i>	<b>567:</b> Pat Rich <i>Social Media and Physicians: a Canadian Overview</i>  <b>626:</b> Martina Moick <i>Physicians' reasons for professional Internet Use and the Impact on Attitudes towards Internet-informed Patients and Prescribing Behavior</i>

16:40-18:15 Paul Berg Hall  
**16:40-17:25**  
**17:25-18:15**  
  
Closing Session  
**Closing Keynote**  
**Closing Remarks**  
Closing Ceremonies  
  
**Susannah Fox, Pew Internet and American Life Project**  
**Larry Chu, MD, MS, Conference Organizer**

# ABSTRACTS



This year, Medicine 2.0 @ Stanford received the largest number of abstract submissions in the history of the conference. Competition for oral, poster and demo interactive presentations was remarkable. With the help of the International Medical Informatics Association Social Media Working Group (IMIA SMWG), the Stanford Organizing Committee and the Scientific Program Committee selected the top 30% of submissions for presentation. Abstracts in the top 20% of all submissions are marked with a single •. Truly exceptional abstracts in the top 3% of submissions are marked with two ••. A note on **Research in Progress (RIP)**: these posters and presentations will provide a description of methods and study design for ongoing research likely to yield interesting findings but which have not yet completed enrollment or data analysis. RIP presentations are selectively chosen based on the design and potential impact of the proposed work.

Flash-compatible teaching resources should be avoided if one wishes to address the largest audience. Educators contemplating using mobile devices should initially develop English-only resources. Finally, because cellular connections are the most common internet connections, teaching resources should be programmed to load quickly through this type of connection. Further investigation is underway to provide additional information about user learning experiences through mobile devices.

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Tejas Desai, Cynthia Christiano, Maria Ferris

## THE APPEAL OF A NEPHROLOGY-SPECIFIC BLOG AMONGST ITS READERS

Blog

Poster Session 2, 12:00pm-1:00pm, September 18, 2011

Lower Lobby

Background

An increasing number of healthcare providers author medical blogs. However, little data exists as to the perception of such medical blogs by blog readers. This information is especially important for existing medical bloggers, who expend great resources to maintain their blogs. Our investigation uncovers the perception of a nephrology-specific blog by its global readership.

Methods

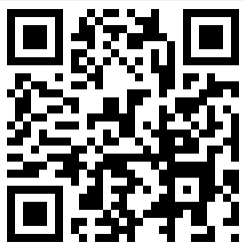
Nephrology On-Demand (<http://blog.ecu.edu/sites/nephrologyondemand/>) is a comprehensive educational website that provides information in many multimedia formats. We measured the usage and appeal of the blog format, known as Nephrology On-Demand Blogs ([http://blog.ecu.edu/sites/nephrologyondemand/?page\\_id=6238](http://blog.ecu.edu/sites/nephrologyondemand/?page_id=6238)). Commentary was allowed through the "Comments" section in each blog for registered users. Eight blogs from national/international (6) and local (2) scientific meetings were published online, detailing the key learning points of selected seminars within a specific meeting. We used Google Analytics to measure usage data for each blog during the first 90 days after their publication. Access to any of blogs could be achieved by completing a short, Qualtrics-hosted survey.

Results

A total of 746 visitors and 1248 pageviews were recorded. The average number of visitors & pageviews to blogs of local meetings were 16 and 27, respectively. These numbers increased to 112 and 181, respectively, for the national/international meeting blogs. International readers contributed between 30-45% of visits to the blogs of local meetings. Of the 165 surveys started, 96% were completed. Eight out of 10 non-first-time readers viewed the blogs as accurate (mean 1.54, SD 0.81), current (1.6, 0.86), objective (1.64, 0.88) and useful (1.6, 0.86). This finding was similarly observed at all training levels.

Conclusions

Our descriptive investigation has 3 key points. First, local meetings generally attract local healthcare providers, but blogs of such meetings can attract a global online audience. Albeit a small number of visits, blogs allow locally presented scientific meetings to showcase their material worldwide. To date there are no additional nephrology blogs that show such data. Second, requiring the completion of a survey prior to accessing the blogs resulted in a large proportion of users completing the survey. Although removal of the required survey would have likely resulted in greater blog access, satisfaction data would have been harder to collect. Third, knowledge that blogs are viewed in a positive manner may motivate medical professionals to continue their blogging efforts. Further data collection is underway to determine if increasing the number of local meeting blogs can improve number of visits and pageviews, on-par with national/international meeting blogs. Further data collection is underway to determine if increasing the number of local meeting blogs can improve number of visits and pageviews, on-par with national/international meeting blogs.



Scan this QR code with your Smartphone device to access our mobile schedule.

Scan Me!

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Tejas Desai

## LEARNING NEPHROLOGY THROUGH MOBILE DEVICES: THE NEPHROLOGY ON-DEMAND MOBILE EXPERIENCE

Web 2.0-based medical education and learning  
Poster Session 1, 12:30pm-1:30pm, September 17, 2011

Lower Lobby

Background

An increasing number of healthcare providers (HCP) are consuming medical information through mobile devices, but the popularity of these devices is unknown. Medical educators who provide online information need to know how potential learners utilize mobile devices to obtain information if they wish to effectively communicate using these technologies. This knowledge will allow educators to properly allocate IT resources and develop effective medical websites. In this study, we characterized how HCPs use mobile devices to access a medical education website.

Methods

Nephrology-related medical information was made available to all mobile devices (smartphones, PDA's) through Nephrology On-Demand Mobile (<http://www.nephrologyondemand.org>) (ISSN 2155-9813). The website was coded in the Wordpress- $\times$  platform and is maintained by the Division of Nephrology at East Carolina University. It contains evidence-based Nephrology teaching material that is categorized by topic, date, and target audience. Computer code from WPTouch was included in the root files of the website to display a mobile-specific version of the website when accessed through a mobile device. Google Analytics code was also inserted into the root files of the website. This code tracked visits, pageviews, time on site, bounce rate, location, connection speed, device type, and browser type for all mobile devices. New and return visits were also calculated by using IP addresses and cookies. Data was collected from February to October 2010.

Results

A total of 638 mobile visits were made during the study period (5.4% of the total visits to Nephrology On-Demand). These visits came from 3 areas of the world (United States 91%, Europe 3%, and Asia 4%, Central & South America 2%). Four-hundred and forty one visits (71%) were from the Apple iPhone device. Adobe Flash-compatible devices, such as those running the Google Android operating system, comprised 16% of all mobile visits. Fifty-five percent of all visits were through a cellular connection. As a result of the slower connection speed, users spent the most time on the website (264 seconds/visit) when using this connection. When users connected via faster speeds, they spent less time but viewed more resources than through a cellular connection (97-158 seconds/visit for 2.14-2.65 resources/visit).

Conclusions

Data from Nephrology On-Demand Mobile can guide educators in developing user-friendly teaching tools in an attractive platform. These data demonstrate the usability from mobile devices. Educators should prioritize Apple iPhone users when allocating IT resources. Adobe



# Welcome Reception

Dean's Lawn in front of LKSC (Tickets Required)

Saturday Sept 17, 2011

6:00-7:00PM

*Join us for  
Drinks and  
Conversation*



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Jill Mara Plevinsky, Linda Goldenhar

## **YOUNG PATIENTS WITH INFLAMMATORY BOWEL DISEASE (IBD): FACEBOOK AS A TOOL FOR SOCIAL SUPPORT**

Building virtual communities and social networking applications for patients and consumers  
Poster Session 1, 12:30pm-1:30pm, September 17, 2011

Lower Lobby

The purpose of this feasibility study was to assess the degree of social interaction among participants on IBD-specific Facebook groups through evaluating the number and type of responses to posts. The hypothesis was that individuals will seek higher levels of social interaction in response to issues regarding diet and peer acceptance compared to more stigmatized matters such as drug and treatment options or side effects. Three scenarios and associated questions were created regarding drug/treatment concerns, diet, and peer acceptance with respect to IBD. They were posted to a total of twelve sites by one female and one male adolescent currently living with IBD. It was found that peer acceptance posts elicited the most responses (24) and the longest responses on average with a mean value of 249 characters per post. The diet posts elicited the second most responses (21) and the second longest responses by a small margin with a mean value of 1.58 characters per post, but resulted in the most friend requests (2), and "likes" (7). Some reasons for this may include a greater degree of comfort sharing non-medically related experiences. Drug/treatment concerns were the least discussed and least engaging posts altogether suggesting that peer acceptance and diet take precedence over drug/treatment concerns in the search for online information and social support via IBD-specific Facebook groups and pages. Findings from this pilot study may be useful for increasing our understanding of how to use disease specific social networking sites to support participating individuals in their quest to obtain valid and reliable information that can be used to help them manage their disease.

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Prajesh Narendra Chhanabhai, Alec Holt, George Benwall

## **TEXT ME OR FACEBOOK ME: THE USE OF MOBILE AND SOCIAL NETWORKS BY GEN Y TO SHARE HEALTH INFORMATION**

The nature and dynamics of social networks and health  
Poster Session 1, 12:30pm-1:30pm, September 17, 2011

Lower Lobby

Background

There is an exponential growth in technological media which has a global impact on how individuals are connecting and communicating. In particular, the role of text messaging via mobile phones and the use of social network sites as a medium is changing the way people share information. Social network sites allow for a greater opportunity to gather information from weak relationships and to strengthen strong relationships. The disadvantage is the proliferation of information that may have questionable sources. There are concerns around the privacy and security regarding use, storage and transfer of information via these networks. The mobile social network medium is an active study area for researchers in health information sharing. It is beginning to affect traditional health systems and was the basis of this study.

The use of these mediums to share health information was investigated, focusing on the Generation Y cohort as early adopters and prevalent users of new technology. This study sought to investigate how this group utilizes mobile and social networks to share health information.

Methods

A survey tool was used to collect data about a cohort's health information sharing behavior. Questions were used to determine if there was any difference in the way these media were used to share health information with family and friends.

Results

A total of 1,747 responses were received. The results were analyzed using a number of statistical models and tests to determine if there was any correlation between the use of these media on the level and frequency of sharing health information on these media. The statistical tests used showed that there is a positive correlation between the use of these media and the sharing of health information across these media.

Conclusions

The importance of knowing the results of this health sharing behavior across these media for both academics and health practitioners is that they can further try to understand why this media is being used to share health information. This can then be used to understand what changes need to be made to the technology in order to allow continued growth of usage of these media for health information sharing. It is also important to ensure that health care providers are aware that there is a shift in the methods of communication and embrace this in their development of future healthcare plans. This study found that health information is being shared across these media between various groups of people and at different frequencies. Text messaging as a means of sharing health information should be looked at as being a very real and practical communication tool when dealing with non urgent medical conditions. However, there is still a concern about using social network sites to share health information; they are being used as a means of crowd sourcing for opinions.

This study has shown that users of mobile and social network sites do utilize them to share health information, and as such developers of these media need to consider this in future development plans, and healthcare providers need to understand how the role of the patient is constantly changing as they begin to share health information with text messages and social network sites.

## 529

Jiri Kofranek, Marek Matejak, Pavol Privitzer, Martin Tribula, Jan Silar, Stanislav Matousek

### HUMMOD-GOLEM EDITION - LARGE SCALE MODEL OF PHYSIOLOGICAL SYSTEMS FOR WEB BASED MEDICAL SIMULATOR

Web 2.0-based medical education and learning  
Parallel Session 1, 11:00am-12:30pm, September 17, 2011  
LK120 Hall

#### Background

"Tell me, I'll forget, show me and I may remember; involve me and I'll understand" - this ancient Chinese wisdom is also confirmed by modern learning methods, where educational simulators are widely applied. The core of sophisticated medical simulators is a complex model of physiological regulations, which incorporates models not only of individual physiological subsystems, but also their connections to form a more complex unit. The detailed structure of models used in commercial medical simulators is usually not published. However, open-source models of integrated physiological systems also exist. The open source model of Hester, Coleman et al. "HumMod" (<http://hummod.org>) is one of the most extensive open-source models of interconnected physiological systems. Our goal was to design a web teaching tool using interactive multimedia connected with large scale model of physiological systems, based on open source HumMod model structure.

#### Methods

The core of the simulators is the simulation model, created in the environments of special development tools designated to create such models. Recent development of simulation environments brings new possibilities for more efficient development of extensive simulation models using the acausal modeling tools. The simulation language Modelica is one of such tools. HumMod model was originally implemented using almost three thousand XML files. Our implementation of the HumMod in Modelica language introduced a much more transparent and intelligible description of the modeled physiological relationships than XML form of source code. We have also unveiled several errors in the original model HumMod, and we modified and expanded the model predominantly in the field of modeling the acid-base homeostasis of the internal environment. Within the project Open Modelica Source Consortium, we are creating a tool which is able to generate the source code from Modelica to C# language. This enables us to generate a component from .NET used in the final application on the Silverlight platform, which enables us to distribute the simulator as a web application running in the internet browser. User interface includes animated figures interconnected with simulation model core. The creation of animated figures is done by artists who create interactive animations in Microsoft Expression Blend. Art designers used the special software tool (Animester), developed by us, to create and test animations that will be controlled by the simulation model.

#### Results

We have designed web accessible simulation tool based on our implementation of HumMod model - "HumMod-Golem Edition", that incorporates interconnected physiological subsystems (respiratory, circulatory, renal, blood gas transfer, volume, ionic and acid-base homeostasis, energy metabolism, and relevant neurohumoral regulation mechanisms). It allows for modeling a number of pathological conditions and corresponding therapeutic interventions.

#### Conclusions

Complex integrative simulators of human physiology can be of large importance when teaching clinical physiology and pathophysiology or studying pathogenesis of varied medical conditions and syndromes using virtual patients. Such simulators include large models of interconnected physiological subsystems. Modelica is a very convenient developing tool for design of those complex hierarchical models.

## 530 •

Kevin A. Clauson, Shara S. Elrod, Paula Eckardt, Fadi M. Alkhateeb, Angela S. Garcia, Elizabeth M. Sherman  
**IMPACT OF TEXTING AND PREDICTIVE POTENTIAL OF HEALTH LITERACY ON MEDICATION ADHERENCE IN T2DM**

Mobile health and digital learning for adherence  
Parallel Session 11, 1:00pm-2:30pm, September 18, 2011  
Plenary Hall

#### Background

Poor medication adherence (i.e., failure to take the proper medication at the correct time) is a causative factor for diminished control of type 2 diabetes mellitus (T2DM). Poor adherence is also correlated with an increased incidence of vascular, nephrologic, neurologic and ophthalmological complications as well as a higher cost burden. One of the chief culprits for suboptimal adherence is patients'

inability to recall and act upon their dosage regimens. Other variables associated with a lack of adherence in T2DM include socioeconomic status, ethnicity (e.g., Hispanics), and low health literacy. Low health literacy is also significantly associated with hypoglycemic episodes. Due to the high penetration of mobile phones across socioeconomic groups and the extremely high read rate (94%) for mobile SMS (short message service), text message medication reminders offer a promising intervention for improving medication adherence in T2DM patients.

The primary objective of this study is to improve medication adherence in patients with T2DM via use of daily SMS medication reminders. Secondary objectives include: 1) to assess health literacy levels in an ethnically diverse, uninsured/underinsured patient population, 2) to examine the predictive potential of measured health literacy and disease knowledge for medication adherence, and 3) to perform a test-retest with health literacy and disease knowledge assessment tools.

#### Methods

A randomized, open-label, controlled study is being conducted at a primary care clinic with a diverse, underinsured/uninsured patient population in the USA. The intervention is a daily SMS medication reminder temporally selected by participants and including the disease and medication de-identified text message, "It's that time". Text selection was chosen to be consistent with previous research and ethics board requirements. Participants will be randomized to either the SMS + standard care (intervention) group or standard care alone (control) group for 6 months. Baseline data, including HbA1C, demographics, and medication regimens will be collected for all patients at the initial visit. Other measures employed at baseline and month 6 in this study include health literacy via the REALM-SF (Rapid Estimate of Adult Literacy in Medicine - Short Form) instrument and disease knowledge with the DKT (Disease Knowledge Test) - T2DM subset tool to allow for test-retest validation. Medication adherence will be assessed at months 3 and 6 via pharmacy refill records, electronic health record (EHR) data, the MMAS (Morisky Medication Adherence Scale) and measured by hemoglobin A1C (HbA1C). REALM-SF and DKT-T2DM scores will also be introduced into the EHR for future visits and targeted diabetes education scheduling. In the intervention group only, a brief questionnaire will be administered to assess satisfaction and evaluate SMS alert fatigue at months 3 and 6. Inferential statistical tests will be used to assess the effect of SMS on adherence. Multivariable linear regression will be used to explore associations between health literacy and clinical outcomes (e.g., HbA1C).

#### Results

Research in Progress.

#### Conclusions

Research in Progress.

## 539

Bassam Kadry

### ANALYSIS OF 4999 ONLINE PHYSICIAN-REVIEWS INDICATES THAT MOST PATIENTS GIVE PHYSICIANS A FAVORABLE RATING

Physician-patient interaction online  
Parallel Session 9, 10:30am-12:00pm, September 18, 2011  
LK120 Hall

#### Background

A majority of Americans use the Internet to search for health-related information. Many online physician review sites provide patients with information about physicians and allow patients to rate physicians. The goals of this study were to 1) determine the most frequently visited physician-review websites that have user-generated content; 2) evaluate the available information on these websites and the methods used by each site to rate physicians; 3) analyze online ratings of 4999 physician reviews.

#### Methods

On 10/1/2010 the ten most frequently visited online physician-review sites with user-generated content were identified using Google Trends. Each site was then studied to evaluate the available information (e.g., board certification, years in practice), the types of rating scales (e.g., 1-5, 1-4, 1-100), and dimensions of care (e.g., recommend to a friend, waiting room time) that patients were asked to rate physicians. Data from 4999 physician-reviews without identifiers were analyzed to assess how physicians are rated online.

#### Results

The 10 most commonly visited websites with user-generated content were: HealthGrades.com, Vitals.com, Yelp.com, YP.com, RevolutionHealth.com, RateMD.com, Angieslist.com, Checkbook.org, Kudzu.com, and ZocDoc.com. A total of 49 different dimensions of care were rated by patients, with a median=4.5 (mean 4.9, SD 2.8, range 1 - 9) questions per site. Depending on the scale used for each physician-review website the average ratings equaled 77 (standard deviation/median/range = 11/76/33-100) for sites using a 100-point scale, 3.84 (0.98/3.8/1-5) for sites using a 5-point scale, and 3.1 (0.72/3.1-4) for sites using a 4-point scale. 62% of the reviews on the 100-point scale were above 75, 58% were rated 4 or 5 on sites with a 5-point scale, and 74% were rated 3 or 4 on sites with a 4-point scale. The patient's single overall final rating of the physician correlated well with the other more specific dimensions of care rated by patients for the same physician. (Pearson Correlation 0.73, P< 0.001)

## Conclusions

Most patients give physicians a favorable rating on online physician review sites. A single overall rating to evaluate physicians may be sufficient to assess a patient's general opinion of the physician. The optimal content and rating methodology that is useful to patients when visiting online physician-review sites deserves further study.

## 542 •

Meira Levy, Sivan Rapaport, Dikla Agur Cohen, Lior Fink, Nava Pliskin

### THE EFFECT OF SOCIAL NETWORKS ON CLINICAL CASE-BASED REASONING

Physicians, internet use, and social networking  
Parallel Session 16, 3:00pm-4:30pm, September 18, 2011  
LK005

#### Background

The emergence of Medicine 2.0 applications and services, which facilitate social networking, participation, openness and collaboration within and between health providers and consumers, is enabled by Web 2.0 technologies. Medicine 2.0 applications have the potential to foster both knowledge exchange and time-saving, clinical innovation transfer. The social collaborative dimension of Web 2.0, in particular, offers ways to cultivate and exploit knowledge sharing in healthcare. The main barrier to knowledge sharing, however, is transforming the tacit knowledge embedded in the minds of people to explicit knowledge for access by other people. Especially in decision-making processes, understanding the rationale behind decisions is critical for ensuring systematic medical decision-making processes. While there is vast research on the role of medical social networks in providing knowledge to physicians and patients and in enabling new communication patterns among these groups, there is a lack of research from the perspective of social-cognitive theory on how Web 2.0 applications influence clinical decision-making processes.

The objective of this study is to analyze usage patterns within a social network of physicians, encompassing mechanisms of medical knowledge sharing and collaboration, and to ascertain whether social networking cognitively influences decision-making processes of physicians. For physicians involved with decision-making processes in a specific clinical case, the purpose of the study is to compare their willingness to use (and actually use) several knowledge artifacts originating from the social network (e.g., statistics, decisions by other, decision rationale).

#### Methods

The activities within a social network consisting of about 300 primary care physicians in Israel regarding a clinical case published in the New England Journal of Medicine (NEJM) are analyzed. Both qualitative and quantitative methods are applied to measure activities within this social network, perform content analysis of decisions and rationale, and survey via a questionnaire for data collection about the decision making processes. The first phase of study is devoted to analysis of routine activities within the studied social network. The second phase of study is devoted to finding whether, in the context of the specific NEJM case and when faced with the option of 1) getting additional information (e.g., statistics or the rationale for the preferred treatment) and 2) accessing the decisions of colleagues and the rationalization for their choices, physicians actually use the additional information. In addition, the effect on decision-making, comparing between the physician's decision before and after the supply of additional information, is assessed and reflections upon the decision-making process are collected via a questionnaire.

#### Results

Research in Progress. The results may help design social networks that can support physicians' decision-making.

#### Conclusions

Research in Progress. The potential contribution of this study is to shed light on the role of social networks as a platform for knowledge capture and transfer, and their effect on physicians' decision-making processes.

## 544 •

William Gunn

### CONNECTING HEALTHCARE RESEARCHERS TO INFORMATION

Collaborative biomedical research, academic/ scholarly communication, publishing and peer review  
Demo Session 2, 4:00pm-4:15pm, September 17, 2011  
Upper Lobby

This abstract proposes a presentation of Mendeley at the Medicine 2.0 2011 conference with the aim of sharing knowledge to improve collaboration between healthcare researchers. Mendeley is a research workflow and collaboration tool which crowd-sources real-time research trend information and semantic annotations of research papers in a central data store, thereby creating a "social research network" based on research data. We describe how the document central networking model can overcome barriers for collaboration by turning research papers into social objects and making academic data publicly available via an open API. Central to the success of Mendeley has been the creation of a tool that works for the researcher without the requirement to be part of an explicit social network.



Mendeley automatically extracts metadata from research papers, allows researchers to annotate, tag and organize their research collection, and then makes it easy to share this information through the network or to other networks a medical professional may use. The tool integrates with the paper writing workflow and provides advanced collaboration options, thus significantly improving researchers' productivity. By anonymously aggregating usage data in real time, Mendeley enables rapid, timely discovery of critical information. A network of collaborators and peers thus grows out of shared interest, with the document as the central focus.

Within 26 months, Mendeley's userbase has grown to more than 800,000 users, and the database has grown to more than 70 million entries, making Mendeley the largest open academic database in the world. Information in the database is accessible directly via Mendeley, or alternatively via Mendeley's open API. Many third-party developers have used the Mendeley platform to add value to their applications. Significant challenges have had to be overcome in creating a tool that is stable for hundreds of thousands of users, both technically and conceptually. Additional efforts go into activities such as article and author name disambiguation, entity extraction, recommendation engines, and enriching the existing network with semantic information.

## 546

### Carol S. Bond, Jaqui Hewitt-Taylor ONLINE DISCUSSION BOARDS AS RESEARCH DATA; EXPLORING THE ETHICAL ISSUES

Ethical and legal issues, confidentiality and privacy  
Parallel Session 15, 3:00pm-4:30pm, September 18, 2011  
LK130 Hall

People living with enduring health conditions (EHC) are increasingly turning to social networking websites to share their experiences, and to both offer and seek help and advice from fellow 'sufferers'. Besides the primary purpose of enabling interaction between people living with an EHC, many of these websites contain material of potential use to researchers. Accessing information from individuals for research purposes has traditionally meant inviting people to participate in information gathering activities, gaining consent to participate and advising participants about anonymity and confidentiality. This process of seeking consent and outlining the boundaries of the use of data is carried out before the participant makes information available to the researcher.

However, the situation is somewhat different when a researcher considers using internet discussion boards. How the established principles of ethical research can or indeed should be applied to research happening in the 'online world' rather than the 'real world' is a challenge to researchers. This abstract explores the issues through consideration of research with discussion board data. In 2001 Eysenbach and Till reviewed health related discussion boards and concluded that members of internet communities do not expect the posts they make to be used by researchers. They identified that the rise of what we now call social networking is creating a blurring of public and private spaces. This research however was carried out before social networking became the everyday activity that it now is for many people. Around the same time (2002) the Association of Internet Researchers questioned whether people contributing in this environment are best understood as research subjects or as authors whose texts are intended as public writing.

Without any agreed framework to draw on, researchers are making their own decisions about how to address the ethical issues. To help illustrate the current situation, a brief review of articles that used data from online discussion boards was undertaken to explore the range of approaches being adopted by researchers. Some did not mention any ethical considerations in the research. Of those that did, a variety of approaches were found. These included asking the operators of the site for permission to use data from the site for research, approaching formal ethics committees, not seeking consent or approval, and acting ethically in self-defined ways. People approaching ethics committees received a range of responses, including a decision that approval was not required, approval with limitations, and approval as sought. Some authors discussed the thinking behind their approach and gave a rationale. Considerations include the public nature of the board, not using participants' nicknames, and not using any direct quotes from participants. The importance of this latter point is reinforced by one of the reviewed articles where it was possible to identify the discussion board and the online ID of the author through the use of the Google advanced search feature. The issues are complex. Ethics review committees and neophyte researchers need more guidance. The people who are at this conference may be well placed to further the debate.

## 547

### Rik Crutzen USING GOOGLE ANALYTICS AS A PROCESS EVALUATION METHOD FOR INTERNET-DELIVERED INTERVENTIONS: A COMMENDABLE EXAMPLE ON SEXUAL HEALTH

Web 2.0 approaches for clinical practice, clinical research, quality monitoring  
Parallel Session 7, 4:30pm-6:00pm, September 17, 2011  
Plenary Hall  
Background

Process evaluation aims to disentangle the factors that ensure successful intervention outcomes and attempts to document the steps involved in achieving successful implementation of an intervention. Integrating both qualitative and quantitative methods during process evaluation yields rich detail about intervention outcomes that neither method could achieve alone. This study focuses on a quantitative method that can be used during process evaluation of Internet-delivered interventions: assessment of visitors' behavior using Google Analytics--a sophisticated and free service. The aim of this study was to demonstrate the potential of Google Analytics as a process evaluation method for Internet-delivered interventions, using Sense as an example. Sense ([www.sense.info](http://www.sense.info)) is developed by STI AIDS Netherlands and aims to provide reliable information - for adolescents and young adults - about sexuality, but also being in love, relationships, love and issues that come with this.

#### Methods

Google Analytics was implemented during the development process of Sense. This provided the opportunity to track visitors' behavior as of the intervention's release. This study reports the data until 21 months after the release (March 2009 - December 2010).

#### Results

In total, there were 850,895 visitors with an average total visiting time (i.e., dose) of 5:07 minutes. Google Analytics provides data to answer three key questions in terms of process evaluation of an Internet-delivered intervention: (1) How do visitors behave?; (2) Where do visitors come from?; and (3) What content are visitors exposed to? These data can be used to adapt the intervention to visitors' needs and thereby increase exposure to the intervention and probability of positive intervention outcomes. To achieve this, additional data need to be obtained through other process evaluation methods (e.g., structured observations, in-depth interviews).

#### Conclusions

This real-life example demonstrates the potential of Google Analytics as a process evaluation method to be used in a process evaluation procedure of Internet-delivered interventions. This is highly relevant given the current expansion of these interventions within the field of health promotion. Two additional questions will be addressed in the presentation to take advantage of Google Analytics' potential: (1) How to combine Google Analytics with other services to result in powerful visitor engagement and interaction research? (2) When should Google Analytics be used to lead or supplement research? The take home messages from the presentation will be distributed through a one-page information sheet.

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### Shannon Hughes CHALLENGES TO SCIENTIFIC VALIDITY IN RESEARCHING THE ANONYMOUS ONLINE USER

Ethical and legal issues, confidentiality and privacy  
Parallel Session 15, 3:00pm-4:30pm, September 18, 2011  
LK130 Hall

The Internet provides an unprecedented opportunity for healthcare consumers, a traditionally silenced group in clinical trial research, to have voice by contributing their treatment experiences on review sites, discussion boards, and patient communities. While many welcome this opportunity for consumers to help further develop the treatment knowledge base, it has also led to concerns about credibility and authenticity of claims in an inherently non-transparent realm. Some social commentators argue that too much "democratization" of knowledge production to a largely anonymous lay public may have adverse social consequences as highly valued concepts of truth, reliability, and accountability become obscure or empty. Anonymity of online users may offer the advantage of liberating users to be more truthful in sharing their experiences, though it simultaneously presents a new challenge to scientific principles that traditionally require for validity the use of known and verifiable samples. Terms of Use statements on health websites clearly state that authenticity and accuracy of consumer-reported information is the sole responsibility of individual users. Consumer treatment experiences on such sites could plausibly reflect any number of true or false claims (authenticity) from persons with or without vested interests (credibility), including such stakeholders as pharmaceutical industry representatives. Implications following from anonymity have not hindered researchers from utilizing consumer-reported treatment experiences as data. This experiential information may soon also factor into drug safety surveillance and regulatory decision-making processes. This presentation discusses results from multiple strategies used to investigate the current state of knowledge about and methods for ensuring the authenticity and credibility of online consumer-reported treatment

experiences. A systematic search of the literature on web credibility/authenticity/validity/anonymity was conducted using PsycInfo, PubMed, ScienceDirect, EBSCO, and CINAHL databases. An open-ended survey was emailed to 15 professional and consumer health website officials inquiring about their experience with and efforts to control authenticity and credibility of user contributions. Finally, 960 randomly selected consumer reviews of an antidepressant and antipsychotic medication from four health websites were inductively coded for consumer-reported drug effects. To assess for evidence of bias, a chi-square test was performed to compare the balance of positive and negative drug effects according to time period of the post and anonymity of the poster. Results reveal that, while numerous studies describe how end-users assess credibility of health websites, few studies directly analyze authenticity or credibility of consumer-reported information. However, research on user-contributed information in non-health related fields offer insights into the possible scope and impact of this issue. Survey respondents (n=9) were unable to estimate the prevalence of consumer-reported data that are not authentic or credible, but speculated that the problem may exist. No respondents identified a systematic method for checking or ensuring authenticity or credibility of consumer-reported data. Finally, few statistically significant differences were found across the 960 consumer medications reviews, indicating no consistent pattern of bias. The literature review and surveyed website officials, however, suggest that continued vigilance and additional research is necessary. This presentation will end with suggestions for future research to help establish the validity of anonymous consumer-reported Internet data.

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### Carina Sparud Lundin, Agneta Ranerup, Marie Berg INTERNET USE, NEEDS, AND EXPECTATIONS OF WEB-BASED INFORMATION AND COMMUNICATION IN CHILD-BEARING WOMEN WITH TYPE 1 DIABETES

Health information on the web: supply and demand  
Poster Session 2, 12:00pm-1:00pm, September 18, 2011  
Lower Lobby  
Background

During the childbearing period, women use the internet both to seek information and communicate. For women with type 1 diabetes, pregnancy and breastfeeding constitute a much more complex situation than for women in general. This implies a great need for support from care providers and relatives. One way of bridging discontinuity in care, particularly in early motherhood, would be to develop a web application that provides complementary interactive support and information. By applying a user-centered approach, the objective of this study was to explore internet use, needs and expectations of childbearing support in women with type 1 diabetes.

#### Methods

Data were collected via a web-based survey with an explorative and descriptive design, in which 139 eligible mothers with type 1 diabetes, giving birth at one hospital in Sweden between 2007-2009, were asked for participation. Data were analyzed with descriptive and analytical statistics, and open answers with a directed content analysis.

#### Results

Of the 105 women who completed the questionnaire, 22% never used the internet to search for information concerning pregnancy, childbirth, and parenthood. 12 % searched for information every day, 29% one or more times a week, and 38% one or more times a month. 44 % of the women declared themselves to be passive participants on social websites, and 45% to be active participants. 45 % had specific expectations of web-based support directed towards childbearing, especially those with higher educational level (P=.01). The web-based support were suggested to include expert-controlled website with reliable, up-to-date information focused on childbearing and diabetes and bi-directional communication with care providers to receive more available support. Participants also asked for online technical devices to interact with their care provider in order to manage, transfer and evaluate the frequent monitoring of blood glucose during pregnancy. Informal, emotional, and appraisal support by bi-directional online communication with women in similar situations was suggested as a way to provide a place of belonging.

#### Conclusions

Our results contribute important details about the web-based needs of childbearing women with type 1 diabetes. This consumer directed study indicates specific areas of development for the provision of effective web-based support that includes facilities for medical informatics, interactive support and social networking in this population.



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Ryoma Seto, Shunya Ikeda, Hiroshi Tsumura

**STUDY ON THE INFORMATION GAP BETWEEN DEMAND AND SUPPLY IN HOSPITAL INFORMATION SERVICES**Health information on the web: supply and demand  
Poster Session 2, 12:00pm-1:00pm, September 18, 2011

Lower Lobby

## Background

Tokyo Metropolitan Government (TMG) renewed the hospital information service "Himawari" in 2008. Himawari works as a search engine that provides information for choosing hospitals and clinics in Tokyo. Our 2008 survey showed that, although few citizens knew of the service, many used the Internet when choosing a hospital. Therefore, we perceived a need to investigate the reasons for poor uptake of the service and to improve the information supply. The purpose of this study was to investigate the methods employed in choosing a hospital and the type of hospital information required by Tokyo citizens.

## Methods

In February 2011, we selected 3200 participants (age, 30-49 years) living with their families in Tokyo, of whom 305 responded. We built the questionnaire in the website powered by "Goo research" of NTT Resonant Inc. The questionnaire consisted of a participant profile, the hospital information services of which they were aware, and their information requirements regarding hospital information services. The Institutional Review Board of Tokyo Healthcare University approved the study.

## Results

With regard to information sources, 260 respondents (85.2%) used the Internet, 186 (61.0%) used word of mouth ("Kuchikomi" in Japanese), while sources such as newspapers, magazines, TV, and radio were used by fewer respondents. With regard to selection of hospital, 170 (55.7%) and 98 (32.1%) respondents used the Internet and Kuchikomi, respectively. The criteria used when selecting a hospital were recorded as follows: opening hours, 251 respondents (82.3%); reputation of hospital, 232 respondents (76.1%); specialty and background of physician(s), 175 respondents (57.4%); therapeutic methods and results, 152 respondents (49.8%); appointments system, 122 respondents (40.0%); and medical facilities, 81 respondents (26.6%). Other criteria were rarely mentioned. The reputation of the hospital was thought to be the most important criterion by 107 respondents (35.1%), while opening hours were nominated by 79 respondents (25.9%). With regard to the hospital information services Tokyo citizens were aware, Himawari provided by TMG was mentioned by 92 respondents (30.2%), virtually unchanged from 30.1% in the 2008 survey. Other services (e.g., Yahoo! Hospital) showed similar results, although 222 respondents (72.8%) used individual hospital websites, a larger proportion than that found in the 2008 survey. With regard to demands for further information, 204 respondents (66.9%) cited complaints made to the government; 171 (56.1%) occurrence rate for infection; 134 (43.9%) mortality rate by disease; 121 (39.7%) physician turnover; 114 (37.4%) nursing staff turnover; and 97 (31.8%) length of stay by disease. Complaints made to the government were considered by 123 respondents (40.3%) to be the most important of these criteria. These demands are not statistically significant with regard to hospital department or patient gender and income.

## Conclusions

This study shows a gap between the information required by the citizens and that which is provided by hospital information services in Tokyo. It is recommended that the public sector should provide more interactive tools (i.e. web widgets of "Himawari") and support for obtaining more patient-centered information, in particular with regard to claims made against the government, to help fill this information gap and clear health disparities.

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Mikael Elf, Ingela Skärsäter, Lilas Ali, Barbro Krevers

**DESIGN OF WEB-BASED SUPPORT SYSTEMS IN LESS STRUCTURED CONTEXTS - THE CASE OF YOUNG CARERS**Usability and human factors on the web  
Poster Session 1, 12:30pm-1:30pm, September 17, 2011

Lower Lobby

## Background

It has been suggested that at least 4% in a given population of young people are young carers (YC), providing substantial support to diseased family members. Many of them have little or no help from society, partly due to societal neglect of this group and partly due to barriers for help seeking, such as shame, stigma and distrust in health and social care resources (HSCR). The group addressed in this abstract, YCs aged 16-25 and supporting someone with mental illness, may find those barriers even more constricting. Research on web-based support for this group are limited, although web-based support may have a prominent role to play in reaching and supporting them. However, web-based support systems (WBSS) are often built around an educational part and a peer-support part, while a number of recent studies of ICT-support to homeless people, at-risk teens and YCs point to additional needs not addressed in such supports. A common factor among these groups seems to be a lack of support in their life context and at the same time barriers to reach important HSCRs. Our objective is to outline a model for web-based

SUNDAY SEPT 18, 2011 3:00-4:30PM

PAUL BERG HALL

# the self-tracking patient

Self-tracking patients are people who track data about themselves. Some do so with hopes to observe patterns in their health over time and make better decisions about how to manage their health.

Attend this session to learn more about the self-tracking movement and see live demonstrations of self-tracking devices. Join Mr. **Gary Wolf**, founder of **The Quantified Self**, and guests for an exciting panel discussion followed by live demonstrations.



**Gary Wolf**, The Quantified Self, **Jef Holove**, CEO Basis, **Lexy Franklin**, Co-founder Striiv, **Christine Robins**, CEO BodyMedia, **Ben Rubin**, CEO Zeo, **Anne Wright**, BodyTrack, **Paul Abramson**, MD and others.

SATURDAY SEPT 17, 2011  
11:00AM-12:30PM  
LK130 HALL

# the stanford epatient forum

A **patient-driven session** focused on the perspective of epatients in the realm of medicine 2.0.

Attend this session to learn about how patients are empowering their own health care through the use of social and emerging technologies.

Meet our Stanford ePatient scholars!

support aiming to increase YCs' opportunities and willingness to overcome barriers in reaching HSCRs that they need.

## Methods

Data from two qualitative studies have been used. Study one was based on interview data (N=12) and explored YCs' needs in their care situation and in relation to a hypothesized WBSS. Data was transcribed and analyzed with content analysis. Study two explored YCs' views (N=8) of a WBSS when acting as co-designers in a participatory design (PD) process. Five consecutive design meetings were video recorded and analyzed with content analysis.

## Results

1) In addition to needs for knowledge (e.g. for understanding mental illness) and needs for communication (e.g. with peers having similar experiences), YCs wanted the opportunity to meet peers in real life and to get "real-life" support. Important real-life support could be e.g. acute relief in the care situation and structured family interventions. Young carers also expressed need for greater commitment from HSCRs. 2) Young carers emphasized human qualities of the WBSS (personification), like competence and a serious attitude. They indicated the importance of commitment and sensitivity in any action on the WBSS. The website was viewed not only as a source for information, knowledge and exchange, but also as something to relate to and trust.

## Conclusions

Localization, mediation and personification may be important properties of a WBSS aimed at YCs. A locally anchored WBSS could facilitate real-life connections between YCs (observing security issues) and would be a prerequisite in helping YCs to become familiar with HSCRs in their place of living. A dedicated staff can build relations to and explore local HSCRs and mediate these experiences on the WBSS. A personified WBSS may offer not only increased visibility, transparency and familiarity of HSCRs, but also trust and support for YCs to overcome barriers in reaching HSCRs.

## 563

Raphaela Laubie

### UNDERSTANDING THE DETERMINANTS OF ONLINE COLLECTIVE ACTION. THE CASE STUDY OF PATIENTS COMMUNITIES

Communities and healthcare

Poster Session 2, 12:00pm-1:00pm, September 18, 2011

Lower Lobby

Internet use has dramatically expanded over the past few years and virtual communities are blossoming on the World Wide Web. Virtual communities offer interesting perspectives and opportunities to both companies and participants, in terms of problem solving (e.g., InnoCentive), creativity (e.g., Appstore), and project funding (e.g., Kiva). This research examines user motivations to join social networks in patient communities. Researchers have already explored some of these aspects. However, they have failed to develop a clear model, integrating both individual and group variables such as group norms and social identity. Drawing on the concepts of intent and goal-directed behavior we explore these causal factors, focusing on the role of habits and emotions in users' behaviors. In this research project, we use a qualitative methodology in compliance with our exploratory quest to understand the determinants of online collective action for patients. In order to get a sociological typology of our field of inquiry, we first proceeded to health 2.0 experts' interviews. Considering the insights given on patients that would be engaged in these communities we proceeded to these specific patients' category interviews. We used SDCI (semi-directive centered interview). We expect our study to analyze and understand the underlying determinants of online communities to generate action, which can disclose precious user-generated content and lead to innovative discoveries as collaborative tools offered by new communication technologies greatly facilitate this approach. Our model, inspired from the literature and converted to interview material, is a revision of Perugini et Bagozzi's model of goal-directed behavior (Perugini et Bagozzi, 2001), which was adapted to social networking websites in Bagozzi and Dholakia's following studies (Bagozzi et Dholakia, 2002) (Dholakia et al., 2004). The interviews also highlighted the emergence of new factors such as belongingness needs (among patients) and exclusivity (dedicated platforms). In our expected field of inquiry, doctors, scientists, pharmaceutical companies or regulators used to let patients know what seemed relevant to their experts' (accommodated) point of view. Today, with the overflow of patients' increased interactions made immediate and simple, things are dramatically changing, allowing patients to narrate in detail, to the whole world the life story of their pains, fears, illness experiences documented with photos and protagonists' true names. These aspects encourage a bottom to top approach in medicine and collaboration between patients and researchers; they may help to tackle aging populations health challenges and may be boosters for the codification of laws among countries and reforms as well.

## 564

William Jordan, Gillian Saunders, Renee Shanker, Peter De Vries, Sean Lucan

### LOCARTO: PROMOTING MOBILE VENDING OF FRESH PRODUCE THROUGH LOCATION-BASED TEXT MESSAGING HEALTH DISPARITIES

Demo Session 4, 12:23pm-12:38pm, September 18, 2011

Upper Lobby

Background

The NYC Green Cart program attempts to infuse low-income neighborhoods with jobs and fresh produce by offering permits for the mobile sale of fruits and vegetables. Because vendors can choose—and change—their vending locations, the Green Cart program poses problems for both program promotion and evaluation. Similar problems have been addressed in the developing world through short message service (sms) text messaging. Our objective is to promote Green Cart vendors and evaluate their geographic distribution and customer volume using text messaging technology.

## Methods

An academic physician was partnered with a community-based organization to develop a web-based map ("Locarto"). Vendors can update and consumers and community organizations can determine Green Cart locations on the map via sms text messaging. Locarto outreach workers solicited vendor participation in 2010. Public promotion of the map is beginning in 2011.

## Results

This demonstration will discuss the Green Cart program and how Locarto addresses unmet needs through novel use of text message-based mapping. The technology platform, development, and implementation challenges will be discussed.

## Conclusions

Locarto attempts to provide a web-based text message interface accessible to low-income and low-literacy communities in order to promote economic development and healthy food availability.

## 567

Pat Rich

### SOCIAL MEDIA AND PHYSICIANS: A CANADIAN OVERVIEW

Physicians, internet use, and social networking

Parallel Session 16, 3:00pm-4:30pm, September 18, 2011

LK005

Background

The use of social media (Facebook, Twitter etc) within the health care sector is becoming of increasing interest to health care providers, consumers and policy makers. While social media is seen as a means of encouraging patient engagement with health care providers, lack of knowledge about social media platforms as well as regulatory and other concerns may limit physician involvement. Information about physician use and acceptance of social media is lacking especially observational data about use in the general physician community. Our objective is to assess Canadian physician use of social media and their attitudes about the perceived value of social media.

## Method

A brief online questionnaire was distributed to the ePanel of the Canadian Medical Association in February, 2011 asking about use of popular social media and social networking sites by physicians as well as their perception of social media. The ePanel is a volunteer group of more than 3000 Canadian medical students, residents and practicing and retired physicians who have agreed to answer questions on health care issues.

## Results

**Research in Progress.** A total of 629 responses were received (19% response rate). Use of social media in general is low among Canadian physicians and use of social media for professional purposes is limited. While half of those polled have a Facebook account, only 12% have a Twitter account and only 7% report having a blog. However 96% report using Google to search for information for professional purposes and 42% say they have participated in an online discussion forum on a medical or health care topic. Physicians have mixed feelings about the value of social media, with 81% feeling it poses professional and legal risks; however, half feel it helps patients gain a sense of community.

## Conclusions

Survey results indicate social media use by physicians is still in its infancy. Physicians question the value of social media and are wary of risks it may pose. However many report seeking guidance in this area and the Canadian Medical Association is in the process of developing guidelines for physicians wishing to use social media.

## 569

Keyvan Sagheb, Peter Schulz, Andreas Bemsch, Vinay V. Kumar, Christian Walter

### EVALUATION OF A NEW INTERACTIVE E-LEARNING TOOL (ILKUM) OF THE UNIVERSITY MEDICAL CENTER MAINZ

Digital learning

Poster Session 1, 12:30pm-1:30pm, September 17, 2011

Lower Lobby

Background

E-learning has been recognized during recent years as an essential tool to improve dental education; however, the

best approach to implementing computer-assisted learning, as well as avoiding information overload are topics of ongoing discussion. Since 2009, our department has been developing a modular interactive e-learning tool (ILKUM) focusing on the medical curriculum (MC) to improve medical education. It includes small e-modules with structured descriptions of diseases and operative techniques mentioned in the MC supported by additional clinical cases, short video sequences, and scientific articles. Additionally updates are announced over Facebook. Our objective was to analyze the overall acceptance of ILKUM. The percentage of students being able to use e-learning (possession of a computer/ access to internet) and those actually using it was evaluated. Additionally, we evaluated ILKUM as a useful learning tool and the potential demand for continuous upgrades. Furthermore, e-learning self-testing scores were analyzed and correlated with the real exam results.

#### Methods

One student cohort (n: 68 +/- 14) was followed in a longitudinal study from the implementation of ILKUM until the final exam (04/2009 - 10/2010). Acceptance of ILKUM was evaluated by an anonymous questionnaire. The overall results were correlated to the average e-learning self-testing results of the students. Statistics were restricted to descriptive analyses only.

#### Results

By the end of 2010, all students had access to a fast internet connection. 90% of the students possessed either a laptop or a netbook. Only 10% had a non-portable desktop computer. The proportion of students using the internet as an information source for academic research constantly increased. The proportion of students who thought ILKUM was a useful tool increased from 84% in 2009 to 90% in 2010. About 90% of all students asked for ongoing ILKUM updates with more content. Positive feedback regarding self-testing increased from 62% in 2009 to 78% in 2010. The proportion of correctly answered exam questions correlated with self-testing feedback, increasing from 51 in 2009 to 73% in 2010. The average monthly account on Facebook was about 6600 clicks.

#### Conclusions

Parallel to the development of our e-learning portal, the proportion of students using the internet as a learning tool constantly rose. Furthermore, there was consistent demand for upgrades to our e-learning tool, which was reflected in the rising number of students preferring e-learning and self-testing. This correlated with an improvement in exam results. The broad acceptance and demand for the new e-learning database among students reflect the importance of developing such systems. Next steps include structural modifications to the database in close cooperation with the students, focusing on the expansion of interactive self-testing. The newly designed e-learning software has positively contributed to the common interest of students and teachers by supporting modern medical education. The ILKUM concept could potentially become a state of the art "level based" modular e-learning tool.

## 570

Umberto Gelatti, Monica Katia Locatelli, Luigi Caimi, Grazia Orizio

### HEALTH INFORMATION TO CITIZENS: A CONTENT ANALYSIS OF ITALIAN WEBSITES DEALING WITH THE THEME OF "WASTE AND HEALTH"

Health information on the web: supply and demand  
Poster Session 2, 12:00pm-1:00pm, September 18, 2011  
Lower Lobby  
Background

In the field of health communication a particularly critical issue is communication to the public of environmental risks, especially regarding topics for which it is difficult to obtain scientific evidence of risk estimates, and there remains a high degree of uncertainty. One of these topics is undoubtedly the impact of waste on people's health, although little research has been conducted in this area. This is a particularly pressing issue in Italy, where the global media has recently put out a message that the city of Naples and the surrounding area have reached such high levels of pollution due to irresponsible waste disposal behavior that the health of the people who live there has been put at serious risk. Information on the presumed environmental and health risks is transmitted via numerous channels, ranging from media reports to public meetings with institutional representatives. With the dissemination and increase of Internet use, websites have become a convenient and quick method of research, often replacing paper-based literature research. Hence, the Internet likely helps to shape risk perception, which is a complex process that can lead to conclusions often very far from the scientific evidence characterized by a quantitative approach. The aim of the study was to evaluate the presence of websites in Italian dealing with the theme "Waste and Health" using three search engines, and then analyze them. In addition, we assessed the visibility of institutional websites, which are committed to ensuring the accuracy and the reliability of the topics dealt with, in respect to their position on the first pages of the search engines.

#### Methods

The keywords "Waste and Health" ("Rifiuti e Salute") were entered in the most commonly used search engines, Google®, Yahoo® and Bing®, and the first 50 references were analyzed, giving a total of 150 occurrences. The web-

sites were then coded according to the content analysis method, using a codebook regarding general information, technical information, information about the contents and information regarding access to Web 2.0. For websites of interest we also evaluated the "page rank", namely the position of the page itself in the search results, in order to assess user visibility of these websites.

#### Results

From the 150 occurrences analyzed, the number of websites found that deal with this subject was only 19, the most numerous being environmental associations (9, 47%), institutional entities (4, 21%) and private companies (2, 11%). The most frequent geographical location (21%) was the Campania region, where Naples is situated. The majority of websites gave a message of increased health risk associated with the three types of waste disposal tackled: rubbish piles (72%), rubbish dumps (87%), and incinerators (89%). Only institutional websites gave a message of "zero risk" for each of the three types of waste disposal. A minority of the websites used Web 2.0 tools, such as FEED RSS (7, 37%) and an Area Forum/Blog (4, 21%). As regards visibility, only one of the four institutional websites maintained its position on the first page of the three search engines.

#### Conclusions

In a situation such as that in Italy, where there is huge media exposure on the theme of waste and health due to the Naples case, which was debated globally, we obtained very interesting results when studying online information on the issue. First, we saw that the majority of our sample of websites dealing with this subject communicated a message of increased risk associated with the three types of waste disposal. This is only one of the channels that can be used to gain information on this topic, but it has the unique characteristic of being an active search, and very easy to access, whereas information gained from the mass media is often passive, not actively searched for by people. We can therefore expect online information to play a crucial role in building perceived risks. Secondly, the visibility of institutional websites appeared to be very low: if someone in Italy built up his knowledge on this theme using the Internet as his only source of information, he would mainly log onto non-government websites, whereas government websites are meant to be committed to ensuring the accuracy and the reliability of the topics dealt with. We could reflect about where the public health stakeholders are in this context, and whether these results could indicate a substantial immaturity of their web strategies in terms of meeting citizens' health information needs. One important consequence of not meeting these needs is that this will strengthen rival health information providers and fuel distrust on the part of professional and regulatory bodies, as reported in the literature. These results provide evidence which is known but often forgotten by our institutions: in a public health perspective it is not enough to manage a situation efficiently, it is necessary to communicate clearly how it has been handled to meet people's needs. Taking communication aspects into consideration is no longer an option, especially in a society that increasingly uses the Internet for communication purposes. Communication is part of management, but achievement of this milestone still appears to be a long way off, even in a developed country such as Italy.

## 571

Grazia Orizio, Anna Caruana, Loredana Covolo, Luigi Caimi, Umberto Gelatti

### 2010 INFLUENZA AND VACCINE INFORMATION AVAILABLE ON THE WEB

Health information on the web: supply and demand  
Poster Session 2, 12:00pm-1:00pm, September 18, 2011  
Lower Lobby  
Background

In the field of public health, preventive measures need an effective communication strategy in order to be successful. During the 2010 influenza pandemic the public was bombarded with information on presumed risks associated with the flu vaccine, which created an atmosphere of suspicion (a "plot theory") that made it very difficult to implement the vaccination campaign in some countries. The aim of the study was to investigate the characteristics and contents of websites providing flu vaccine information.

#### Methods

Website selection was performed, from an Italian IP address, in autumn 2010 via the two most commonly used search engines (Google.com and Yahoo.com) using eight keywords (flu vaccine, flu vaccination, flu immunization, flu shot, influenza vaccine, influenza vaccination, influenza immunization, influenza shot). We analyzed the first three pages, for a total of 480 occurrences. We included websites at least in English and we classified the results in four categories: 1. "classical" websites with at least one section specifically dedicated to flu vaccine in a structured way; 2. websites based on web 2.0 philosophy (blogs, social networks, communities, forum, videos); 3. websites displaying popular news/articles; 4. scientific documents. The first category was coded according to the content analysis method, using a codebook that enabled two types of information to be collected: a qualitative analysis of the websites and a qualitative analysis of the flu vaccine information provided by the websites. The website analysis was performed according to the WHO's "Good Information

Practice Essential Criteria for Vaccine Safety Web Sites", and specifically regarded general information, credibility, accessibility, design and content (authority of sources, accuracy, currency, review process). The flu vaccine contents regarded administration, doses, times, indications, efficacy, contraindications, benefits and risks. For all the four categories we evaluated whether the overall attitude was pro, neutral, or against the flu vaccine. We also evaluated the "Page Rank", namely the position of the page itself in the search results, in order to assess user visibility.

#### Results

We selected 87 "classical" websites, 13 web 2.0 websites, 26 websites displaying popular news/articles and 25 scientific documents providing influenza vaccine information. About 55 "classical" websites were about the seasonal vaccine only, 3 about the anti-H1N1 vaccine and 29 about both. The websites were most often private ones (36%), public health agencies (29%), health facilities (13%), public health associations (11%), and pharmaceutical/diagnostic companies and universities (both 4%). Regarding the attitude towards the flu vaccine, 67% "classical" websites (2 regarding the seasonal vaccine only and 4 both vaccines), 3 (23%) web 2.0 website, 7 (27%) websites displaying popular news/articles and no scientific documents had a negative attitude. Statistical difference was found when comparing "classical" websites and websites with popular articles (p= 0.010). Entering the 8 keywords in the Yahoo search engine we found a higher number of different websites on the first page (first 10 occurrences) compared to Google: 28 versus 18. Whereas Google always ranked first Wikipedia only, Yahoo ranked 4 websites, 3/4 with a .gov extension --cdc.gov, csm.gov, flu.gov-- and Wikipedia. The 6 negative attitude websites never ranked on the first page. Web 2.0 websites and websites displaying popular news/articles with negative attitude towards the flu vaccine were listed only using Google and never using Yahoo.

#### Conclusions

We found that the majority of the "classical" websites providing flu vaccine information had a positive attitude towards the vaccine (93%). A negative attitude was more present in web 2.0 websites and in websites with popular articles. The page ranking analysis showed the crucial role of search engines regarding access to information on the Internet.

## 573

Anna Merla, Grazia Orizio, Peter J. Schulz, Umberto Gelatti

### DRUG-SELLING WEBSITES: A NEW SCENARIO IN PUBLIC HEALTH? A SYSTEMATIC REVIEW

Public eHealth and health policy  
Parallel Session 12, 1:00pm-2:30pm, September 18, 2011  
LK120 Hall  
Background

Drug-Selling Websites (DSWs) are companies that sell pharmaceutical preparations, including prescription-only drugs, on the Internet. Very little is known about this phenomenon, due to its hidden nature when occurring outside national legislation. The aim of the study was to perform an up-to-date and comprehensive review of scientific literature focusing on the broader picture of DSWs by scanning several scientific and institutional databases, with no publication time limits.

#### Methods

As of January 2011, we searched four electronic databases (PubMed, ISI web of knowledge, Science Direct and PsycInfo) for the grey literature on the Internet using the Google search engine and its tool Google Scholar, and we investigated the official websites of 7 institutional agencies (World Health Organization, the US and European Centers for Diseases Control and Drug Regulation Authority). We focused specifically on DSWs offering prescription-only drugs. We decided to analyze further and report only articles with original data, in order to review all the available data regarding DSWs and their usage. We reported data on the three main areas on which the literature focuses: the characteristics of the websites, the quality of pharmaceutical products purchased online, and the number of consumers and their characteristics. Regarding the first group (articles dealing with DSW characteristics) we reported, if available, the number of DSWs analyzed, year of data collection, willingness to dispense pharmaceuticals with or without a prescription, availability of a physician's assistance or online medical consultation, disclosure of contact details, geographic location, delivery conditions, types of medicines available, availability of drug information, prices of online drugs and overall costs, sales-promotion strategies, presence of quality certifications, duration of websites, privacy and disclaimer statements, and date of last website update.

#### Results

We selected 198 relevant articles: 76 articles with original data, 117 articles without original data (editorials, regulation articles or the like) and 5 reviews. Our findings show first of all that a great part of papers available on DSWs are reflection articles, such as commentaries and editorials, which do not include original data. When they do contain original data, the latter are highly fragmented as they aim to answer highly varying search demands, using different methods. The articles with original data concerned samples of DSWs in 47 cases, online drug purchases in 13, consumer characteristics in 15, and case reports on adverse effects of online drugs in 12.



## Conclusions

The evidence shows that DSWs are an important phenomenon which is continuing to spread, despite partial regulation, due to intrinsic difficulties linked to the impalpable and evanescent nature of the web and its global dimension. From a broader point of view, the example of DSWs is emblematic regarding internet and public health: where public health – in terms of regulation and education – does not take control of phenomena, someone else does, with interests often very little to do with people's health. A considerable effort must therefore be made to keep up with technological advances and the resulting social changes, by means of an international approach, in order to exploit the Internet's huge potential, while minimizing the risks it can generate.

## 575

Bart J. Brandenburg, Erik Jansen

### WHAT LIES AROUND THE BEND? EXPLORING NEXT STEPS IN SOCIAL MEDIA AND PRIMARY CARE

Consumer empowerment, patient-physician relationship, and socio-technical issues  
Demo Session 1, 12:53pm-1:08pm, September 17, 2011  
Upper Lobby

In 2009 we, two Dutch physicians assisted by a communication and IT specialist, started a primary care consultation service on Twitter, called @tweetspreekuur. The free service consists of an account where Twitter users can ask health related questions (24/7). Primary care physicians provide answers within 24 hours, sometimes after consultation of a medical specialist in our network. We reported our first year results at the Medicine 2.0 Maastricht conference and were pleased and honored with the Medicine 2.0 Maastricht Award. Our analysis of 132 direct message episodes (1148 tweets, categorized according to the International Classification of Primary Care (ICPC)) showed that the @tweetspreekuur service covers all areas of primary health care as every ICPC category is represented. It is time-efficient and great fun to do. A questionnaire, with recruitment via Twitter, demonstrated good user satisfaction amongst the 122 respondents. Although gradually increasing in number, Twitter consults are still relatively insignificant in quantity. Our account is followed by less than 1% of Twitter users in the Netherlands. It is the significant health problems presented to us and the positive reactions from users and colleagues however, that encourages us to continue. Our two leading concepts, "The Proof of the Pudding is in the Eating" and "Learning by Doing" gave our project a leap start. We realize now that the time has come to contemplate the next steps and address topics such as legal aspects, patient safety and sustainability of the service. We will present our exploration of a few of the next possible steps that primary care "social physicians" can take while delivering health services through social media. For instance, expanding our service to other social media such as Youtube and Facebook (or the Dutch equivalent Hyves), where large health and health care related communities exist. Comparing our social media practice with the legal e-consultation guidelines of the Royal Dutch Medical Association demonstrates how theory and practice differ and also shows that transparency and accountability are an important part of the solution. Once again comparing our results, including a content analysis of our second year, with ongoing research in the field of e-consultation (Nijland et al) and telephone consultation (Derkx et al) as well as with data from the Netherlands Information Network of General Practice (the LINH database) helps to define the place of social media within the spectrum of 21st century health care services. With the aid of a holistic framework for sustainable e-health technologies (Nijland, 2011) we will measure the sustainability of our health innovation. Finally, our 2010 questionnaire taught us a lot about the characteristics of our clientele. Some memorable Twitter consults sparked our curiosity to find out more. We will present a few video vignettes of the remarkable social media pioneers that have entrusted their health problems to us.

## 576

Sivera A.A. Berben, Tom H. Van De Belt, Lucien J.L.P.G. Engelen, Lisette Schoonhoven

### SOCIAL MEDIA IN EUROPEAN HOSPITALS: A DESCRIPTIVE STUDY

Participatory healthcare  
Parallel Session 2, 11:00am-12:30pm, September 17, 2011  
LK130 Hall  
Background

Internet and Social Media are an important part of daily life. Social media (SoMe) like Twitter, LinkedIn and Facebook, improve communication and patient participation in health care. Patients and professionals use SoMe for multiple disease related forms of communication. An American initiative showed that many hospitals in the USA are using SoMe. However, it is unknown whether hospitals in Western Europe use SoMe, and which types of SoMe they are using. The objective of this study is to explore SoMe usage by hospitals in Western Europe.

A descriptive study was performed to explore SoMe usage by hospitals in the following thirteen European countries: Norway, Sweden, Denmark, United Kingdom, Ireland, The Netherlands, Belgium, Luxembourg, Germany, France,

Spain, Switzerland and Austria. We included hospitals with at least 200 beds. Between April 2009 and July 2011, three measurements were performed for each hospital. During these measurements, we visited the hospital website and searched for the use of SoMe with a standardized method and checklist. The usage of the following six types of SoMe were examined: the use of YouTube accounts or other video channels and number of views, Twitter account and number of followers, Facebook account and number of friends, LinkedIn account and the number of connections. Finally, we examined whether the hospitals used weblogs and RSS-feeds. The outcomes of the third measurement are currently being analyzed using descriptive statistics.

Results  
These results are preliminary and based on the initial two measurements. 1998 hospitals were included in the study. The number of hospitals per country that used SoMe ranged from 7 (Luxembourg) to 741 hospitals (Germany). The first measurement showed that: five types of SoMe were used in two countries, i.e., The Netherlands and United Kingdom; three types of SoMe were used in one country, i.e., Germany; two types of SoMe were used in four countries, i.e., Denmark, France, Luxembourg and Sweden; one type of SoMe was used in four countries, i.e. Spain, Norway, Austria and Belgium; no type of SoMe was used in two countries, i.e., Ireland and Switzerland. The second measurement demonstrated an increase in the number of hospitals that used SoMe. Furthermore, the number of different types of SoMe that were respectively used increased as well. Differences within countries and between countries will be presented at the Medicine 2.0 Congress at Stanford. At that time, the results of the third measurement will also be available.

## Conclusions

Our preliminary results showed that Hospitals in Europe use Social Media. We found remarkable differences between countries as well as an increased use of SoMe during the study period. During the Medicine 2.0 Congress, we will launch an interactive website with the results of this study.

## 579

### Ingela Skärsäter, Lilas Ali, Mikael Elf, Barbro Krevors YOUNG ADULT CARERS IN THE RISK ZONE. DESIGN OF A HEALTH-PROMOTING, RANDOMIZED TWO-ARMED CONTROLLED TRIAL FOR YOUNG ADULTS WHO SUPPORT PEOPLE WITH MENTAL ILLNESS

Participatory healthcare  
Poster Session 1, 12:30pm-1:30pm, September 17, 2011

## Lower Lobby

## Background

Currently, most psychiatric care takes place in outpatient settings where family members and close friends often assume great responsibility for the mentally ill. It is important, therefore, to learn how best to support patients and the people who care for them, to learn which forms of social support are of greatest value to those struggling with mental illness, and how individuals can benefit from specific components of support, such as information and education, in their daily lives. Pedagogic processes integrated with person-centred care and treatment may become increasingly important to study. The overall aim of this study is to evaluate the quality and usefulness of information and communication technology (ICT) health efforts aimed at young adults who are close relatives or friends of individuals with mental illness.

## Methods

The participatory design of the program comprises three phases: (I) a survey of the needs of young relatives and close friends for Internet-based information, education, and support, (II) the development of a website, and (III) an intervention based on the previous phases. A randomized two-armed controlled trial of the intervention, with follow-ups at 4 and 8 months, will be conducted in a randomized sample of young adults aged 16-25 years living in community in Sweden. To allow for drop-outs, an estimated total of 400 participants who support a family member or a friend with mental illness would be included in the study.

## Conclusions

We believe that the design of the study, and the randomization procedure, outcome measurements, and study protocol meetings should ensure the quality of the study. Furthermore, as the participatory design is one of the foundations of the intervention of this project, the involvement of young adult informants throughout the study should have the potential to effectively target the heterogeneous needs of the young adult carers.

## 581

Robyn Whittaker, Mark Carroll, Barbara Mittleman, Wendy Nilsen

### ISSUES IN MOBILE HEALTH PANEL

Web and mHealth applications  
Panel Session 3, 11:15am-12:00pm, September 18, 2011  
Plenary Hall

Mobile phones have had the most rapid uptake of any technology to date. mHealth, and specifically the use of mobile phones for health interventions, is a relatively new field receiving a lot of attention. Research has shown some benefit with respect to smoking cessation, medication reminders, and the management of long-term conditions between clinic visits. Robyn Whittaker has been involved in

developing, testing and implementing mobile phone population health interventions in New Zealand. In 2010/11, Dr. Whittaker's Harkness fellowship involved key informant interviews with people across the U.S. health and mobile technology sectors. These interviews covered the potential value of mobile health, barriers to successful implementation, and outstanding issues yet to be resolved. For this panel session, Dr. Whittaker is joined by some of her interviewees to discuss key findings from the project. Panelists include: Deb Levine, MA, Executive Director and founder of ISIS Inc, developer of mobile phone sexual health programs for young people; Lorian Abroms, PhD, as professor of public health communication and social marketing GW University School of Public Health, developer of Text2Quit smoking cessation program; Barbara Mittleman, MD, internal medicine/rheumatologist, Director NIH Public-Private Partnership Program, co-chair of the first mHealth Summit; and William (Bill) Riley, PhD, Program Director Division of Cardiovascular Sciences NHLBI, chair of NIH mHealth Inter-Institute Interest Group, adj professor Department of Prevention and Community Health GW University School of Public Health with interests in eHealth technologies, tobacco dependence, diet/exercise adherence, insomnia treatment, and behavioral assessment.

Panelists will discuss their perspectives on mobile health for health information and behavior change interventions, healthcare service delivery, public health surveillance and data collection, research and public policy. Topics will include some of the key issues facing this field, such as: Where can the real value of mHealth be seen? Extension of current communications methods or transformation to a patient-centered system? What do we know about what works? How to best use theory and evidence to shape mHealth intervention design? What are the main barriers to the implementation of mHealth? What business models might work?

## 582

Tom H. Van De Bel

### WIKIS AS AN OPPORTUNITY TO IMPROVE PATIENT PARTICIPATION IN DEVELOPING INFORMATION LEAFLETS: A DEMONSTRATION PROJECT IN INFERTILITY PATIENTS

Wikis  
Poster Session 1, 12:30pm-1:30pm, September 17, 2011

## Lower Lobby

## Background

In the process of developing patient information the participation of end-users is often rare. Usually, healthcare professionals create the information alone with little to no patient input. This is a missed opportunity, as patients have gained a wealth of experience based on the knowledge of their disease. Clinicians are also seldom trained in estimating patients' information needs and describing them in layman's terms. Thus, we hypothesized that utilizing the experience-base of patients in the development of information leaflets would address this critical shortcoming of the presently available patient information. Our objective is to explore the feasibility of using a wiki as a patient participation tool for generating a patient information leaflet.

## Methods

This observational study will be the first to use wikis in the development of dynamic patient information leaflets. Fertility care was selected as the setting for this pilot because this group of patients is familiar with the Internet, they are well educated, and they are of a demographic age in their twenties or thirties. The target population was all Dutch fertility patients that received or have received intrauterine insemination(s) (IUI). In the Netherlands, IUI is the most common treatment in fertility care with 28,500 cycles each year provided by 100 fertility clinics. Mijnzorgnet B.V., a non-profit healthcare organization that offers online platforms for patients, their relatives, and healthcare professionals provided the wiki used in this study. We developed a questionnaire and asked patients to identify relevant topics for the wiki. Subsequently, Dutch infertile patients and professionals were invited to help add or improve the IUI information. To raise awareness among patients and professionals and to persuade them to make contributions, two strategies were employed (one online and one offline). After eight months, we will evaluate the process. First, by means of interviews and questionnaires, we will address users' expectations and experiences and focus on the barriers and facilitators for participation in the wiki. Second, we will determine the accuracy, clarity and presentation format of the information distilled on the wiki by comparing the information with current fertility guidelines; as well as a usability questionnaire. Third, server data logs will be statistically analyzed.

## Results

Currently, both the wiki and the evaluation are ongoing. The preliminary results are interesting. Over 2000 people have visited the wiki but only six people have modified or added information to the wiki. During the Medicine 2.0 Congress, we will be able to present the final results of our study.

## Conclusions

If this innovative tool appears to be successful, the ripple effect can be both important and beneficial. By using a wiki tool, patients are able to participate in the development of patient information and collaborate with a variety of health professionals (physicians, nurses, laboratory workers). Furthermore, quality improvements with regard to information provision are expected. We also hope that

information leaflets will be dynamic and up to date. Finally, using a wiki in the creation of patient information leaflets may save resources, including money, health professional time, and editorial resources.

## 583 •

**Taridoz Chomutare, Luis Fernandez-Luque, Gunnar Hartvigsen, Eirik Årsand**

### REVIEW OF IPHONE APPLICATIONS FOR DIABETES SELF-MANAGEMENT

Mobile health applications for management  
Parallel Session 14, 3:00pm-4:30pm, September 18, 2011  
**LK120 Hall**  
Background

We are experiencing an increasing growth in interest for mobile health (mHealth) applications for self-management of blood glucose (SMBG). In spring 2009, we found 60 diabetes applications on iTunes for iPhone and as of February 2011 the number has grown over 400% to 260. Despite the growth, there still lacks research on diabetes mHealth applications. For example, the impact that emergent technology such as social media has on further development of use cases is largely unexplored. Our objective is to study the salient characteristics of mobile applications for diabetes on the Norwegian market using a popular mobile platform: Apple's iPhone.

#### Methods

We searched the Norwegian market iTunes Store for diabetes applications using search terms "diabetes" and "glucose". The inclusion criterion was applications that featured a component for blood glucose tracking. We excluded applications for healthcare professionals and non-English applications. Search hits were 260, of which 49 met the selection criteria and were installed on an iPod for further analyses. The inclusion comprised 19 free and 30 paid applications, where the mean and modal price was the equivalent of €2 and €1.40, respectively. We studied the following features: (1) self-monitoring (blood glucose, physical activity, diet, weight, insulin and blood pressure), (2) functional integration of social media, (3) data export and (4) synchronization with Personal Health Records (PHR) or portals.

#### Results

Tools for tracking insulin injections were present in 33 of the 49 selected applications, although most neglected making references to Type 1 or Type 2 diabetes, or insulin pump technologies. Just over half of the applications had some form of diet management; either by tracking carbohydrates intake or making meal suggestions. Weight tracking and physical activity had each 20 and 19 applications, respectively. Only two of the eight applications with an educational module had personalized education or advice, 7 had reminders, while 11 had some form of integration with social media. Four applications had a component for synchronizing with PHRs or web portals. No application had visible effort towards patient privacy and safety beyond disclaimers and warnings about potential risks with using the application.

#### Conclusions

While there seems to be a wide selection of applications available for people with diabetes, this study shows the hype about social media has not yet translated to seamless functional linkage of SMBG tools to the social Web in many applications. Web 2.0 tools can provide peer support and personalized education, both of which are recommended for SMBG, especially for people with Type 2 diabetes not using insulin. ZipHealth is a good example of a functionally integrated application, where specialist functionality like PHR is interfaced with specialist providers such as Microsoft HealthVault or Google Health. Preliminary evidence seems to point to a future with increased use of wireless sensors, usage of PHR in augmenting social engagement with peers and personalizing health education, but this study has shown these concepts are still seldom recognized in iPhone SMBG applications in the Norwegian market.

## 584

**Richard Booth, Kamini Kalia, Robert Fraser**

### A SYSTEMATIC REVIEW OF PUBLISHED ACCOUNTS OF SOCIAL MEDIA USE WITHIN NURSING: WHERE PRACTICE OUTPACES RESEARCH

Physicians, internet use, and social networking  
Parallel Session 16, 3:00pm-4:30pm, September 18, 2011  
**LK005**

#### Background

The last decade has seen tremendous growth in the use of communication technology within healthcare. Along with the rise of various eHealth technologies during the early 2000s, the recent increased prevalence of socially-driven Internet technology (social media) has begun to impact the nursing profession in a number of salient fashions. Nursing education and practice are two areas which have been influenced by the evolving communication modalities that social media technologies can facilitate. Regardless, the nursing profession as a whole has been remarkably slow to recognize and study these new modalities of communication facilitated by the evolution of social media. The objective of this study is to outline the current state of knowledge pertaining to social media usage within the nursing profession, using two different, yet synergistic research approaches: 1) generate a traditional systematic review of Web 2.0/social media examples in the published

academic literature as related to the profession of nursing; 2) capture and analyze a purposeful cross-section of current social media examples within the profession that complement or evolve the available published material. The research questions utilized for this study include: 1) what elements of social media in nursing have been explored in the literature to date? 2) how are nurses using social media functionality for professional practice that have not been studied or addressed in the literature?

#### Methods

Academic publications examining social media used in nursing were collected and analyzed in this study (n=54). Expository works outlining background knowledge and feature-listings were also included due to the relative newness of the topical area. Articles and studies of an interdisciplinary nature were included if the outcomes or perceptions of the nurses could be extracted separately from the results of the other participants. Non-published accounts of social media usage (n=18) were uncovered in three primary fashions: 1) the researchers' experience or background knowledge; 2) crowd-sourcing examples from social networking sites; and 3) the use of real-time social media search engines, like Socialmention.com to monitor Internet traffic for potential examples. All study results and examples were organized thematically into three overarching categories: social, technical, and political. Subthemes, including the specific results of the studies or examples documented, were created to populate the overarching social, technical, and political categories.

#### Results

The integration of published and non-published accounts of social media use in nursing offers a cross-sectional outlook as to how the nursing profession is currently utilizing these technologies. The results of the study also demonstrate that the majority of social media currently used within the profession primarily serves an educational or communicative role between early adopter participants. Consumer engagement was not found as a salient theme in either the published or the non-published accounts.

#### Conclusions

The results of this study provide a unique perspective into the current usage of social media within the profession of nursing. Further evaluation measures must be undertaken in order to ascertain the impact social media technologies can (and are) having on the nursing profession in its ability to deliver care to an increasingly digitally-connected consumer.

## 587

**Sam Nordfeldt, Carina Berterö**

### TO USE OR NOT TO USE - PRACTITIONERS' VIEWS ON THE WEB 2.0 PORTAL FOR YOUNG PERSONS WITH DIABETES

Building virtual communities and social networking applications for patients and consumers  
Poster Session 1, 12:30pm-1:30pm, September 17, 2011

#### Lower Lobby

#### Background

Children and adolescents with diabetes need intensive daily self-treatment, guided by hospital-based pediatric diabetes teams consisting of nurses and nurse specialists, physicians and dietitians, social workers and/or clinical psychologists. These practitioners meet patients and their parents when hospitalized at onset and continue to meet them as outpatients over many years. However, little is known about the attitudes of practitioners towards the use of Web 2.0 resources on the Internet for dialogues with patients. We aimed to explore practitioners' attitudes toward an open Web 2.0 portal tailored to young diabetes type 1 patients and parents, school staff and others. The portal offered a range of targeted services: message boards, blog tools, interactive pedagogic devices, self-care and treatment information by text and video materials, news from local practitioners, diabetes research updates, contact and FAQ services, and more.

#### Methods

Eighteen professionals in pediatric diabetes care teams wrote an essay on their experience from use of the portal. Two main guiding questions were asked, focusing on positive and negative user experiences. Their essays were analyzed using modern techniques of qualitative content analysis. This method to a great extent focuses on the subjects and context, and can be applied to e.g. transcribed interviews, texts and narratives. Two researchers performed the analysis independently. Open comparisons and in-depth discussions were made iteratively. Thus any discrepancies were resolved through discussion; no measure of inter-rater reliability was used.

#### Results

A first theme emerging from the data was named 'To use or not to use'. The frequency of use among the health care professionals vary immensely; from never using it to using it on a daily basis and regularly promoting it. Many stated that they visit the website now and then, just looking around. Individuals reflect on the idea of contributing actively to online dialogues. There were positive statements of the website's existence, design and function. Individuals' perceived problems refers to a range of aspects, such as technical problems, time, computer unfamiliarity, lacking commitment, lacking access and jumbled information. A major theme--Information center for all--embraces safe facts, information and hints useful for several categories of professionals as well as patients and their significant others.

ers.

Complementary to traditional care, practitioners describe various situations mediating information through the portal to patients and when informing significant others. Some demonstrate the website as part of their practice and some do not. They also presume benefits on part of their patients' active use at home; as peers exchange experiences the site becomes alive. For families and children, practitioners believe the portal will help and support them in learning more at home, enabling them to manage situations themselves without having to call their physicians. Knowing it is themselves or other practitioners being behind the information makes it feel safe to recommend it for use.

A second major theme--Developing our practice--includes reflecting upon what information to give and how. Regular meetings including different professions and hospitals offer a constructive process for teamwork; developing information content and policies together. Over time the use of the website is increasing with new information and updates; patients are referring to contents as well. An interest is expressed in adapting more content for patients to learn more about their views by reading online dialogues. Individuals find it advantageous to see what questions patients present and what answers they receive. Assuming they will meet their patients with significant others online, individuals feel like doing more to approach them, entering more functions their patients need.

#### Conclusions

Practitioners embraced positive attitudes towards a tailored open Web 2.0 portal, suggesting possible future benefits from systems integrating factual information and practitioners engaging in online dialogues with patients.

## 588

**Barbro Krevers Krevers, Mikael Elf, Lilas Ali, Ingela Skärsäter**

### IN PURSUIT OF QUALITY AND USEFULNESS REGARDING WEB-BASED SUPPORT FOR YOUNG CARERS OF PERSONS WITH MENTAL ILLNESS

Participatory healthcare  
Poster Session 1, 12:30pm-1:30pm, September 17, 2011

#### Lower Lobby

#### Background

The Internet is still a new field for health care service delivery. Consequently there is a need to examine the quality and usefulness of web-based support for different target groups. This requires development of a framework that adapts theories and methods concerning quality of care, since these are originally developed for a health care based on personal meetings. Several young carers of persons with mental illness shoulder great responsibility. They are vulnerable and at risk of falling ill; for this reason it is important to develop useful support that meets their needs. The present study is a part of a research project that develops and evaluates a web-based support system (WBSS) with concern for young carers' needs. The WBSS is based on a participative design process that involves participants from the target group to accurately define their needs. The WBSS provides information and possibilities to communicate via FAQ, forum and blog with health care professionals and with other young carers in similar situations. The present aim is to evaluate the usefulness of a WBSS intervention for young carers, and to scrutinize usefulness in relation to quality of care.

#### Methods

240 participants 16-25 years of age, caring for a family member or a close friend with mental illness, were randomized into two groups receiving different interventions; Group A got access to the WBSS and Group B got a brochure about available supports for young people in the community. The participants completed structured questionnaires; at baseline, and after 4 and 8 months. Usefulness is measured as the intervention's ability to meet the needs of support, defined by the participants in the design process. The usefulness is evaluated in terms of quality of care and process perspective; including participants' expectations, use and views on the WBSS.

#### Results

In Group A (WBSS) 66% had positive expectations of their intervention; the corresponding proportion was 40% in Group B (brochure). The utilization of the intervention (at least once) after 8 months was 41% in Group A, and 38% in Group B. The majority of the users in Group A found the WBSS to have good structure quality: i.e. the content concerned the target group, as well as good process quality: i.e. easy to navigate and read. Less than half of the users thought that the WBSS related to their own problems and the use of interactive communication in the WBSS was low, with implications for result quality. Comparable results of views on the intervention were obtained in Group B.

#### Conclusions

The WBSS was considered to have good quality in several aspects; presumably due to the participatory design. Although the participants had high expectations of the WBSS the utilization was still rather low. This probably had negative influence on the result quality i.e. to what extent the WBSS could meet the participants' needs. An important insight is that a framework for WBSS quality must also consider the governing factors for interactive usage of WBSS, in the pursuit of high quality and usefulness for participants.



## 589 •

Joseph Kim

### THE IMPACT OF SOCIAL MEDIA IN PHYSICIAN CONTINUING MEDICAL EDUCATION

Web 2.0-based medical education and learning  
Parallel Session 3, 2:30pm-4:00pm, September 17, 2011  
LK120 Hall

We will explore the impact of incorporating social media and social learning into formal certified continuing medical education (CME) activities for US-based physicians. We will examine several examples where social media is used to assess clinical practice gaps and educational needs of physicians. We will review specific CME activities that incorporate the use of social media and social learning and examine several examples of comments and discussions that are relevant to the stated learning objectives of each activity. We will also explore the impact of social media on physician engagement and learning.

## 592 ••

Katy Plant

### CANCER THRIVING AND SURVIVING: AN ONLINE WORKSHOP THAT IMPROVES QUALITY OF LIFE.

Participatory healthcare  
Parallel Session 2, 11:00am-12:30pm, September 17, 2011  
LK130 Hall  
Background

Surviving cancer following initial treatment is ever more common. Cancer survivors, even those with low chances of recurrence, have been shown to be depressed, suffer post traumatic stress, and have poor sleep among many other problems. These issues are seldom addressed in standard cancer treatment. Cancer Thriving and Surviving, a six week peer facilitated, asynchronous workshop was developed to determine the: 1. Acceptability of an online interactive six-week program for cancer survivors 2. Effectiveness of the intervention (improvements in depression sleep anxiety, stress, role function, fatigue and self-rated health) 3. Patterns of health care utilization (visits to oncologists, visits to other physicians, nights in hospital, and emergency department use.

#### Methods

British Survivors with five years of survivorship or less were recruited mostly from the Macmillan Cancer Support Trust website to participate in a six week, peer led, cancer survivor workshop. The workshops combined the strengths of interactive didactic content, structured social networking, and self tailoring. Workshops offered approximately 30 pages of new interactive didactic material each week, as well as four threaded discussion boards where participants could interact. There were also sections for keeping individual records, links to other websites, and an internal post office for messaging individual participants. The workshop was based on self-efficacy theory and self-tailoring. Workshop topics included: stress, pain, sleep, depression fatigue and weight management, problem solving, finding joy, goal setting, action planning, decision making, exercise, healthy eating, dealing with difficult emotions, body changes, effects of treatment, medications, communications and working with the health care team. Data was collected online using standardized validated instruments at baseline and six months later. Data were analyzed utilizing student T-tests.

#### Results

312 survivors left contact information, 145 completed baseline questionnaires, 135 participated in one or more workshop session and 110 completed follow up data. 82.6% of participants logging on at least once for each of the six sessions with a mean log in of 5.5 times per week. Participants visited a mean of over 1300 different web pages. Each workshop generated approximately 1000 bulletin board posts. Significant improvements ( $p < .01$ ) were shown in fatigue, depression, stress, sleep, role function and overall quality of life.

#### Conclusions

The workshop format was acceptable to users and proved to be highly engaging. The workshop was also effective in improving both quality of life and exercise. A larger randomized trial is being conducted. If the findings are replicated, this workshop may have a place in assisting cancer survivors with problems that are not well managed in the current health care system.

## 593

Leonid Kandel, Yoav Mattan, Itzhak Gur, Shimon Firman, Lena Rosenmann

### PAIN IN THE BONE - INTERNET HEALTH INFORMATION AMONG ORTHOPAEDIC PATIENTS

Consumer empowerment, patient-physician relationship, and socio-technical issues

Parallel Session 8, 4:30pm-6:00pm, September 17, 2011  
LK130 Hall  
Background

Medical information on the internet is a powerful tool for patient self-education. It can either enhance patients' knowledge and control over the disease or mislead them. In a recent survey we performed among orthopaedic surgeons, almost half of them felt that only a minority of their patients used the internet for their health problems. We conducted this current study among orthopaedic pa-

tients to learn about their habits of health-related internet use and examine if these depend on demographic and disease-specific variables. We hypothesized that younger patients and patients with chronic diseases will be more internet-friendly. The objective of this study is to examine the internet health information consuming patterns and attitudes among orthopaedic patients.

#### Methods

After Institutional Helsinki committee approval, 600 patients from six different orthopaedic outpatient clinics were prospectively recruited to the study. Patients with disease duration shorter than six months were excluded. Each patient was asked to answer a questionnaire that included, along with some demographic and general information, questions about patient's internet use concerning the current orthopaedic condition. In the questionnaire the patient was asked about: whether the internet was used; what are exact questions the patient wanted to find the answer to (natural history of the disease, optional treatments, complications, recommendation about specific surgeon, alternative medicine recommendations etc); whether he/she was satisfied with information he/she found; the discrepancy between the internet based information and the real treatment options the patient was provided; whether the patient tried to use his/her internet-based knowledge, asking from the doctor for additional explanations, changes in the treatment or surgical approach, additional tests, alternative treatment; if internet self-education influenced the patient-physician relationship, perception of control and compliance with the treatment; and whether the physician referred the patient to the internet ("Internet prescription").

#### Results

Research in Progress.

Conclusions

Research in Progress.

## 595 •

Lena Rosenmann, Roger Sevi, Omer Or, Itzhak Gur, Yoav Mattan, Leonid Kandel

### ORTHOPAEDIC SURGEONS ARE WILLING TO PROVIDE AN "INTERNET PRESCRIPTION" FOR THEIR PATIENTS

Health information on the web: supply and demand  
Parallel Session 5, 2:30pm-4:00pm, September 17, 2011  
LK005  
Background

In the 21st century, internet is a major source of health information for patients and their relatives. Many physicians refer their patients to various sites and some even run their own sites. However, the quality and the integrity of this information are variable and in many cases it has clear economic interests. Sometimes it does not take into account different treatment options, creating a conflict between the physician and the patient. Professional medical organizations try to deliver more reliable and non-biased sites, but these are few among thousands of others. Thus we hypothesized that physicians, and especially surgeons, will mistrust this channel of patient education. This study was conducted to examine the attitude of orthopaedic surgeons toward Internet-educated patients.

#### Methods

This is a cross-sectional survey of nationally representative sample of orthopaedic surgeons. We prepared a questionnaire about surgeons' attitude to their patients' Internet use which contained 12 closed questions, asking about: the percentage of patients who search the internet; referral of patients to different education sites; data quality; influence of internet-educated patient on physician's authority, doctor-patient relationship, patient's control perception and compliance, unnecessary tests and interventions and final health outcome. A questionnaire was administered to orthopaedic surgeons, both board-certified and residents, during an annual National Orthopaedic Association meeting. The questionnaire was offered to all the surgeons attending the meeting and they were aggressively urged to fill it. 201 surgeons filled the questionnaire. Their mean age was 46.41 years. 62 were residents (mean age 35.44 years) and 139 were attending surgeons (mean age 51.49 years). The latter were 12.410 years after the board exams.

#### Results

83% of surgeons referred their patients to different Internet sites, however 27% did it only rarely. 62% of surgeons felt that the quality of information is fair, 27% felt that the quality is good or excellent. Most of surgeons believed that Internet does not jeopardize their authority (71%), doctor-patient relationship (77%), or patient's control perception (91%) and compliance (84%). However, 74% of surgeons were concerned that Internet-educated patients are exposed to unnecessary tests and interventions. When stratified by professional age (residents, young specialists, older specialists), an interesting trend is seen. Younger surgeons (residents and young specialists) rarely refer their patients to the Internet as opposed to older specialists ( $p < 0.5$ ). However, after 20 years experience, this trend stops. A similar trend is seen when asked about the data quality ( $p = 0.08$ ). 90% of surgeons wanted the National Orthopaedic Association to develop a site that can serve as an "internet prescription" for patients' referral. 45% agreed to participate in this project, however only a small minority supplied their connecting details.

#### Conclusions

In our study we found a positive attitude among orthopaedic surgeons towards Internet-educated patients.

However, some overdiagnosis and overtreatment can happen. Younger and older surgeons are less Internet-friendly, probably because of lower professional confidence in the first group and lower Internet literacy in the second. National Orthopaedic Associations can play an important role in preparing good-quality sites to be "Internet prescriptions" within different fields of orthopaedic surgery.

## 602 ••

Chris Paton

### THE HEALTH INNOVATION EXCHANGE (HIVE) - BRINGING TOGETHER GOVERNMENT, CLINICIANS, ACADEMIA AND INDUSTRY TO FOSTER HEALTH INNOVATION IN NEW ZEALAND

Physician-patient interaction online  
Parallel Session 9, 10:30am-12:00pm, September 18, 2011  
LK120 Hall

The Health Innovation Exchange (HIVE - [www.hive.org.nz](http://www.hive.org.nz)) is a social networking platform designed to support and foster innovation in the New Zealand healthcare sector. The HIVE is funded by New Zealand Ministry of Health (MoH) and is operated by the team at the National Institute for Health Innovation (NIHI) at the University of Auckland. Based on the Drupal Open Source platform, the HIVE brings together clinicians, health IT professionals, government officials, academic researchers and the health technology industry.

The key to bringing together the disparate user groups targeted by the HIVE is a careful effort to cater to each group and offer a neutral ground for discussion. The homepage blog, created by the community and curated by Dr. Chris Paton, targets the Health Innovation industry and technical workforce such as IT managers for hospitals and CEOs of Health IT companies. Clinicians are drawn in by the HIVE e-Learning platform used for Post-Graduate clinical courses at the University of Auckland. During their studies, clinicians can use the HIVE to communicate with other students and teachers and hold discussions in private forums specifically set up for their courses.

Senior government officials are brought into the discussions through a series of coordinated consultation efforts. For example, the Chair of the NZ Health IT Board at the NZ Ministry of Health used the HIVE to facilitate discussion about a new "Health IT Plan" for the country. In another example, the Ministry of Research, Science and Technology (MoRST) used the site to promote a range of videos it produced to support a new multi-million dollar grant scheme to foster innovation in the NZ health sector.

As these communities begin to discuss and form networks, they can use the HIVE to track their new connections by "friending" and posting private messages to each other. Fostering innovation in the health sector requires a careful building of trust across a range of different and difficult-to-access groups. The HIVE appears to be successfully achieving its objective of using a social media platform to build trust and to allow new innovation to flourish.

## 605 •

Raymond Wu

### SIMCODE ACLS - ONLINE REAL-TIME ACLS SIMULATION TRAINING AND CERTIFICATION SYSTEM

Digital learning  
Demo Session 1, 12:35pm-12:50pm, September 17, 2011  
Upper Lobby

In the U.S., it is estimated that at least 500,000 patients a year suffer from cardiac arrest requiring resuscitation. Patient outcomes depend greatly on the quality of the resuscitation effort and well-executed resuscitation requires a coordinated team effort led by an effective team leader. Advanced Cardiovascular Life Support (ACLS) is a set of skills used by healthcare professionals to help patients experiencing life-threatening events. With over 4 million physicians, nurses, paramedics and other healthcare professionals in the rapidly growing U.S. healthcare industry, there is much need for effective and efficient ACLS training.

Current training methods do not provide the necessary practice to become competent or comfortable with these skills. In addition, there are no effective yet scalable methods to maintain and track competency between the standard biannual ACLS training classes. Annually in the U.S., an estimated \$100M is spent on training classes while another \$260M is incurred in lost revenues and additional work coverage costs. Current Conditions and Competition Traditional training methods cram large amounts of complex material in 1-2 days without follow up. Studies have shown that they fail to adequately teach and maintain ACLS skills, with retention limited to 3-6 months, far short of the 2-year "recertification" cycle in use today. They also fail to establish consistency among various training centers, teach team dynamics, or track ongoing ACLS competency.

Physical simulation labs improve performance and retention and are therefore gaining in popularity. However they suffer from critical issues including extremely high cost, geographic and time limitation of resources, and varying simulation quality. Similarly, the few currently available computer-based ACLS simulators are deficient in many aspects including low levels of realism, lack of team management training, and low "replay value" (due to limited numbers of scripted scenarios).

The Solution SimCode ACLS™ is a web-based training



system which uses Rich Internet Application technology and the "Software-as-a-Service" model to provide a highly-scalable and cost-effective training solution which addresses the issues that plague other training modalities. This system can also achieve the following critical goals: 1) to provide consistent, real-time, high-fidelity ACLS simulation training anywhere and anytime; 2) to foster development of team management skills; 3) to facilitate centralized storage of simulation performance data; 4) to enable users and supervisors to easily review performance history and track simulation competency; and 5) to facilitate rapid distribution of updates to ACLS protocols and system improvements to ACLS providers.

**Current Stage of Development**  
The SimCode ACLS™ simulator component has been commercialized and used by individuals around the world, as well as several US institutions.

Over the past year, our company has been invited to present it at several conferences including the 11th International Meeting on Simulation in HealthCare, the international 2010 American Society of Anesthesiologists Annual Meeting, and national 33rd Annual Meeting of the Society of General Internal Medicine. The system is under constant evolution based on the advances in resuscitation and digital education research as well as internal and external feedback. In addition, we are currently developing a novel learning component targeted for novices.

## 611

**Cornelia Van Uden-Kraan, René Leemans, Remco De Bree, Pim Cuijpers, Niels Peek, Roderik Kraaijenhagen, Coen Van Kalken, Irma Verdonck-De Leeuw**

### **ONCOCOMPASS: AN E-HEALTH MANAGEMENT PLATFORM TO FACILITATE AND INNOVATE SUPPORTIVE CANCER CARE**

Web 2.0 approaches for clinical practice, clinical research, quality monitoring

Demo Session 4, 12:05pm-12:20pm, September 18, 2011

**Upper Lobby**

Background

In the Netherlands, government policy statements and national guidelines reflect broad scientific and social support for a structured, integrated approach to supportive care in cancer patients. However, care providers often lack the operational and organizational means to deliver care in a cost-effective manner. IT applications can be used as helpful tools and have the potential to improve the efficiency of care. By developing an e-health management platform, supportive cancer care may be facilitated and innovated. Eventually more insight will be obtained into supportive cancer care flow including the need for and use of minimal intervention strategies, self-help programs, and allied health services. Also, more insight will be obtained into possible determinants of supportive cancer care and success of interventions such as socio, demographic, and clinical parameters; co morbidity; and coping strategies.

Our objective is to develop the OncoCompass, a personal e-health portal that supports cancer survivors by finding and obtaining optimal supportive care, adjusted to their personal health status and situation.

**Methods**

The OncoCompass is based on the PreventionCompass: an e-health portal which facilitates direct-to-user delivery of individualized preventive healthcare. We adapted this generic model for cancer survivors based on the Dutch national guidelines "Cancer Rehabilitation" and "Screening for the need for psychosocial care". The basic assumption in developing the OncoCompass is to implement the most recent scientific insights as obtained from literature reviews. Quality of life and lifestyle domains incorporated in the OncoCompass were reviewed by a multidisciplinary oncology team and experts in the field of cancer rehabilitation and supportive care. To ensure adequate uptake of the OncoCompass, end-users and other stakeholders are involved in the development process. Currently, needs assessments are conducted among cancer survivors and care professionals. Parallel, the usability (user performance, satisfaction with content, interface and functionality) of OncoCompass is tested by end-users by means of scenario-based testing with Morae™ software. Following on from this, the OncoCompass will be refined.

**Results**

By means of the OncoCompass patients can independently fill in questionnaires on quality of life (physical, psychological, social, and spiritual) and lifestyle. Data are processed in real-time. Patients can view the results by means of a well-being profile. Supported by an evidence based knowledge and decision support algorithm, advice is given automatically concerning supportive care and lifestyle. Based on the individual well-being profiles, participants can be directed towards guided self-help treatments or professional care providers: intervention mapping. Web 2.0 features will be added to the OncoCompass, such as an intervention review system, by which participants are able to provide feedback on the intervention to which they were directed by the OncoCompass.

**Conclusions**

The OncoCompass has the potential to be used as a helpful tool in careful monitoring quality of life and outcome and to deliver supportive care in a structured, comprehensive, and cost-effective manner. However, the OncoCompass is still in the development stage. To evaluate

the feasibility and cost-effectiveness of the OncoCompass we will conduct several multi-centre studies among cancer survivors.

## 612

**Peter H.M.P. Roelofsma, Jeana H. Frost**

### **COMBINING SOCIAL MEDIA WITH VIRTUAL COACHING TO PREVENT AND OVERCOME LONELINESS AND BREAK SEDENTARY LIFESTYLES IN ELDERLY**

Web 2.0 approaches for clinical practice, clinical research, quality monitoring

Parallel Session 7, 4:30pm-6:00pm, September 17, 2011

**Plenary Hall**

Between one-third and one-half of older Europeans suffer from mild or severe loneliness - the subjective feeling that their social network does not meet their current needs. Loneliness in the elderly is linked to a low quality of life and early morbidity as lonely people exhibit poor health behavior, excessive stress reactivity, and inadequate or inefficient physiological repair and maintenance processes. In the management of chronic disease in elderly patients, it is crucial to prevent and overcome loneliness.

While a variety of face-to-face interventions exist to combat different forms and causes of loneliness, these programs typically rely upon a large staff of healthcare workers to deliver services. The advent of the social web presents new opportunities to design technological solutions to target loneliness in elders. Insights from social psychology, gerontology and communication science can be adapted to create technologies that help people foster and maintain hybrid online/offline relationships to alleviate loneliness.

This project combines virtual coaching with online social networking to prevent and overcome loneliness in Europe's aging populations and increase overall physical activity among the elderly. The goal of the project is to develop an easy to use and expandable IT solution embedded in the home environment that helps people connect with others in their existing social network, meet new people, and remain active throughout the day. End user care organizations will offer the system to their residences. The 3D virtual coaching system is being developed based on user-centered design approach that includes an iterative process of user involvement. The virtual coaches are specifically developed to engage elders for enduring social emotional relationships. The coach visits users throughout their day from when they wake to when they go to sleep and presents messages and other mediated communication from people in the social network: both the personal and the professional care network.

The program offers support on multiple levels by providing an avatar-based coach embedded in the physical environment of the home. The virtual coach teaches the elderly to use the new technology and social networking tools (e.g. Facebook and Skype) that connect with people. It also supports them in information processing about social and care services and activities within the community. The virtual coach provides prompts and nudges to guide the elderly from moment to moment. In order to help elders improve their social network, the virtual coach provides a friendship enrichment program, based on empirical research, that helps elders initiate and maintain meaningful, lasting relationships. In addition, the virtual coach guides the elderly through a behavioral enrichment program based on implicit and intentional motivational theory to motivate them to be more active. Bio- and ambient sensors are connected to the system providing input for real time feedback of the virtual coach to the elderly.

While social networking offers new ways to overcome loneliness, it is also a new and sometimes intimidating way for elders to connect. The platform is therefore designed for usability and acceptance through a co-creation design process developed in related projects. To inform the design of the system, elders participated in the design process. Elders participated in focus groups, interviews, and tests of early versions of the platform in several European centers. Usability and acceptance studies of the system were carried out. The results indicate a high rate of acceptance of the virtual coach. Several pilot tests conducted within the apartments of retired elderly (65+) living independently, both with and without a risk for diabetes type II or cardiovascular disease, yielded promising results. We will present the results of these pilot tests. We conclude that combining virtual coaching with social networking is a promising way to help elders to create and sustain social networks.

The project is designed within a consortium of academic research institutions, end user health care organizations, building cooperations, city councils and SME's. The project is part of a larger project on 'Healthy cities and high service neighborhoods'. The system is tested and deployed within real life settings in The Netherlands, Norway, Finland, Canada and Germany. A first version of the system will be installed in 150 housing units built for elderly people located in Amsterdam and Tampere, Finland and then a second generation platform in housing units in several European Living Labs. The program has been funded by European and national grants. The project builds upon other ambient assisted living and coaching platforms developed by this team to address different health care concerns in the elderly. It is a collaboration between living labs and industry partners across Europe.

## 613

**Lilas Ali**

### **THE IMPACT OF A WEB-BASED INTERVENTION ON YOUNG INFORMAL CARERS OF PEOPLE WITH MENTAL ILLNESS**

Public eHealth, population health technologies, surveillance

Poster Session 2, 12:00pm-1:00pm, September 18, 2011

**Lower Lobby**

Background

Young adults often take responsibility and offer care and support for significant others who suffer from mental illness. This adoption of responsibility has consequences not only for the mentally ill, but also for the carer. As the internet becomes increasingly fundamental to young adults in their daily lives, web-based interventions may be effective in supporting those caring for a person with mental illness. Our objective is to analyze (according to stress, burden, quality of life, and self-efficacy) the impact of a web-based intervention (information, education, and support) for young adults supporting persons with mental illness.

**Methods**

The study design was prospective and randomized. The sample consisted of young informal carers (N = 241; 16-25 y), where n = 120 completed structured questionnaires at baseline and at 8 months and were allocated to web-based support respectively brochure support regarding available support in the society for young adults.

**Results**

The collected data is currently being analyzed. Data will be presented and discussed according to the Perceived Stress Scale, the COPE index negative impact scale, quality of life measured by the EQ5D, and self-efficacy measured by the General Perceived Self-Efficacy Scale.

**Conclusions**

It is very important to measure the stress and burden of young informal carers of persons with mental illness in order to understand their handling of such responsibilities and their abilities to access support.

## 618

**Jeana H. Frost, Bartho Hengst, Mies Van Eenbergen**

### **FORMULATING A DESIGN PROCESS FOR MEDICINE 2.0: THE CASE OF KANKER.NL**

Building virtual communities and social networking applications for patients and consumers

Poster Session 1, 12:30pm-1:30pm, September 17, 2011

**Lower Lobby**

Background

Medicine 2.0 presents opportunities to develop new patient platforms, but existing projects have had mixed success. A key design problem concerns the tension between developing designs to fit user needs versus designs that anticipate needs unknown to users. How do we design Medicine 2.0 applications that are innovative and support novel modes of patient participation, while still addressing user needs? As a team we are drawn to the ideas of User Centered Design (UCD), where developers build to the needs and capacities of users, still we see some limitations. UCD may increase usability and accessibility, but the process has difficulty generating designs beyond the user experiences, especially in social media platforms, where the tool gains increasing value with activity and time and users cannot anticipate final products.

To address this concern, we propose a hybrid design process. Based on expertise, lessons learned from other projects, and available resources, we plan to build a platform that layers patient knowledge and insight on top of the expert-generated clinical information. The result will be a single system to access, discuss, collect, add to, and share information about cancer and quality of life. Within that general concept, we propose a design process that includes our users within each phase. The program, Kanker.nl, is a collaboration between the umbrella organization for 25 cancer patient organizations (NFK), comprehensive cancer centers in the Netherlands that collect outcome data on patients (CCC), and the main Dutch cancer charity (KWF Dutch Cancer Society). This collaboration is unique in that we have access to patient information, outcome data, patients themselves and an interdisciplinary team. The goal for this phase of the project is to design a platform that is innovative and capitalizes on our unique resources and is designed to be useful and accepted by people with cancer, family members and patient organizations. To do so, we aim to develop a design process that integrates UCD into a plan for innovation.

**Method**

To understand our users, test assumptions, ensure usability and engage our future users we are conducting two types of research. In the first, using interviews and surveys, we will assess current media literacy and informational and social support needs. In the second, we test prototypes with end users. The platform begins with a proof of concept and then expands to include more advanced functionality. To evaluate the success of our design process, we will follow up on our design work with survey-based evaluation studies. We will measure the usability of the system, the perceived level of innovation, and level of user acceptance as compared to existing websites for cancer patients in the Netherlands.

**Results**

We are designing for participation in healthcare but recognize that the design process cannot be solely participatory. Therefore, we propose a hybrid design approach.

Our design research is ongoing. Individuals and patient organizations have been receptive and enthusiastic about contributing their own voice to the research. Building a new media platform with multiple partners motivates changes in the culture of a variety of organizations. Early results indicate that involving user organizations not only ensures future user acceptance, it heightens interest and support for the project and comfort with implementing these changes. Organizations are interested in hosting surveys and supplying participants for research exercises. Qualitative and quantitative findings from our evaluation study will be presented.

## 621

Chris Paton, Peter Murray, Margaret Mary Hansen, Francisco Grajales

### USING SOCIAL MEDIA APPLICATIONS IN ACADEMIC RESEARCH

Building virtual communities and social networking applications for health professionals

Panel Session 2, 2:30pm-3:15pm, September 17, 2011

#### Plenary Hall

This international panel discussion aims to explore issues relating to the use of social media in academic research and to hone in on social media applications that may align with research methodologies. While use of social media is growing in health care and academia, there has been, to date, little exploration of or research into its use toward various communities (e.g. providers, patients, educators, learners). This is an appropriate time to discuss the issues and begin the process of developing suitable research agendas that strive to address questions about issues such as validity and data quality of virtual social interactions and respective platforms.

The panel members will present introductions to four topic areas, which will then be opened up for discussion with attendees. We recognize that there are many other potential issues to explore, and the discussion will also offer opportunities to touch on these.

Conducting Evaluations of Social Media Applications and Implementations in Healthcare

The process of including social interactions in software applications generates some interesting and difficult research conundrums for academic evaluations. The success or failure of these projects has less to do with the technical suitability of an implementation and much more to do with network effects and how users interact with each other.

We now need new tools and procedures for conducting evaluations of social media implementations and need to recognize the increased uncertainty involved in conducting evaluations in the social realm.

Data-mining Social Media Healthcare Applications for Academic Research

Very large quantities of data are being generated by social media applications. Online patient communities are generating data, not just about individual patients, but also about the social connections between the users in the community. We will discuss some of the academic research issues resulting from this exponential increase in data including issues of data-storage and anonymization and how to use natural language processing to make sense of the content stream.

Using Social Media to Enable Academic Research: Collaboration Tools for Researchers and Leveraging Social Tools for Data Collection

Research groups spanning multiple countries and time-zones often conduct academic research. Social media tools enable academics to connect and collaborate in both synchronous and asynchronous communications. Using these tools, research collaborations can form Virtual Organizations (VOs). Where next for social media and academic research? Which tools have the panel members excited? For the final section of the panel discussion each member will hypothesize on where the trends are leading us and open a discussion with congress attendees about the use of social tools for research purposes.

## 622

Arun Keeppanasseril

### MEDICINE AND WEB 3.0 - A WISH LIST

Health information on the web: supply and demand  
Parallel Session 5, 2:30pm-4:00pm, September 17, 2011  
LK005

Medicine has been notoriously slow in incorporating information and communication technology. For a long time, the profession gleefully stood by the wayside, unmindful of the IT enabled re-engineering of the service sector. Landmark reports about patient safety and the relentless focus on healthcare costs didn't leave much choice for medicine but to undertake a whole new look at the way it operates. As a result, medicine has slowly but surely braced itself for embracing ICT as an operating framework rather than as a provider of solitary solution to it's many and diverse challenges. Today, the profession has come a long way from the slow starter to a potential power user of ICT solutions. As much as it is a part of modern man's daily life the World Wide Web is poised to be the medium of healthcare transaction in the near future. If Web 1.0 was more mindful of the traditions of medicine (author-

ity based, subjective, centered around clinical knowledge, expertise and intuition), Web 2.0 facilitated some of the most daring changes in the history of the profession viz, the EBM movement and patient centric care. The interactive nature of Web 2.0 has nevertheless seen it helping the onset of enormous data and information deluge - both for the physician and the patient alike.

Whereas the physician has to cope up with the blinding pace of knowledge generation (both peer reviewed and otherwise); the patients feel empowered with the easy information access but are enamored by the the challenge of ascertaining the veracity of web based information. Patient support groups, social media, online advocacy and personal health records are the milestones of this era. It also brought privacy in to limelight like never before. The development of the graphical web from its early days in 1995 to the social web of late 2007 has been compared to the developing brain- Web 1.0 and 2.0 as embryonic, formative technologies while Web 3.0 promises to be a more mature web where better 'pathways' for information retrieval will be created, and a greater capacity for cognitive processing of information will be built. The immense amount of information, the complex social dynamics, and the increasingly sophisticated health care expectations and goals cry out for a mechanism to initiate contextual knowledge processing and retrieval.

The impending emergence of semantic web promises to unleash the potential gains from all the accumulated knowledge in a far more effective manner than at present. It is imperative for the medical profession and the technology developers to engage each other in a synergistic relationship in order to maximize the potential benefits of semantic web. This presentation is designed as a friendly wish list for Web 3.0 features and applications from the medical profession to their ICT counterparts. From knowledge enabled medicine to patient safety, operational management to stake holder involvement, the list encompasses a large number of potential applications which can strike the 'sweet spot' of wholesome qualitative healthcare improvement.

## 623

Iiris Riippa, Patrick Francke, Johan Groop, Karita Reijonsaari

### MEASURING THE EFFECTS OF EHEALTH APPLICATIONS ON EFFICIENCY: A SYSTEMATIC LITERATURE REVIEW

Social networks

Parallel Session 10, 10:30am-12:00pm, September 18, 2011

LK130 Hall

#### Background

Efficiency measures if current resources are used to their full potential; to maximize the value for money. eHealth applications have been claimed to improve efficiency in health care. Nevertheless, eHealth investments need to be justified through rigorous efficiency studies. The efficiency of eHealth applications has been measured using a wide array of approaches and parameters, such as the quality of care, patient satisfaction, clinician satisfaction, the number of outpatient visits, the longevity of care episodes, and the cost of care. The existing literature on the efficiency of eHealth applications appears to be rather fragmented. We believe that future research could benefit from a structured review of the current literature. The objective of this research is to analyze how the efficiency of eHealth applications has been measured in the existent literature. The scope of this inquiry is limited to web-based applications.

#### Methods

Nephrology On-Demand (<http://blog.ecu.edu/sites/nephrologyondemand>) is a comprehensive educational website that provides information in many multimedia formats. We measured the usage and appeal of the blog format, known as Nephrology On-Demand Blogs ([http://blog.ecu.edu/sites/nephrologyondemand/?page\\_id=6238](http://blog.ecu.edu/sites/nephrologyondemand/?page_id=6238)). Commentary was allowed through the "Comments" section in each blog for registered users. Eight blogs from national/international (6) and local (2) scientific meetings were published online, detailing the key learning points of selected seminars within a specific meeting. We used Google Analytics to measure usage data for each blog during the first 90 days after their publication. Access to any of blogs could be achieved by completing a short, Qualtrics-hosted survey.

Results  
A total of 746 visitors and 1248 pageviews were recorded. The average number of visitors & pageviews to blogs of local meetings were 16 and 27, respectively. These numbers increased to 112 and 181, respectively, for the national/international meeting blogs. International readers contributed between 30-45% of visits to the blogs of local meetings. Of the 165 surveys started, 96% were completed (Figure 2). Eight out of 10 non-first-time readers viewed the blogs as accurate (mean 1.54, SD 0.81), current (1.6, 0.86), objective (1.64, 0.88) and useful (1.6, 0.86). This finding was similarly observed at all training levels.

#### Conclusions

Our descriptive investigation has 3 key points. First, local meetings generally attract local healthcare providers, but blogs of such meetings can attract a global online audience. Albeit generating a small number of visits, blogs allow locally presented scientific meetings to showcase their material worldwide. To date, there are no additional nephrology blogs that show such data. Second, requiring

the completion of a survey prior to accessing the blogs resulted in a large proportion of users completing the survey. Although removal of the required survey would have likely resulted in greater blog access, satisfaction data would have been harder to collect. Third, knowledge that blogs are viewed in a positive manner may motivate medical professionals to continue their blogging efforts. Further data collection is underway to determine if increasing the number of local meeting blogs can improve number of visits and pageviews, on-par with national/international meeting blogs.

## 625

Francisco Lupiáñez-Villanueva, Wainer Lusoli, Margherita Bacigalupo, Ioannis Maghiros, Norberto Andrade, Cristiano Codagnone

### HEALTH-RELATED INFORMATION AS PERSONAL DATA IN EUROPE: RESULTS FROM A REPRESENTATIVE SURVEY IN EU27

Ethical and legal issues, confidentiality and privacy  
Parallel Session 15, 3:00pm-4:30pm, September 18, 2011  
LK130 Hall

Emerging technological and societal developments have brought new challenges for the protection of personal data and individuals' rights. The widespread adoption of social networking, participation, apomediation, openness, and collaboration stretches the concepts of confidentiality, privacy, ethics and legality; it also emphasizes the importance of electronic identity and data protection in the health field. Governments across the Atlantic have adopted legal instruments to defend personal data and individuals' rights, such as the Health Information Portability and Accountability Act (1996) in USA, the Recommendation No. R(97)5 on the Protection of Medical Data issued by the Council of Europe (1997) in addition to specific legislation adopted by each EU Member State as part of the Data protection Directive 48/95 transposition process. These reflect policy makers' concerns about the need to safeguard medical and health-related information.

On the other hand, bottom up developments such as the widespread usage of "PatientLikeMe" and the availability of industry based platforms for user-owned electronic medical records (i.e. Google Health or Microsoft Health Vault) are often pointed at, arguing that users do not really care about data protection as long as sharing such data produces more value than it destroys. There is, however, a clear evidence gap as to the attitudes of Europeans with respect to this issue. The purpose of this paper is to identify and characterize individuals' perception, behaviors and attitudes towards health-related information and health institutions regarding electronic identity and data protection. The research is based on Eurobarometer 359 "The State of Electronic Identity and Data Protection in Europe", a representative sample of people in EU27 conducted in December 2010.

The survey was conducted in each 27 EU Member States via a national random-stratified samples of ~ 1,000 interviews; overall, 26,574 Europeans aged 15 and over were interviewed face-to-face in their homes. The questionnaire asked questions about data disclosure in different context, including health. Specifically, it included questions related to health and personal information, disclosure in Social Networking Sites and on eCommerce sites, trust in health institutions, approval required for disclosure and sensitivity of DNA data. Specifically, we will provide an encompassing portrait of people's perceptions, behaviors and attitudes across EU27, we will examine the influence of socio-demographic traits and Internet use on such attitudes and behaviors. We will explore significant differences across major regional block. Finally, we will present results from factor analysis that aimed to identify commonalities between variables, and from cluster analysis, use to create typologies of individuals concerning health-related behaviors. Empirical analysis allows to broaden and deepen understanding of the consequences of data protection in Medicine 2.0.

Our data also call for further, joint research on this issue, which links demand and supply of medical and health-related data. Indeed, not all people need or want the same level of detail: researchers and physicians clearly need to access more while end users or insurance companies can live with less information. This is one of the crucial points regarding the revision of the Data Protection Directive in Europe (Directive 95/46).

## 626

Martina Moick, Ralf Terlutter, Susanna Meyer, Norbert Schell

### PHYSICIANS' REASONS FOR PROFESSIONAL INTERNET USE AND THE IMPACT ON ATTITUDES TOWARDS INTERNET-INFORMED PATIENTS AND PRESCRIBING BEHAVIOR

Physicians, internet use, and social networking  
Parallel Session 16, 3:00pm-4:30pm, September 18, 2011  
LK005

#### Background

Today's physicians are becoming increasingly confronted with Internet-informed patients and are being forced to reconsider their behavior towards their patients. However, the Internet not only influences health knowledge and behavior of patients but also the actions of physicians. Our objective is to segment different types of physicians



based on their reasons for using the Internet for professional activities and to analyze how the segments differ in their attitude towards the Internet-informed patient and their prescribing behavior.

#### Methods

In December 2010 and January 2011 a survey of German physicians was conducted. The survey contained a set of questions about use of the Internet, attitude towards Internet-informed patients and prescribing behavior. The sample was drawn from a physicians e-panel maintained by GfK HealthCare, a survey research company in Nuremberg, Germany. 287 physicians from three medical fields participated in the survey. To assess the reasons why physicians use the Internet for their professional activities, respondents were given a list of statements. They were asked to rate their level of agreement on a 7-point scale (1, strongly disagree; 7, strongly agree). By using principal components factor analysis with varimax rotation, three different primary reasons for using the Internet were found: (1) being on the cutting-edge and self-expression (Cronbach's  $\alpha = 0.882$ ), (2) efficiency and effectiveness ( $\alpha = 0.787$ ), (3) diversity and convenience ( $\alpha = 0.710$ ). The three factors accounted for 71.365% of variance. Moreover, to identify particular types of Internet users amongst the physicians, a Two-Step-Cluster analysis was used and four types of Internet users were revealed. The different types of Internet users were described based on demographic data, e.g. practice type, age as well as duration of private and professional use of the Internet.

#### Results

Based on physicians' reasons for using the Internet, four types of Internet users were clustered: (1) The Self-expressional Socializer, (2) The Information Seeker, (3) The Internet Denier and (4) The Driven Self-expressionist. While differences in medical field ( $\chi^2 = 16.729$ ,  $p = 0.010$ ), duration of private Internet use ( $F = 4.173$ ,  $p = 0.007$ ) and duration of professional Internet use ( $F = 3.351$ ,  $p = 0.020$ ) are statistically significant, age shows no significant differences ( $\chi^2 = 1.693$ ,  $p = 0.946$ ). Physicians' reasons for using the Internet have an impact on their attitude towards Internet-informed patients, concerning their (1) attitude towards informed patients in general ( $F = 9.215$ ,  $p = 0.000$ ), (2) the perceived improvement of the physician-patient relationship ( $F = 5.386$ ,  $p = 0.001$ ), (3) the perceived accuracy of information that the Internet-informed patient brings into the doctor's practice ( $F = 3.658$ ,  $p = 0.013$ ) as well as (4) the perceived amount of time that has to be devoted to an Internet-informed patient ( $F = 3.356$ ,  $p = 0.019$ ). Concerning the use of the Internet and the impact on prescribing behavior, no significant differences were found. None of the user types would tend to prescribe a desired medication because the patient is informed ( $F = 1.910$ ,  $p = 0.128$ ).

#### Conclusions

Results indicate that four separate user types can be identified that differ significantly with regard to their attitude towards Internet-informed patients. No significant differences were found regarding prescribing behavior.

## 627

### Edward G. Feil, Peter Sprenglemeyer, Betsy Davis FIDELITY AND MONITORING OF MULTIDIMENSIONAL TREATMENT FOSTER CARE USING A MULTI-MEDIA INTERNET-BASED SYSTEM

Building virtual communities and social networking applications for patients and consumers

Parallel Session 4, 2:30pm-4:00pm, September 17, 2011

LK130 Hall

#### Background

While there have been numerous validated interventions developed to address a variety behavioral and mental health concerns, it has been difficult to move these treatment approaches into the community while retaining the effectiveness found in the clinical trials. Multidimensional Treatment Foster Care (MTFC) is a well-researched psycho-social intervention in which multiple treatment agents work in a coordinated manner to address behavioral issues and provide young people with in vivo behavioral interventions. There have been several randomized controlled trials that have demonstrated the effectiveness of this intervention approach, and program developers have created a clear set of criteria by which implementing agencies can demonstrate that they are meeting fidelity criteria. These criteria have been formalized as a certification process. A central difficulty for community agencies is the concern that despite their efforts and expense in trying to run this complex intervention, they may not be certified and it is difficult to track progress toward this goal during development. This presentation describes an Internet-based Treatment Fidelity Monitoring System created to assist MTFC consultants and implementing agencies to improve clinical outcomes by moving more efficiently towards and maintaining fidelity of program implementation.

#### Methods

The research will involve a randomized control trial nested design, wherein foster adolescents (as secondary subjects, with foster-parent report on their behavior) and their foster family will be nested within community agency and agency nested within TFC consultant. Community agencies will be randomly assigned to one of two conditions: Internet-based Fidelity implementation vs. usual care MTFC implementation.

#### Results

Preliminary tests of this fidelity monitoring system have demonstrated feasibility for community agency, foster parent, and program consultant use with favorable initial data regarding ease of use and follow through by participants. Current research efforts will be reviewed regarding this fidelity management system and a randomized controlled trial of the effectiveness of the system. Within our effectiveness examination, we will focus on outcomes related to increasing MTFC agency and program consultant efficiency in moving towards criteria for implementation fidelity. This presentation will include qualitative data from beta-testing agencies, quantitative data regarding system usage, and information about the iterative process of program development with key stakeholders, program developers, and website developers. The system will be demonstrated along with key features that assist MTFC implementing agencies to move toward program certification with full information.

#### Conclusions

A critical contributor to unsuccessful dissemination efforts is the prohibitive need for intensive monitoring by intervention developers/consultants; a difficulty exacerbated as the distance increases between these individuals and community agencies attempting to achieve and maintain implementation fidelity. The current project proposes one possible solution to this problem by developing an Internet-based fidelity feedback mechanism for program consultants, clinical supervisors and interventionists as part of an empirically-validated program's data collection and reporting functions; mechanisms that would link local clinical programs and nationally-based dissemination teams through direct, immediate, high quality data and make it more likely that local service organizations can implement services at the highest possible level of fidelity and achieve stronger community-based intervention outcomes.

## 631

### Rachel Fournier, Catherine L. Lavoie, Trevor Van Mierlo, Peter Selby

### MONTRÉ À LA CIGARETTE C'EST QUI LE BOSS! USING HIGHLY TAILORED TEXT MESSAGES TO HELP YOUNG ADULTS QUIT SMOKING

Mobile health and digital learning for adherence

Parallel Session 11, 1:00pm-2:30pm, September 18, 2011

Plenary Hall

#### Background

Smoking rates among young Canadian adults remain high at 27%, compared to 18% of the general population. Young adults tend to underutilize traditional, evidence-based services such as telephone quit lines and cessation medications, rendering the age group especially difficult to reach. In the literature, emerging evidence indicates that SMS-based Mobile Health (mHealth) services are a potentially effective means for the delivery of health interventions for smoking cessation. However, research to date has primarily been among English-speaking populations. This pilot study is testing the interest of French-speaking young adult smokers in Quebec in an adapted mHealth quit support intervention, and the effectiveness of such an intervention.

#### Methods

The Quebec Division of the Canadian Cancer Society (CCS) developed a pilot program targeting francophone smokers aged 18 to 24. The mHealth service was an adaptation of Evolution Health's general population, English-language mHealth smoking cessation platform. At project onset, CCS conducted a series of qualitative studies including focus group testing and individual interviews. Results were utilized in the cultural and age-specific adaptation of the existing mHealth smoking cessation platform and its delivery algorithms and protocols. Following this adaptation, a promotional campaign targeting young adults was implemented to recruit participants. To qualify for the study, participants completed a brief and anonymous online registration. Once qualified, participants received text messages based on intended quit date. In addition, participants were encouraged to text keywords to the mHealth service, whereupon they received immediate support messages designed to assist with relapse prevention. Results

At the time of submission, this pilot study is still in progress. 183 young adults were recruited for the pilot test. Quantitative measures including overall participation, demographics, drop-out rates, and 3-month quit rate are being evaluated. Usability data, including the use of keywords, is being collected electronically. Quit rate data is based on self-report Internet surveys. In addition, qualitative measures such as satisfaction, ease of use and feasibility are being investigated. This study will also report results and insights from focus group testing and individual interviews. Technical and methodological limitations will also be discussed.

#### Conclusions

Initial focus group testing among young adult smokers indicated that text messaging is a welcome, feasible and cost-effective means of encouraging young adult smokers to quit. Based on focus group and individual interview results, the original English-language, general population SMS platform was significantly modified. Existing behavior-change mHealth interventions have great potential to be adapted to suit the needs of various demographics. How-

ever, efforts at adaptation require significant expertise as well as in investment in behavioral and technical tailoring. Further research is required in order to assess the potential impact of culturally tailored SMS programs for smoking cessation.

## 632

### Peter Schulz, Keyvan Sagheb, Andreas Bemsch, Vinay Kumar, Harald Affeldt, Kathy Taylor, Christian Walter

### INTERACTIVE LEARNING OBJECTIVE CATALOGUE OF THE UNIVERSITY MEDICAL CENTER MAINZ (ILKUM) - IMPROVING LEARNING IN DENTAL AND MEDICAL EDUCATION

Web 2.0-based medical education and learning

Parallel Session 1, 11:00am-12:30pm, September 17, 2011

LK120 Hall

#### Background

E-learning has been recognized during recent years as an essential tool to improve dental education; however, the best approach to implementing computer-assisted learning, as well as avoiding information overload are topics of ongoing discussion. Since 2009, the Department of Oral and Maxillofacial Surgery has been developing an interactive e-learning tool called ILKUM to improve the coordination between education content and student learning requirements.

#### Methods

ILKUM is an interactive e-learning database focusing on the medical and dental curriculum (DC, Lernzielkatalog) and is based on the concept of the ADEE (Association of Dental Education in Europe) and Miller levels. In addition to the classical interactive construction, the system has been modularly implemented to improve reconciliation between DC and the medical performance requirements. The database rests on the technical concept developed for the MySQL Workbench. It runs on a high-performance Unix-based server with a Debian operating system in a Java-runtime environment. These requirements reflect preconditions required to give all users high-speed, authenticated (password) access to the DC-database. To communicate with other university databases, ILKUM is equipped with a Representational State Transfer Interface (REST). Based on this interface, ILKUM communicates via extensible markup language (XML) with the university authentication, mail, video streaming, and calendar servers. Also a web application for the Apple iOS and Google Android operating systems communicates over the REST interface with ILKUM. As an additional feature, ILKUM is able to send real time strings from its system architecture to NCBI Pubmed to obtain the latest scientific literature. Results

The content modules of the e-learning-database are interactive and directly linked to the appropriate lecture files and e-learning units (clinical cases, short video sequences, scientific articles). This guarantees a quick, topic-oriented method to query the learning content without time and local limitations, as well as direct individual determination of the required knowledge conditions. Since 2009, ILKUM has developed to be the core system for e-learning at the University Medical Center. As of 2011, all dental clinics and 32 medical clinics are using ILKUM for their e-learning activities. There is broad acceptance by the dental and medical students for using ILKUM as the e-learning main portal for their learning and communication requirements. Conclusions

The broad acceptance and demand on the part of the students show the development potential of this e-learning project. Next steps include structural modifications and enhancements of the database in close co-operation with the students, as well as enlargement of the self-testing capabilities. The newly designed e-learning software is believed to have positively contributed to students' and academic teachers' desire to improve and utilize a promising teaching tool. Moreover, it offers a new state of the art "level based" modular learning style.

## 633

### Daniel Todkill, John Powell PARTICIPANTS' EXPERIENCES OF AN ONLINE INTERVENTION AND RANDOMIZED CONTROL TRIAL

Web 2.0 approaches for clinical practice, clinical research, quality monitoring

Parallel Session 7, 4:30pm-6:00pm, September 17, 2011

Plenary Hall

#### Background

The Internet has become host to a growing variety of interventions from tools to treat depression or increase physical activity, to helping the user stop smoking. Whilst there is an expanding body of literature evaluating the effectiveness of these interventions, fewer studies have examined participants' motivations and experiences of engaging with an intervention that is delivered solely online. This can inform how we may tailor interventions to increase uptake, compliance and maximize the effects.

The study aimed to explore participants' attitudes toward partaking in a large Internet based, randomized control trial and their experiences of using an online intervention through qualitative methodology.

#### Methods

The PSYWELL trial is a large randomized control trial ( $n = 3070$ ), evaluating a self directed, online training tool (MoodGYM) which uses a cognitive behavioral therapy



approach. In this trial we evaluated the use of MoodGYM as a tool to promote mental wellbeing in the general population. We recruited members of the general public living in the United Kingdom through the National Health Service (NHS) website 'NHS Choices'. On entry to the trial, participants in the intervention arm were invited to take part in a telephone interview. Eighty participants allocated to the intervention arm consented to being contacted for an interview. The participants were stratified for age and gender bands and we contacted accordingly by band. This was not a representative sample, but a purposive one designed to intentionally sample a broad range of opinion from different genders and ages. Fourteen males had indicated willingness to participate and all were contacted. The stratification was conducted blinded to participants' performance and compliance in the PSYWELL trial, with knowledge of only gender and for year age grouping prior to invitation and interview. Of those contacted (n=60), 20 were able to provide consent and time for interview (18 female, 2 male) and were invited to the interview. Twenty participants undertook a 45 minute semi-structured interview. All interviews took place after participants' involvement in the PSYWELL trial had ended. The transcripts were analyzed using the Framework Approach to identify themes characterizing the experience of participation in an internet trial and intervention.

#### Results

Four core themes emerged from the interviews. First: convenience, participants reported the availability of the online resource 24 hours a day, and without having to either commute to or attend appointments to be a major benefit. Second: brand reassurance, participants entered personal, intimate details onto the web, the important factor in encouraging them to do this was the 'branding' of the tool and trial by both the University of Warwick and the NHS, which were seen as trusted institutions. Third: positive outcome, the majority of feedback favored the intervention, with dramatic individual examples of how an online intervention impacted upon people's lives. Fourth: the language used in the tool was important and frequently not seen as relevant to the individual within the older age group believing the tool was aimed at a younger generation, and generally participants perceiving the intervention's language (Australian) to be 'Americanized'.

#### Conclusions

The qualitative study demonstrated the potential for an online Internet intervention to dramatically affect individual's lives. It had the advantage over other intervention delivery methods in being readily accessible 24 hours a day with few barriers to access. Engagement with the tool was largely dependent on it being provided by a source that was perceived to be trusted. To increase satisfaction, the importance of adapting or designing the style of language used by interventions to fit the individual user or user group should be considered as an implication for future research.

### 635

Frank Chen, Eric Hekler, Abby King

#### ANALYZING FRAMES OF REFERENCE FOR THE DESIGN OF PHYSICALLY ACTIVE GAMES

Human-computer interface (HCI design)

Poster Session 1, 12:30pm-1:30pm, September 17, 2011

Lower Lobby

Background

Scientists such as Langer and colleagues demonstrated how reframing the perception of everyday physical activities by hotel maids as exercise has healthful benefits (e.g., improved body fat, blood pressure, BMI, etc) without reported behavior change. The mechanisms for this benefit are not well understood. A likely explanation is that reframing a behavior as exercise promotes increased subconscious exertion in the behavior, thus resulting in improved health benefits. There has been much interest in the use of games to promote health. For example, the Wii Fit and Xbox Kinect both require physical activity from participants to play the games. Dance Central for Kinect promotes physical activity in a context of completing dance moves based on on-screen instructions. This game is designed as a game but within the game, there is the "work-out" mode. When workout mode is turned on, a calorie counter and total amount of time exercising is added to the game, thus giving the frame that the actions being engaged in are "exercise." This manipulation allows for a relatively clean experimental manipulation for testing the mechanisms outlined above. A potentially interesting side-effect of framing the activity as "exercise," however, might be reduced motivation for sustained engagement in the dance game if it is perceived as "exercise" as opposed to play. The proposed study will test a) if framing a dance program as "exercise" promotes increased energy expenditure relative to a dance program being framed as a game and b) if framing a dance program as a game promotes longer engagement in the program relative to an exercise frame.

#### Methods

Participants will be asked to complete a baseline questionnaire asking them about potential factors that may impact engagement in physical activity (e.g., current exercise and gaming habits). All participants will be asked to use the Dance Central game. We will then randomize participants into two conditions: 1. Tell participants they are "playing a dance game meant to be fun and engaging." We will place the game in Perform Mode, which gives feedback

on performance and score based on performance. 2. Tell participants they are "using a dance program focused on dancing for exercise". We will place the game in Workout Mode, which gives feedback on performance, score, workout time and number of calories burned. We will observe the amount of energy expenditure and time spent in the game; after each session, we will ask participants to rate perceived energy expenditure and enjoyment. The amount of time spent in the game will serve as an additional measure reflecting motivation for this activity frame. We will instrument participants with a Zephyr Bio-Harness to objectively monitor exertion level.

#### Results

**Research in Progress.** Results from this study should help elucidate the best mechanisms for harnessing design and framing messages to promote physical activity in games.

#### Conclusions

Understanding the link between the framing of an action and its impact on exertion and behavioral engagement has important implications for promoting physical activity. Based on this link, we plan to explore the power of social media to engage competition, cooperation, and reward in motivating physical activity gaming. Still, social media may have unintended negative consequences on motivation due to the person's social network.

### 636

John W. Sharp

#### RESEARCH DATA: WE HAVE AN APP FOR THAT

Collaborative biomedical research, academic/ scholarly communication, publishing and peer review

Poster Session 2, 12:00pm-1:00pm, September 18, 2011

Lower Lobby

To promote clinical research, a variety of tools must be available to allow for the flexibility required by different approaches to research and data collection. The availability of open source tools and rapid development platforms has been a boon to clinical research. Small studies require basic web forms and secure databases to store data quickly and allow exporting of the data for analysis. The increasing use of data from the electronic health record (EHR) requires large storage capabilities, the use of relational or NOSQL databases, strong query capabilities and visualization tools. Again, open source, rich media and light weight web services enable the management of these data sources. Open source tools are by design the creation of an interactive community of programmers and users. Traditional clinical trials, especially those regulated by the FDA, have required expensive, proprietary solutions. Now, open source software can provide more flexibility although extensive validation procedures are still mandated by regulations. Social networks for research teams provide daily interaction on protocol changes and recruitment issues. Genomic data also requires massive storage capability. Genomic scientists have developed a broad range of open source tools developed in small online communities plus statistical packages like R for analysis. Social networking in the broader research community enables linkages between researchers with similar interests leading to collaborative grants and projects. Several open source tools are now available to enable scientific communities. Research efforts can now be supported by a variety of available tools which are lightweight and flexible. Most are now open source which are easy to support and maintain; open source tools are developed and enhanced through communities. Clinical research can benefit by these rapid development platforms appropriate for each type of study.

### 637

Emily Seto, Kevin J Leonard, Joseph A Cafazzo\*, Caterina Masino, Jan Barnsley, Heather J Ross

#### MOBILE PHONE-BASED REMOTE PATIENT MONITORING FOR HEART FAILURE MANAGEMENT: A RANDOMIZED CONTROLLED TRIAL

Mobile health applications for management

Parallel Session 14, 3:00pm-4:30pm, September 18, 2011

LK120 Hall

Background

Remote patient monitoring of heart failure patients has been shown to be able to improve health outcomes. Mobile phones are becoming increasingly ubiquitous and economical, but the feasibility and efficacy of an mHealth remote monitoring system is still unknown. The objective of this randomized controlled trial was to determine the effects of a user-centric mobile phone-based remote monitoring system on heart failure outcomes, self-care, and clinical management.

#### Methods

One hundred heart failure patients were recruited from a large multidisciplinary Heart Function Clinic and randomized into the remote monitoring group (RM) and the control group (SC) who received standard care. The RM group (N=50) took daily weight and blood pressure readings, weekly single-lead ECGs, and answered daily symptom questions on a mobile phone for 6 months. Readings were automatically transmitted wirelessly to the mobile phone and then to data servers. Instructions were sent to the patient's mobile phone and alerts were sent to a cardiologist's mobile phone as required. During recruitment, all participants were asked to complete a baseline

questionnaire (94 returned) and were interviewed. Post-study questionnaires were provided to all participants (84 returned), and 22 patients in the RM group and 5 clinicians were interviewed post-study.

#### Results

Approximately 70% of RM patients completed at least 80% of their daily readings over the 6 months. Quality of life measured with the Minnesota Living with Heart Failure Questionnaire improved only for the RM group (decrease of 9 points, p=.02). Heart function (left ventricular ejection fraction (LVEF)), heart failure prognosis (Brain Natriuretic Peptide (BNP) blood tests), and self-care (Self-Care of Heart Failure Index) improved for both the RM and SC groups. Being enrolled into the clinic was a confounder to the improvements from the monitoring system. Patients who were new to the clinic (enrolled less than 6 months) showed greater improvements when compared with the more stable patients who were enrolled into the clinic over 6 months (BNP p=.003; LVEF p=.02). A subgroup analysis, removing the 37 new patients from the total of 100 patients, found that only the RM group had significant improvements in BNP (decreased by 150 pg/mL, p=.02), LVEF (increased by 7.4%, p=.005), and self-care maintenance (increased by 7 points, p=.05) and management (increased by 10 points, p=.03). No differences were found between the RM and SC groups in terms of mortality, re-hospitalization rates, or emergency department visits. The small sample size was a limitation of this study because it was underpowered to detect differences in these outcomes measures. The patient interviews revealed that the monitoring system helped patients improve their self-care knowledge and helped them to correlate and modify their lifestyle behavior according to changes in weight, blood pressure, and symptoms. Patients found the portability of the system to be beneficial, and several patients took the monitoring system on vacation. Clinicians thought the system helped them manage their patients, particularly through medication changes.

#### Conclusions

In summary, the findings from the trial have provided evidence of improved heart failure self-care, clinical management and health outcomes from mobile phone-based remote monitoring, which support the findings from recent meta-analyses. These results support the implementation and further research of such systems as cost-effective and portable tools compared to traditional remote monitoring systems for heart failure management.

### 640

#### MADELEINE SVENSSON, TOBIAS SVENSSON, YLVA TROLLE LAGERROS STRATEGIES TO ENCOURAGE E-HEALTH - THE EFFECTS OF USING DIFFERENT REMINDERS TO VARIOUS EXTENTS ON OVERALL RESPONSE PATTERNS IN A LARGE RANDOMIZED INTERNET-BASED INTERVENTION STUDY

Usability and human factors on the web

Poster Session 1, 12:30pm-1:30pm, September 17, 2011

Lower Lobby

Background

The use of the Internet as a research tool has dramatically increased in the past several years. Yet, the current literature favors the response rate achieved from paper-based studies. Knowledge of successful methods to increase participation in Internet-based research is scarce. The objective of this study is to examine the effects of different reminders to encourage study participation on overall response patterns in an Internet-based intervention study.

#### Methods

In 2008, 3,876 employees at four companies in the railway sector in Sweden were randomly e-mailed an Internet-based lifestyle questionnaire consisting of: A) questions, B) questions + interactive personalized automated feedback, or C) questions + interactive personalized automated feedback + telephone counseling. The questionnaire assessed health aspects including diet, physical activity, sleep, stress, alcohol/tobacco consumption, and motivation to change health. Interactive feedback was provided for all health sections; telephone counseling was offered for diet, physical activity, alcohol and smoking habits. Nine months later, a follow-up questionnaire (C) was e-mailed to examine health improvements. 4-5 and 11 e-mail reminders were sent at baseline and follow-up, respectively. Additional reminders (flyers, texts in internal media/bulletin board, information talks, SMS, visit by the research group etc) were also administered at the four companies, to various extents. The number of additional reminders was summarized and analyses were based on the total number of received additional reminders (low, moderate or high). Response patterns were examined in relation to basic characteristics, company, work type (office/field worker), received e-mail reminders, and total number of received additional reminders. As a result of the study, the companies received recommendations for future health implementations.

#### Results

38% and 36% completed the baseline and follow-up questionnaire, respectively. The majority of the participants was male, non-smokers, employed as field workers, and had a BMI U25. The 4-5 e-mail reminders increased the total response rate by 15%; the 11 e-mail reminders by 21%. Additional reminders had a marginal effect on

total response rate, yet generated a positive effective on the response rate among office workers (71%). Since the planning process of the study, the company involved had the highest overall response rate (61%;  $P < 0.001$ ), despite receiving a moderate number of additional reminders. The employees at this company were almost 1.80 (CI: 1.55-2.08) times more likely to participate in the baseline questionnaire, compared to the company which entered the study just prior to the start and had the lowest overall response rate. Participant characteristics including sex, age, BMI, smoking, motivation to change health habits, and version of the completed questionnaire (A, B or C) were not associated with time of response. The highest participation at follow-up, however, was found for those who completed baseline questionnaire A, consisting solely of questions. Conclusions

A well-established collaboration with the participants prior to the start of the study and to send out e-mail reminders on a continuous basis are two effective strategies to increase the response rate in Internet-based studies. Additional reminders conducted in the work setting may only be effective among office workers participating in Internet-based studies.

## 643

David Hale

### FROM DATA TO WISDOM: BAKING KNOWLEDGE AND EXPERTISE INTO GOVERNMENT HEALTH DATA

Public e-Health and health policy

Parallel Session 12, 1:00pm-2:30pm, September 18, 2011  
LK120 Hall

The U.S. government's Open Government Initiative focuses on transforming government data into platforms for innovation that directly benefit citizens. Empowering industry, academic researchers, and citizens to solve challenges requires more than a raw download.

Data is only one component of the value that public health agencies can provide through open government. The missing link is their knowledge, experience, and expertise. These critical elements must be baked into a data system through partnerships, cooperative weaving and mashing of data, and development of web and backend services that provide Health IT developers, researchers, and citizens access to that know-how, adding context to the content. This session will highlight the limits of open government health data as raw downloads; demonstrate methods of encapsulating the knowledge and expertise of public health agencies into a data system and promoting innovation in the startup community, industry, and academic research; present a model to create a cooperative environment where diverse, risk-averse stakeholders set aside differences and utilize multi-agency data systems to improve the public health; show how data systems such as these can bridge the gap between public health agencies, industry, and citizens and increase meaningful utilization of public health data and demonstrate point-of-care applications created utilizing systems of this type.

The two data sets from which the U.S. National Library of Medicine's Pillbox (<http://pillbox.nlm.nih.gov>) is derived (the U.S. Food and Drug Administration's (FDA) Structured Product Labels (SPL) and NLM's RxNorm) have been freely available for years as raw data downloads, but contain inherent barriers which have prevented their use by all but a limited number of industry experts. Recognizing this challenge, the NLM and FDA formed an interagency team comprised of regulatory and legal experts, pharmacists, and computer scientists to break down these barriers and create a system that is not only open, but also useable and adaptable by all.

The mashup of these two data sets involved translating regulatory requirements and user personas developed through ethnographic field study into a system to parse the complex schema of drug labeling information, normalize and augment that data, and create a search and discovery system tailored to address the complexities of medication identification and reference. More than providing data access through online tools and an API/web services, Pillbox's "secret sauce" is that it encapsulates the knowledge and expertise of two public health agencies.

In addition to creating a platform for the development of innovative applications in areas such as drug identification, medication management, clinical decision support, and emergency response Pillbox is uncovering errors in drug labeling information which have remained uncorrected for years, increasing industry awareness of those errors, bringing stakeholders together to improve accuracy of drug label data, and opening the door to development of innovative solutions to increase validation and accuracy of this data.

## 646

### Kathleen Gray, Kristine Elliott, Ryan Naylor, Greg Wadley PUBLIC ENGAGEMENT WITH BIOMEDICAL RESEARCH THROUGH SMARTPHONE-BASED AUGMENTED REALITY

Collaborative biomedical research, academic/ scholarly communication, publishing and peer review

Poster Session 2, 12:00pm-1:00pm, September 18, 2011  
Lower Lobby

Background

Science communicators have advocated engagement as an important precursor to public understanding of science, and have sought to facilitate engagement by immer-

sion in a scientific environment. The advent of new social media technologies has increased the opportunities available for biomedical scientists to engage the general public in their work. Smartphone-based augmented reality (AR) is one such technology. In the phone's camera viewfinder, real-time geospatial and other internet data are overlaid on the real-time view of the phone user's actual location, thus augmenting this view and creating a blended world.

We hypothesized that AR is capable of providing the benefits of both mobile learning and locative media. AR can provide a unique mode of public access to biomedical research information, and strengthen laypeople's sense of engagement with that information and those who generate it, by linking such information to physical sites of biomedical research for the attention of laypeople who pass by or stop in the vicinity.

Methods

We undertook a pilot study of AR user acceptance, in a metropolitan precinct housing several internationally renowned biomedical research institutions. We selected Wikitude World Browser version 5.0 ([wikitude.org](http://wikitude.org) and [wikitude.me](http://wikitude.me)) to create a prototype "world" containing six research institutes within the precinct as points of interest (POI), and we designed web content about each institute for smartphone-based access. For one POI, a more detailed information architecture was developed, and information of several different levels of complexity was provided (authoring focused chiefly on repurposing existing rich media content freely available online) to allow us to examine how users responded to each level, and which levels they found accessible. Eleven volunteers with no biomedical expertise were observed while using the prototype application on an iPhone in the precinct and interviewed afterward. Usability research design and data analysis were based on an established usability testing framework.

Results

More than half the participants commented that the application was handy, safe and enjoyable, and that they felt confident using it and would recommend it to others. When asked about the usefulness of the application to access locative-sensitive biomedical research information, most participants responded favourably. Participants expressed a range of personal preferences for the types of information presented and how that information was structured. Participants were unable to clearly describe the effect of locative media on their learning, and identified a number of issues with the Wikitude browser interface. Nevertheless, when prompted, more than half were able to report something new that they had learned from this brief experience of using mobile AR, mostly gleaned from the least scholarly or technical content provided in the "world". Conclusion

The challenge for biomedical science communicators using new social media is to provide user friendly, accessible, robust information architectures, as well as to allow users to explore complex information according to their personal preferences. Recent software upgrades to the Wikitude AR browser may better address some of the criticism arising from user acceptance testing in this pilot study. Further content enhancements also are likely to increase the application's suitability to the mobile context. The largely positive feedback from our proof-of-concept study suggests that smartphone-based AR has potential to increase public engagement with the biomedical research endeavour. Further research on a larger scale is needed to yield statistically significant results and deeper insights into the dynamics of using locative media for mobile learning of this kind.

## 647

Patrick Michel Archambault, France Légaré, Marie-Pierre Gagnon, Andrea Bilodeau, André Lavoie, Jean Lapointe, Julien Poitras, Karine Aubin, Sylvain Croteau, Martin Pham-Dinh

### EMERGENCY PHYSICIANS' BELIEFS ABOUT THEIR INTENTION TO USE WIKI-BASED REMINDERS TO PROMOTE EVIDENCE-BASED TRAUMA CARE

Building virtual communities and social networking applications for health professionals

Poster Session 1, 12:30pm-1:30pm, September 17, 2011

Lower Lobby

Background

Wikis are knowledge translation (KT) tools that could help emergency physicians collaborate asynchronously in the updating and sharing of reminders. Reminders (e.g. care protocols) help physicians make decisions based on evidence. However, no study has determined the factors influencing emergency physicians' intentions to use a wiki-based reminder.

This study aimed to identify physicians' salient beliefs regarding their intended use of wiki-based reminders promoting evidence-based trauma care.

Methods

Using the Theory of Planned Behavior, we conducted semi-structured interviews to identify these salient beliefs. Based on previous work by Godin and Kok, a sample size of 25 participants was determined sufficient to elicit these beliefs. Among the 61 eligible physicians working in three trauma centers in Quebec (Canada), we contacted 30 physicians and five were not available. To elicit a wide variety of beliefs, we purposefully selected a sample of 10 physicians from a level I trauma center, 10 physicians from a level II trauma center and 5 physicians from a level III

trauma center. We also included older and more experienced physicians who might have different beliefs. Before the interview, all participants were presented a video that explained wiki characteristics and featured a physician using a wiki-based reminder. Two independent coders analyzed the content of the verbatim interview transcripts to identify participants' attitudinal, normative and control beliefs. Conflicts between coders were resolved through discussion. They classified responses into themes (salient beliefs). Themes that expressed the same idea were grouped and their frequency calculated. Results

A majority of participants were male (92%), had a median age of 38 years (ranging from 28 to 58 years) and had a median of 11 years of clinical work experience (ranging from 1 to 34 years). We identified 19 attitudinal, 16 normative and 33 control beliefs. The top two attitudinal beliefs were that using a wiki-based reminder would: reduce errors ( $n=14$ , 56%) and save time in developing a reminder ( $n=13$ , 52%). Only two disadvantages were reported: the fear of reproducing an existing resource like UpToDate™ ( $n=1$ , 4%) and the added stress of using a wiki-based reminder while treating a trauma victim ( $n=1$ , 4%). The three most influential normative beliefs (people who would approve or disapprove the use of wiki-based reminders) were: 1) nurses ( $n=17$ , 68%); 2) physicians ( $n=14$ , 56%); and 3) trainees ( $n=12$ , 48%). Finally, the top three control beliefs were facilitators of the use of a wiki-based reminder: 1) access without passwords ( $n=21$ , 84%); 2) mobile access ( $n=20$ , 80%); and 3) peer-reviewed information ( $n=19$ , 76%). The top negative control beliefs (barriers) were: 1) the lack of internet access ( $n=8$ , 32%); 2) immediate decision making in trauma ( $n=7$ , 28%); and 3) rapidly changing wiki-based reminders ( $n=6$ , 24%). Conclusion

This is the first study to identify the salient beliefs influencing physicians' intentions to use a wiki-based reminder to promote evidence-based trauma care. These beliefs will be used to construct a questionnaire that will measure the influence of each of these beliefs in a broader population of emergency physicians.

## 649

Maritta Anneli Välimäki, Heli Hätönen, Lauri Kuosmanen, Marita Koivunen, Minna Anttila, Anneli Pitkänen

### CONSUMER EMPOWERMENT: HEALTH INFORMATION ON THE WEB

Consumer empowerment, patient-physician relationship, and socio-technical issues

Parallel Session 8, 4:30pm-6:00pm, September 17, 2011  
LK130 Hall

Background

e-Health has been increasingly used in the field of mental health care. Major difficulties may still arise when introducing new web-based health information into routine daily practice. Psychiatric nurses have less often used computers or Internet with patients and their information and communication technology (ICT) skills may be low. Substantial evidence suggests that to change behaviour is possible, but this change generally requires comprehensive approaches at different levels (nurses, doctors, team practice, hospital, wider environment), tailored to specific settings and target groups.

The objective of this study is to describe and evaluate the implementation process of Web-based portal into daily clinical practice on psychiatric wards.

Methods

We developed an interactive multi-service online portal application (in English Mental.Net) to support their knowledge level of their own illness and treatment and self-management skills. The portal is meant for patients with schizophrenia spectrum psychosis (F20-29, ICD-10) and their professional carers. The portal can be used independently by patients or in collaboration with patient and nurse. It aims to offer health information to support patients' self-management skills and to update nurses' knowledge level. The portal was implemented in two acute psychiatric hospital wards ( $n = 9$ ) with a six-step implementation model. The study population consisted of all registered and practical nurses working on nine acute psychiatric wards ( $N = 89$ ) and patients admitted in the study wards during the data collection period ( $n = 100$ ). Patients' feedback was collected through interviews ( $N = 32$ ). Nurses attitudes toward computers and IT use were evaluated regarding motivation, beliefs and satisfaction with computers, computer use and Internet use (Burges 1991) at Baseline and 18 months after the implementation of the portal. In addition, analysis of 93 patient education sessions were conducted. Results

This study showed that it is possible to implement Web-based portal into daily clinical practice with systematic implementation process. Out of 100 possible patients, 93 used the portal during their hospital stay. Patients' reported that portal supported their individual information management process. They were more aware of the existing methods used to deliver information to patients. However, some concerns were also raised relating to safe Internet use, such as privacy and security issues. In general, nurses' attitudes were neutral toward computers at the baseline and the follow-up assessment. Further, IT use did not changed significantly during the study period. Based



on the analysis of 93 patient education sessions, nurses reported barriers restricting the use of the portal to support patient health information. These were a lack of computers, a lack of time for patients, nurses' negative attitudes towards computer use, and a lack of ICT skills. The main facilitators for portal use were appropriate technological resources, easy Internet access, enough time for portal use, and a high level of motivation among staff to use computers.

#### Conclusions

This project showed that ICT based e-Health has the potential to contribute to improvements in the empowerment of people with severe mental illnesses and their carers. However, it is important that plans for change will be based on characteristics of the evidence and barriers and facilitators to change. Future research should explore the various structures, formats, and interventions of implementation in psychiatric care.

## 652

Natalie Louise Byrom, John Powell

### GOING (DIGITAL) NATIVE: INVOLVING YOUNG PEOPLE IN MEDICINE 2.0 RESEARCH

Consumer empowerment, patient-physician relationship, and socio-technical issues

Poster Session 2, 12:00pm-1:00pm, September 18, 2011

#### Lower Lobby

#### Background

The term "digital natives" has increasingly been used in academic discourse to describe the generation of young people who have grown up using Web 2.0 technologies as part of their everyday lives. When conducting research with the aim of developing Web 2.0 based interventions to support the healthcare needs of young people, it is important to involve young people in the design of the research. Involving young people can confer many benefits, including: maximizing the chances of adoption of the intervention, identifying relevant outcome measures, aiding recruitment of research participants, and assisting in the dissemination of findings. User involvement in research is about understanding and incorporating the user perspective into the project, often from the initial stages. In order for young people to engage in this process, it is important to equip them with the knowledge, skills and confidence to comment on and contribute to proposed programs of research.

The two main objectives are as follows; to use innovative approaches to capture the views of young people to inform the design of a program of research examining the role of Web 2.0 technologies in supporting the health care needs of young people living with long term conditions and to give young people an insight into the research process and to build their confidence in communicating their ideas and opinions to the research team.

#### Methods

We invited twenty young people aged between fifteen and seventeen years from diverse socio-economic backgrounds to participate in a Young Researcher Scheme, accredited by the University of Warwick. The young people were recruited through their schools, and nominated by their teachers on the basis of their enthusiasm for the project and ability to participate without this impacting negatively on their studies. The young people were invited to attend a day-long workshop held at the University of Warwick where they were introduced to the project and the research team and given a short course in research methods. The research team posted videos on YouTube and set up a Facebook and Twitter page for the project to help the young people selected prepare for their involvement in both the Young Researcher Scheme and with the research team. On the day of the workshop the young people were asked to design a research project based around the theme of: "long term conditions, young people and web 2.0/social media" and were assisted narrowing their area of interest by members of the research team, patients and expert consultants. They were encouraged to choose both the web 2.0 technology and the long term condition they wished to research independently, helping the research team to gauge what technologies and health conditions young people engaged with the most. Participants in the young researcher scheme were equipped with the necessary skills and techniques to undertake research and produce a 1,000 word research paper on the topic of interest. The young people were also provided with the equipment to make a short film to disseminate the findings of their research report through YouTube, and record a short monologue reflecting on their experience of the research process.

#### Results

The reports and videos produced by the Young Researchers were used to refine existing research objectives within the ongoing program of research and identify future areas of interest. We will demonstrate videos of these outputs in this presentation.

#### Conclusions

Innovative approaches to user involvement in research can help to capture the views of participants who may not contribute in more traditional consultation processes. The user involvement strategy piloted here was successful in ensuring sustained engagement with our research program, and will be replicated in future studies. Medicine 2.0 research has much to gain from understanding the perspectives of the younger generation of digital natives

and their relationship with technology in the context of their healthcare.

## 654

Panagiotis D. Bamidis, Stathis Konstantinidis, Charalambos Bratsas, Alvaro Salva Lezaun, Francisco Grau Castilla, Stefan Dietze, Daniela Giordano, Chara Balasubramaniam, Eleni Kaldoudi, Maria Nikolaidou, Costas Pattichis

### TO 2.0 OR TO 3.0? CONTEMPORARY CHALLENGES FOR MEDICAL EDUCATION FROM THE MEDUCATOR

Web 2.0-based medical education and learning

Parallel Session 3, 2:30pm-4:00pm, September 17, 2011

#### LK120 Hall

#### Background

Over the past few years, Medical Education has been experiencing an evolving shift from 'teaching' to 'learning', and from classic (passive) lectures to active learning and participation, which is in parallel strongly related to an increasing involvement of information and communication technologies and the Web. Inherent to these developments is also the abundance of medical educational content and resources available in various open educational resources as well as learning platforms of individual academic institutions and scientific societies. However much of this resource information is hidden, thereby rendering the materials not widely available or easy to discover and retrieve due to lack of standardized content sharing mechanisms. The mEducator project ([www.meducator.net](http://www.meducator.net)), is an EU funded initiative of 14 organisations that faces this lack by attempting to establish "best practice" towards the repurposing and sharing of medical educational multi-type content by means of implementing and experimenting between two different sharing mechanisms, namely, one based on Web2.0 and mash-up technologies, and one based on the semantic web (Web3.0) and Linked Open Services.

This paper presents some of the recent efforts and achievements of the mEducator consortium towards the repurposing and sharing of medical educational multi-type content. This is done in three main axes, namely, the creation of mEducator metadata (scheme), and the development of two prototype solutions and platforms: one which is Web2.0 / mash-up based, and a second one, based on Web3.0 and (semantic) Linked Services.

#### Methods

mEducator work has so far given rise to a model for framing the representation and treatment of information gathered from the reuse and repurposing of learning resources from distributed repositories. The model takes into account both static user-edited or automatically generated metadata fields and the emerging, dynamic information clouds that surround a learning resource when users comment on it, tag it etc, i.e. by a combined use of strict taxonomies/controlled vocabularies with folksonomies. The model in progress also involves, as mentioned above, research and deployment of a semantic Web services architecture to map profile fields to existing Linked Open Data vocabularies and ontologies, enrich existing metadata via identification of key terms, expand search queries via semantically related terms and retrieve additional but related relevant data from external sources.

#### Results

To this extent, the consortium is currently building two prototype solutions. The first one, Solution 1, is performed upon the widely known MEDTING platform. In fact, the mEducator platform in Solution 1 is a wrapper of MEDTING, with its own user interfaces, look and feel and the specific functionalities of mEducator. This forms a brokerage mechanism based on mashup and other technologies. In a standard mashup scenario, where a website loads several mashups, the mashups are usually hosted in the same web server as the website and the mashups are requesting information from different sources. In solution 1, this is not the case; the mashups are all hosted in the platform's web server and that is the same server that all mashups are going to be querying. On the other hand, solution 2, practically aims to allow for federated access to eLearning repositories across the Web, thereby integrating existing educational resources using "Linked Services" technologies that enable federated queries for educational resources by (i) end users and (ii) 3rd party applications. Solution 2 also allows the publishing of educational resource metadata as Linked Data, following state of the art Linked Data principles (URIs, RDF, SPARQL, interlinked data with established vocabularies such as SNOMED, MESH, GALEN etc...).

#### Conclusions

It is true that collaboration and content sharing in (all facets of) medical education will inevitably alter the overall process of developing and preparing educational materials. The formation of content sharing networks/consortia as well as project clusters will ensure that responsibility is not merely vested in just one of the institutions involved, and the notion of collaboration goes beyond merely sharing tasks and content across different educators. To this respect, emphasis in mEducator is also geared to provide an alternative view of learning content organization, management and sharing for use and re-use across healthcare institutions, via "social" associations amongst learning resources with emphasis on their repurposing history and creators' associations. This endeavor is now tested in the provision of the aforementioned solutions/prototypes. Mid-

term planned evaluations with different target groups are expected to shed light into its effectiveness.

## 655

Connie Chen, Ming-Chih Kao, Kenneth Ng, Alex Tam, Aaron Brodeur, Suelyn Yu

### APOMEDIATION AND THE AFFORDABLE CARE ACT

Web 2.0 approaches for behavior change, public health, and biosurveillance

Poster Session 1, 12:30pm-1:30pm, September 17, 2011

#### Lower Lobby

The proliferation of online health information has been supported by the development of search tools helping consumers navigate this growing body of content. However, recent surveys suggest that consumers increasingly get lost amidst vast amounts of irrelevant information, eventually abandoning their search. Despite increased online information, under-utilization of available social services by low-income persons remains an on-going concern, driven in part by lack of centralized and personalized information.

The Affordable Care Act promises a dramatic expansion of available care and prevention services to be enacted incrementally over a four-year period. Provisions include prohibiting insurers from charging co-payments or deductibles for Level A or Level B preventive care screenings, broadening Medicaid eligibility, and creating temporary high-risk insurance pools for adults with pre-existing conditions. While the newly redesigned [healthcare.gov](http://healthcare.gov) has made substantial progress towards making consumer health information transparent and usable, much of the information is still spread across multiple web pages, requiring users to sift through many pages of policy text and determine for themselves what information applies to them.

Seeing as the impact of proposed health care expansions will only be as great as their reach and utilization, we offer here a solution to this information bottleneck leveraging web 2.0 apomediation theory to create a personalized web platform able to automatically suggest free services and health screenings individuals may be eligible for under the Affordable Care Act. The platform we have built relies on sleek design and not volume of content to engage users. Instead of querying users on their medical history and insurance information, we distill our intake survey into five simple demographic questions. Current offerings by the US Preventive Services Task Force for this purpose are instead tailored for physicians, suffused with medical language and which require medical knowledge to interpret the jargon.

Drawing upon strategies shown to be successful in engaging users, our platform additionally integrates social media and task-completion functionalities. Social incentives are powerful levers by which to motivate patients to modify health behaviors and have similar applicability in promoting the completion of preventive health screens. To provide consumers with discrete outputs, we have built in functionality to allow for immediate identification of local physicians with whom one can schedule appointments with planned extension into immediate online appointment booking.

Apomediation theory has widespread applicability to public health beyond the Affordable Care Act. Information about state and local services are spread across difficult to identify offices and resource databases. Several non-profit clearinghouses already exist such as Single Stop USA that collate information about social services for low-income individuals. Incorporating web 2.0 strategies, including personalization, intelligent interaction and social incentives represent the next steps to guiding consumers to relevant resources. Obama's stated commitment to expanding internet access in rural and low-income communities further suggests relevance of such strategy. The wealth of publicly-available health data provided through websites such as [healthindicators.gov](http://healthindicators.gov), [opendata.gov](http://opendata.gov), [healthdata.gov](http://healthdata.gov), and the IOM Health Data Initiative have potential to further support efforts in this area.

## 656

Amith Vikram Rangarajan, Gauri Balani

### PHARMACOVIGILANCE IN THE SOCIAL MEDIA ERA: A FRAMEWORK FOR SOCIAL MEDIA ADVERSE EVENT MONITORING

Health information on the web: supply and demand

Poster Session 2, 12:00pm-1:00pm, September 18, 2011

#### Lower Lobby

Several million people have adopted social media and this user-base is all set to increase rapidly in the future. The patients have started adopting this platform to post and share their disease condition and treatment related experiences. This user-generated media (UGM) on patient care is increasing at the rate of thousands of posts per day. There is a severe degree of under-reporting in the conventional adverse event reporting process, especially in hospital settings. It is estimated that around 10% of serious adverse events and 5% of non-serious adverse events get reported to regulatory authorities. This problem can be effectively addressed by implementing adverse event monitoring through social media. The unique feature of drug treatment related data in social media is its high volume and diversity. Social media requires a new kind of pharmacovigilance to better suit its unique attributes.

We propose a social media monitoring framework by synthesizing web crawler and semantic technologies with a unique pharmacovigilance process. We have developed



an application that combines webcrawling and semantic functionalities to suit this purpose.

Events that are considered "expected" for a drug are listed in its reference safety information. All "expected" events for the marketed drug of interest will be programmed into the semantic filter of our application. The application shall flag posts related to events that are not in the "expected" list for a particular drug ("unexpected" events).

Our application can be set to search a list of social media websites for adverse experiences related to a particular marketed drug. It aggregates all such posts and further segregates them in terms of the organ system and its "expectedness" in the final output report.

The output report can be subjected to safety review in a pharmacovigilance unit. The posts in the final output report get processed and followed up on depending on their type and entered into safety database accordingly. Our framework allows for proactive monitoring of social media. This will lead to more effective, actionable safety signals that can help with ensuring brand success and continued growth in the increasingly stringent global regulatory setting.

## 657

Maria Luaces, Leonor Roa, Uwe Spangler, Jesus Canora-lebrato, Sonia Gutierrez Gabriel

### CONVERTING OPPONENTS INTO ADVOCATES: IMPLEMENTING FACEBOOK FOR PROFESSIONAL PURPOSES IN A PUBLIC UNIVERSITY HOSPITAL IN SPAIN

Building virtual communities and social networking applications for health professionals

Poster Session 1, 12:30pm-1:30pm, September 17, 2011

Lower Lobby

Background

The Spanish Healthcare System is governed under a state-owned model, a condition which plays a key role on the user experience and its relationship with the healthcare system. The use of Web 2.0 and social networks as professional tools is just starting to be considered. Furthermore, these new tools are being introduced bottom-up from employees to executives. A computer-based, paper-free hospital can offer unique opportunities to use the Web for professional development; this is the case for our university hospital. We have created a dedicated profile in the social network with academic aims for our hospital. The three main objects are as follows: to provide physicians, fellows, and medical students with scientific updates in the different areas of interest; to share the academic events and grand rounds hosted by our hospital with our scientific community; to provide updated information about scientific events, grant opportunities and other sources of continuing education for our scientific community.

#### Methods

A multidisciplinary board including attending physicians from different areas has been created. The mean age of the members of the board is 35 and 50% of them are PhDs. Nurses and other health professionals have been invited and are welcome to join the board in order to keep a wider scope and make the contents interesting to all healthcare professionals. The hospital serves a population of 210,000 and has 277 attending physicians, 93 fellows and 90 medical students. The board has established the rationale, aims and target population. A draft has been presented to the CEO and the Department of Public Affairs. Our main cause of concern was getting the Health Department of the Regional Government's approval, responsible for any content published on behalf of the hospital. A prerequisite to obtain the clearance was that contents should be exclusively scientific and devoted to professionals.

An English version was also created. The profile finally included the following sections:

- Wall: main interface to spread information
- Info: describing the aims of the hospital, the company overview, mission, products, profile and contact information events: announcements of scientific events hosted by the hospital
- Notes: further information
- Photos: from the events in the hospital or other events of interest
- Information about the new profile was spread on a peer-to-peer basis.

#### Results

The official Facebook profile was published on the 24th of January 2011 without any official opening. Since then, there have been 9542 visits to our posts. 90% of the users are in between 31 and 45 years old, and 61% are women. The wall receives most of the visits (458), followed by the info (74) and the events (56). There are 74 followers in the Spanish version and 15 in the English version. Their country of origin is Spain in 70 cases, USA in 3, and UK in 1. Comparing the number of visits with the number of posts, we have only had 12 feedback comments, but all of them are positive. Quantitative tools to evaluate the use of the web service include a survey via Google Docs—as well as data provided by Facebook itself. This survey yields information about baseline characteristics, current use and perceived needs of the users. After 3 months of postings, the initial reluctance of the directives to support this social network has turned into realization that it really serves as a teaching tool and further as a very good marketing tool to attract medical students and fellows. Up to date, only 5 out of the

20 public hospitals in Madrid are hosting a social media profile, due to the lack of awareness of its usefulness and, ultimately, to the so-called "digital gap".

#### Conclusions

A dedicated Facebook page for a university hospital in Spain with an academic profile has been considered as innovative and is gaining increasing acceptance within the local medical community. There is a growing trend among healthcare professionals toward using the social network to interact with peers. In the future, the profile will continue to evolve into a highly interactive tool as it is already integrated into the daily routines of our physicians, fellows and medical students.

## 659

Jackie Bender, Lorraine Ferris, Joel Katz, Alejandro R. Jadad

### WHAT IS THE ROLE OF ONLINE SUPPORT FOR THE SUPPORTERS? A MULTI-METHOD STUDY EXAMINING THE USE OF ONLINE COMMUNITIES AMONG BREAST CANCER PEER SUPPORT PROVIDERS

Building virtual communities and social networking applications for patients and consumers

Parallel Session 7, 4:30pm-6:00pm, September 17, 2011

LK120 Hall

Background

Online communities offer cancer patients a convenient way to obtain supportive care from peers, however, little is known about how or why patients use them for this purpose. Cancer peer support providers are in a unique position to provide insight into the role of online communities in relation to other sources of supportive care.

This multi-method study aimed to identify the extent, nature and conditions of online community use among breast cancer survivors, known to be peer support providers.

#### Methods

We surveyed the attendees of a support group facilitator-training workshop provided by a national non-profit breast cancer support agency in Canada from September 2008 to May 2009 inclusive. Survey participants were a mean 56 years of age (SD 9.52), and a median of 5.9 years post-diagnosis (IQR 7.3), with no evidence of current disease. The response rate was 73% (n=73). The questionnaire asked about the extent to which participants used online communities, when, how often, and why, as well as why not. Descriptive statistics were used to summarize responses. A purposive sample of twelve survey participants with diverse disease characteristics were interviewed on how they used online communities as a resource, and how in their opinion, online communities compared to other sources of supportive care. Interview transcripts were analyzed using a descriptive interpretive approach involving constant comparison methods and thematic content analysis.

#### Results

Online communities were used by nearly one-third (31.5%) of the sample, on a daily or weekly basis (91.3%), most often during (73.9%) and shortly after (60.9%) breast cancer treatment for treatment information, symptom management, and emotional support. Reasons for non-use, reported by more than two-thirds of the sample, included lack of: need (48.0%), self-efficacy using online communities (30.0%), trust in Internet resources (24.0%), self-efficacy using computers (20.0%) and awareness (20.0%). Qualitative interviews revealed that online communities were used as a problem-focused coping strategy to address unmet supportive care needs, particularly during periods of stress, uncertainty, or insufficient local support. Although online communities were used to varying extents depending on the individual's needs and circumstances, they were regarded as a unique supportive care resource due to their availability, anonymity, limited commitment, quality of information and reassurance from similar others. An integrated framework of social support, health behaviour and technology adoption theories helps to explain the conditions that influence their use.

#### Conclusions

Online communities may have the potential to fill gaps in supportive care services by addressing the unmet needs of breast cancer survivors, particularly during periods of stress and uncertainty. Targeted, peer-led strategies are required to promote awareness of the usefulness of online communities as supportive care resources, and to overcome barriers to their use. Further research should examine the use of online communities among typical breast cancer survivors.

## 660

Thomas Milton Jones, Lon Newman

### TAKING PERSONAL HEALTH RECORDS TO A NEW LEVEL; ESTABLISHING A PLATFORM FOR ALLOWING FOR CONSUMER CONTROL OF INTEROPERABLE HEALTH CARE INFORMATION

Personal health records and patient portals

Parallel Session 13, 1:00pm-2:30pm, September 18, 2011

LK130 Hall

The Personal Health Record should be the hub for exchange of health care information among all of the actors (physicians, allied health care personnel, research personnel, families and the consumers themselves) engaged in a consumer's health care. Making the PHR the hub rather than treating the PHR as a node on a provider-centered

system of systems (such as can be seen in "tethered" PHR solutions) solves knotty issues surrounding patient consent and consumer control of health information exchange. We will describe how effective use of and development of open source software has created an infrastructure for empowering consumers and for securely separating consumer health care information from other information networks (including social networks) wherein consumer privacy can be compromised.

Effective development and deployment of Personal Health Records (PHRs) have the power to reduce the tension between advocates of federated and consolidated electronic health records (EHRs). The widespread fear of national health information data bases has driven many to espouse federated "shareable" EHR systems in which health information is kept in source systems and can then be assembled through a series of queries for viewing by duly authorized users. Each "view", of course, necessitates a new assembly. While this approach certainly does not create a national health information data base, it also has many performance and logistical problems that contribute to sluggish adoption.

In contrast, the consolidated model involves creating the shareable EHR in near real time by updating from the source systems to the lifetime EHR. While this model is thought to have a better price to performance ratio, simpler access control, and heightened security, the specter of a national health information data base has knee-capped its adoption. The use of PHRs to consolidate health care information is an appropriate model to reconcile the tension between these two approaches.

In 2006, the National Committee on Vital and Health Statistics (NCVHS - USA) focused its attention on Personal Health Records and concluded that "The greatest opportunities for improving health and health care lie in enabling information exchange between the three dimensions (Healthcare Provider, Personal Health, and Population Health) of the national health information infrastructure." The NCVHS concluded that "The full potential of PHR systems will not be realized until they are capable of widespread exchange of information with EHRs and other sources of personal and other health data." Because the Tolven PHR has been developed on the same open source platform (and utilizing the same information model, standard vocabularies, and data types) as the Tolven EMR and the Tolven Clinical Research applications, interoperability of data exchanged between all three dimensions is greatly enhanced. The Tolven platform is now serving as a secure infrastructure for health information exchange in the Netherlands, the United Kingdom, and the United States and is being implemented in Singapore. By placing the consumer at the hub of health information exchange, consumers can be more confident that health information is shared only when appropriate and only with whom the consumer designates. Through the creation of secure accounts for consumers and for health care providers, Tolven has created a model for avoiding collisions between networks with competing interests. The Tolven PHR consolidates health information for the consumer while side-stepping the pitfalls of a national health care information database.

Our current experience has shown that patients are motivated to use PHRs that assure privacy and consumer control of information flow and that provide the ability to send and receive personal health information to and from their providers. We believe that PHR use will be accelerated by including such functionality as secure messaging between patients and providers and availability of appointment scheduling options.

## 661

Britt Hedman Ahlström, Agneta Nydén, Helena Osmar Swerksdotter, Lena Niklasson, Marie Lindström, Louise Hakenäs-plate, Elisabet Wentz

### A FOCUS ON EVERY DAY LIFE: INTERNET-BASED SUPPORT AND COACHING FOR YOUNG ADULTS WITH NEUROPSYCHIATRIC DISORDERS - A CHAT LOG ANALYSIS

eCoaching

Poster Session 2, 12:00pm-1:00pm, September 18, 2011

Lower Lobby

Background

Few studies conducting qualitative research regarding treatment, daily living, and need of support for young adults with neuropsychiatric disorders such as ADHD, autism spectrum conditions, and Tourette's disorder have been published.

The objective of this study is to describe how young adults with neuropsychiatric disorders function and manage their everyday life based on chat log analysis.

#### Methods

This study is part of a larger intervention project, NP Young Coaching, a structured internet-based support and coaching program for young adults with neuropsychiatric disorders. Twelve young adults between age 15 and 25 years were included in the study. They received coaching during eight weeks over the internet (chat and e-mail) twice a week. The texts composed in the chat sessions constituted the data for the analysis, and the 12 chat logs consisted of 445 pages. Qualitative content analysis was conducted in NVivo 9. The text was divided into meaning units. All the meaning units were labelled with codes which were compared regarding differences and similarities, and thereafter sorted into subthemes and themes.

## Results

Two themes became visible: 'ways of functioning in everyday life' with the subthemes: 'difficult things', 'stress and rest' and 'when feelings and thoughts are a concern', and the theme 'ways of managing everyday life' with the subthemes: 'decide and carry out' and 'making choices for life'. The young adults described their ways of functioning which showed that they were dealing with difficult things such as being treated unfairly, feeling offended by teachers and peers and being undeservedly accused for behaving egoistically. They also experienced hard words from teasing siblings, friends and parents, which was a source of sorrow. The young adults described that their feelings of stress were caused by being too busy and feeling too unfocused in social situations. Tiredness was the starting point of feeling stressed and led to guilt for not getting things done. The young adults were drained of energy and had serious sleeping problems. Feelings and thoughts were a concern when they were dissatisfied with their bodies, felt obsessive, and felt anxious. Feelings of discomfort were described as a consequence of losing control in personal emotional downturns. Ways of managing everyday life included decisions to plan and following those plans. To enable that, control was important as well as time management. The young adults made choices for life and wanted to succeed. They had high expectations of themselves, and strove for high scores and described distinct ideas about what would be their future profession.

## Conclusions

This study led to a more in-depth knowledge about these young adults' everyday lives through support and coaching over the Internet, and showed their ability to use the chat for expressing what every-day life meant to them. The implications of the findings are that by using e-coaching for this population, new opportunities are available for health care professionals to acknowledge these young adults' problems, and online coaching could facilitate the contact between the young adult and the medical and healthcare service.

## 662

Monica Murero

### ALICE GETS SICK IN FACEBOOKLAND: CHALLENGES IN DIGITAL LITERACY FOR HEALTH 2.0

Personal health records and patient portals

Parallel Session 13, 1:00pm-2:30pm, September 18, 2011

LK130 Hall

## Background

The aim of this study is to evaluate what challenges Facebook Group users with poor levels of Digital Literacy encounter when discussing severe medical conditions in Health 2.0 contexts. Do they act like a modern "Alice in cyberland"? In this paper, a novel concept of experienced-based learning aimed at improving Digital Literacy for Health 2.0 environments will be delineated. The need for international educational programs addressing the Digital "Illiteracy 2.0" is documented.

Relevant experienced-based literature was combined to picture the general criticism that have been observed in the last ten years, showing that privacy, security and surveillance discourses fail to protect citizens and patients online, particularly in social media and web 2.0 environments.

## Methods

A survey was conducted to assess the ability of the sample (n=342) to define terms, to recognize threatening situations, and to discover opportunities while visiting a selected number of Facebook's groups discussing health care related issues in the field of transplants and organ donation. Also, experience-learning attitudes and behaviors were accounted for in order to test the short-term efficacy of an educational model aimed at improving Digital Literacy 2.0. The sample was recruited via an online "snowball" method.

## Results

Preliminary results clearly show that Facebook Group users are rarely aware of online risks, and are not proficient in protecting their privacy. This is particularly relevant when discussing serious health matters. In spite of the fact that the sample perceives password-protected environments as safe, in 92% of the cases they are not aware that Facebook public Groups discussions can be easily accessed by profit-oriented third parties. None of those interviewed were aware that their individual profiles can be commodified by Facebook itself. Moreover, 100% of the interviewed admitted to have registered to the popular social network without reading the "terms and conditions". The majority agreed that the experience of learning more about their privacy, security and surveillance has changed their perception, and will modify their online behavior. For example, 76% of the sample expressed the intention to "clean" the contents of their Facebook account and 92% of the interviewed agreed when asked if educational programs in forms of tutorial should be administrated to Health 2.0 users from policy makers or online service providers, including Facebook.

## Conclusions

Poor Digital Literacy in Health 2.0 environments can be highly challenging for privacy, security, and commodification of personal data. When people in Facebook Groups discuss severe medical conditions, poor levels of Digital Literacy are observed. Our findings reinforce the need for vast educational programs of Digital Literacy 2.0 at the

same strength of alphabetization. This empirical case study frames a novel concept of experienced-based learning model in Health 2.0 environments, where a leading role of policy makers and marketing oriented agents - including Facebook - is expected, particularly in tomorrow's internet-saturated society.

## 663

Leonor Roa Santervas, Jesus Canora Lebrato, Maria Luaces Mendez, Uwe Spangler, Sonia Gutierrez Gabriel

### WEB 2.0 BASED TOOLS AND PHYSICIANS: ARE WE REALLY READY TO GO?

Collaborative biomedical research, academic/ scholarly communication, publishing and peer review

Poster Session 2, 12:00pm-1:00pm, September 18, 2011

Lower Lobby

## Background

The use of web 2.0 tools is growing in everyday life.

2011 will be possibly the year of the mobile Internet applications going mainstream. As for other sectors, physicians also find multiple applications available for daily practice, research and communication between doctors and patients. One of the working hypotheses of this study is that most practitioners can use these tools but are still reluctant to use them at work for daily practice and investigation. In times of cut backs for social services in most developed countries, the use of efficient tools is essential, not only for doctors, but also for the management of medical institutions.

This research tries to describe the state of the art of the usage of web 2.0 tools in the daily medical practice in Spain, with a special focus on the efficient use of tools. Furthermore, patterns of age, medical specialty, research purposes and clinical applications of web 2.0 tools could be described, in order to adopt educational programs for the implementation of competency based training.

## Methods

A first heuristic approach led to a survey, which was deployed through an online questionnaire, distributed through mail, social networks like Facebook and Twitter. Due to the preliminary state of this research work, it is important to follow up the first quantitative results with some qualitative case studies on the efficient usage of web 2.0 tools which add value to the medical practice in hospitals and doctor's offices.

## Results

**Research in Progress.** In less than 2 weeks time until end of February 2011, more than 300 doctors have answered this first survey. First preliminary results have shown that 97% have Internet at home and 47% use mobile services in comparison to 44, 4% of Internet users on Spanish population. What is interesting is that the most popular application are still e-mail and more than 80% do not actively employ content creating tools. Doctors are generally advanced e-learning users, with more than 40% learning online. Most doctors also use office products. Although more than 70% have published scientific articles and post gradual studies, the usage of web 2.0 research tools like Zotero, for instance, is very low. A high percentage of the interviewed physicians find web 2.0 tools theoretically useful and efficient.

## Conclusions

**Research in Progress.** First results have shown that the hypotheses could be backed. Most Spanish physicians have Internet at home, they are familiar with many of the web 2.0 tools but they don't use them in their daily practice or in their research work. Most of their internet time is still for leisure. Therefore it is necessary to investigate how physicians could be motivated in the use of these tools, showing them the added value with the help of best practices and lessons learned.

## 664

Pierre Elias, Nithin Rajan, Hadley Wickham, Clifford Dacso

### A USER-DRIVEN WEB APPLICATION TO EXPLORE TREATMENT OPTIONS FOR LOWER BACK PAIN

Online decision technology

Poster Session 2, 12:00pm-1:00pm, September 18, 2011

Lower Lobby

## Background

Chronic lower-back pain (CLBP) affects 30 million Americans yearly, at an annual cost of over \$100 billion. Few patients find complete pain relief in a sea of uncertain treatment alternatives. For physicians CLBP involves uncertainty over symptoms and patients' preconceived notions. These mutual frustrations can lead to an antagonistic, rather than collaborative, approach. In addition, a user-driven approach to treatment decisions is time-consuming and difficult to achieve in an office visit. Thus, there is a need for an application for knowledge-translation and decision-making in CLBP that facilitates interactive information sharing and incorporates patients' demographics, values, and preferences. Our Web 2.0 application collects information from different sources (clinical databases, users themselves), combines and weights the information based on the users' inputs and preferences, and presents it to users in a meaningful way. It also has an asymmetrical relationship advantage (leveraging the same information platform with two different entry points—lay and expert), which is a core Web 2.0 pattern. Analytical Hierarchy Processing (AHP) is a framework for structuring and evaluating competing alternatives that has been used in

non-medical decision-making for 30 years. Through binary prompts, AHP determines relative preferences amongst complex problems. We propose a methodology for a Web-based version of AHP for CLBP.

The objective of this study was to assess the value of a Web-based Analytical Hierarchy Processing framework as a participatory, user-driven decision-support model in chronic lower-back pain.

## Methods

We redesigned AHP for CLBP by incorporating the Oswestry Disability Index (ODI), a gold-standard back-pain outcome measure. ODI rates back pain on a scale of 1-100 in 10 life-areas, ordinarily ranking the value of improvement within each area on the same scale (0=pain-free). For a training dataset, the raw data (N=349) from a 2005 BMJ study that compared rehabilitation and surgery was characterized for AHP. Exploratory data analysis was conducted for each ODI life-area by treatment, including a probability distribution of each pain-state and life-area. Significant differences between surgery and rehabilitation were further examined over baseline, 12 months, and 24 months using linear regression/ANOVA. Data visualization and local polynomial regression fitting elucidated distinctions between treatment effects.

## Results

Data-checking found 33 patients crossed-over from rehab to surgery mid-trial. Due to uncertainty of time-frame and large effect on outcomes, they were analyzed separately. Apparent differences in baseline ODI scores between treatments disappeared over time. Surgery averaged a decrease of 10.99 from baseline to 12 months while rehab averaged a decrease of 5.93. ANOVA was significant ( $p=0.026$ ). There was no significant difference between the two groups by 24 months, suggesting that surgery patients began worse than rehab but ended with approximately equal scores. Data visualization elicited a "gray area" that suggests non-linearity in the responses where surgery outperformed rehabilitation in ODI score improvement. This distinction was not statistically significant but would bear revisiting with more data. The framework was able to compute patients' probability states for all pain levels and ODI questions. It differentiated which treatment would be better dependent on the patient's starting level of pain and preferences. The AHP model also detected ranges for appropriate expectations of pain improvement.

## Conclusions

Combining a proven decision framework with the Web 2.0 values of information sharing and user-centered content, AHP holds the potential to improve CLBP decision-making for patients and practitioners. It may also level patient expectations and reduce regret. We have begun developing a systematic methodology to apply AHP to other diseases.

## 665 •

Gunther Eysenbach, Cynthia Chew

### INFODEMOLOGY AND INFOVEILLANCE: INNOVATIVE METHODS AND TOOLS TO MEASURE, TRACK, AND ANALYZE POPULATION HEALTH-RELEVANT UNSTRUCTURED DATA FROM THE INTERNET AND SOCIAL MEDIA

Health information on the web: supply and demand  
Parallel Session 5, 2:30pm-4:00pm, September 17, 2011

LK005

Infodemiology can be defined as the science of distribution and determinants of information in an electronic medium, specifically the Internet, or in a population, with the ultimate aim to inform public health and public policy. "Infoveillance" is the longitudinal tracking of infodemiology metrics for surveillance and trend analysis. With "information" we mean unstructured, textual, openly accessible information produced and consumed by the public on the Internet.

Our preliminary research - primarily done on the context of seasonal influenza and the H1N1 pandemic - suggests that collecting, mining, and continuously analyzing textual data from various open and proprietary Internet sources has significant potential to inform public health and public policy. Infodemiology data can be collected and analyzed in near real time, and various indexes and indicators can be constructed, which show - in analogy stock indices - trends in real time sentiment, public opinion, public health relevant behavior, and knowledge. It can also measure inequities and disparities in the availability of health information.

Examples for infodemiology applications include: detecting and quantifying disparities in health information availability; the analysis of queries from Internet search engines to predict disease outbreaks (eg. influenza); monitoring peoples' status updates on microblogs such as Twitter for syndromic surveillance; identifying and monitoring of public health relevant publications on the Internet (eg. anti-vaccination sites, but also news articles or expert-curated outbreak reports); automated tools to measure information diffusion and knowledge translation, and tracking the effectiveness of health marketing campaigns. Moreover, analyzing how people search and navigate the Internet for health-related information, as well as how they communicate and share this information, can provide valuable insights into health-related behavior of populations. In this talk we will present an open source toolkit (Infovigil) to monitor, track, archive, and visualize health information



seeking and information provision patterns on the Internet. We will illustrate the potential of this approach by presenting data from our H1N1 data-mining exercise, where we archived all tweets containing the keywords H1N1 or "swine flu" or "swineflu" sent during the H1N1 pandemic (over 2 million between May and December 2009). Among other sub-projects, we analyzed vaccination sentiment over time, identified frequently tweeted news articles, analyzed the social media strategies of public health agencies and hospitals, and evaluated the impact of individual and organizational twitter users (as measured by re-tweets and other metrics).

The Infovigil platform is a tool allowing researchers and public health officials to set up analysis and tracking projects, and for creating dashboards for "all hazards" epidemic intelligence, and we are looking for partners and funders to refine this vision.

## 666

### Brigitte Piniewski, Cristiano Codagnone, David Osimo CROWD ACCELERATED HEALTH INTELLIGENCE: IMPACT ON POLICY MAKING

Public eHealth and health policy

Parallel Session 12, 1:00pm-2:30pm, September 18, 2011  
LK120 Hall

In this paper, the authors discuss how preventable poor health in recent decades has spread across the globe with a tsunami-like intensity. Despite the massive health impact we are witnessing today, adequate prediction and/or prevention mechanisms remain grossly underdeveloped. Hence, this tsunami continues to threaten the future prosperity of our nations, bringing economies throughout the globe to their knees.

Yet, core to this discussion is that preventable poor health is by definition preventable. This tsunami appears almost entirely mediated through unintended consequences of modernization. In the pure pursuit of profit we have unwittingly supported the choice architectures that overwhelmingly enable poor lifestyle choices in preference to optimal choices.

The authors then go on to explain why aggressive attempts at improving health care delivery (supply side) has left us remarkably inept at transforming the health as well as the health costs of crowds. This almost singular focus of Health Information Technology (HIT) on care delivery may be largely responsible for the underperformance of our predictive and preventive capacity at this time. Relying on institutional (hospital and clinic) data that tracks care delivery to proactively manage the health expression of crowds may be similar to using a rear view mirror to drive a car.

Hence an urgent and paradigmatic shift in public policy making is proposed. Communities and individuals must play a key role in co-creating the knowledge engines that support evidence-based investment of public health funds. New scientific truths (eScience) must be supported through complex free living system analysis of networked communities, nudging simulators, and emerging data intensive advanced modeling techniques.

Building upon this background, the authors propose the core principles of modern actionable solutions. In short this involves: the provision of mundane yet high yield health data through light instrumentation of the crowd, real time living epidemiology linked into advanced algorithms that sort the per unit co-occurrences into wellness or illness promoting event streams, simulated and actual, nudging through persuasive technologies such as serious gaming to reward optimal behaviors and most importantly, timely visualization and reliable simulation to pre-evaluate and proactively direct public health investments in evidence-based ways.

Here, data and insights from disparate sources and disciplines ranging from clinical and biomedical research, economics, public health policy, information systems, and data mining advances, and more have been expertly organized. The malignant spread of environmentally induced human underperformance and the emerging data intensive and crowd sourced science of Reachability management which holds the promise of robust prediction and prevention are discussed and defined in this paper.

Information technologies must be integrated with the expressed purpose of optimizing human performance and lifting our collective health talents. Gone be the days of choice architectures that silently and systematically erode our health and our economies; may our nations reclaim their heritage of a robust and prospering future through the co-production of an effective eScience.

## 668

### Annette Boyer AN INNOVATIVE APPROACH TO PATIENT EDUCATION

Personal health records and patient portals

Poster Session 2, 12:00pm-1:00pm, September 18, 2011

Lower Lobby

CECity, in collaboration with healthcare partners, has developed an innovative approach for consumer education. This education can be used for patients, healthcare providers, pharmacies, pharmaceutical manufacturers, health plans, and government agencies. This presentation will focus on the delivery of patient education using CECity's platform and how our web-based solution provides

patients with expert, guided education and information on both their medical conditions and their medications. The my Patient Medication Education (myPME™) website is an interactive online tool centered on patient safety and medication adherence and compliance, based upon the guidelines for useful Consumer Medication Information established by the US Food and Drug Administration.

As more and more consumers desire to have greater empowerment related to the decisions affecting their health, they require greater access to the appropriate knowledge and tools. Additionally, consumers are looking for networks of people who understand their condition from first-hand experience. As a result, myPME™ has the ability to grow to support social media and Web 2.0 in the future.

myPME™ enables patients to learn about their condition and medication at their own pace. Patients not only learn, but their level of understanding is continuously evaluated with ongoing assessments and surveys with real-time feedback to create teachable moments. The tool measures patients' pre- and post-comprehension levels of the information presented and identifies gaps in their knowledge. Additional resources are provided as part of the program to help patients close the gaps in their understanding of their condition or their medication.

CECity works closely with content partners to design the program and ensure that what myPME™ delivers fulfills federal Patient Package Insert (PPI), medication guide and, if applicable, other Risk Evaluation Mitigation Strategy (REMS) requirements. myPME™ is designed to be more than just a fully FDA-compliant digital patient package insert. It also addresses the longstanding challenge of providing balanced, high-quality health information to patients in an easy-to-use format that is both understandable, trackable, and shows patients "what they don't know that they don't know", and then closes those gaps.

The tool has been in extensive testing with patients and healthcare providers for over six months. The official launch is scheduled for summer 2011. After launch, select healthcare providers will be using the tool with their patient populations to determine the impact of education on the adherence rates using available prescription drug data. CECity, the industry leader in lifelong learning and performance improvement, lead the collaboration to develop myPME™ with expert consultation from leaders in consumer medication education. CECity has applied over 15 years of research, experience, and research in the principles of adult learning and healthcare education to develop myPME™. myPME™ delivers the highest quality information for patients on their medical conditions and their prescribed medications. The result is a one-of-a-kind patient education and medication, safety, compliance, and adherence solution.

## 669

### Will Riley, Margaret Morris, Sean Munson, Paul Resnick AFFECTCHECK: HOW REAL-TIME FEEDBACK ON AFFECTIVE TONE INFLUENCES TWITTER COMMUNICATION

eCoaching

Poster Session 2, 12:00pm-1:00pm, September 18, 2011

Lower Lobby

Background

Tools that invite self-reflection of affective tone may help people communicate more effectively in online social networks, allowing them to develop and maintain the social connectedness that contributes to health and well-being. In a recent study, people described reluctance to post health experiences because they were worried they would be perceived as either complaining or boasting, and with an aversion to those that they perceived as chronically complaining. In this study, we explore ways to enhance self-awareness about projected affective tone on Twitter. To help Twitter users ("Twitterers") self-monitor affective tone, we created a tool that reflects the positivity or negativity of "tweets" as they are written. Inspired by real-time spell checking, the tool automatically color-codes words (red for negative words and green for positive words), which allows writers to edit their emotional content before publication. Like many spell checkers, the tool also allows writers to correct and personalize the automatic classification of words. By clicking on a word, writers can redefine it as negative or positive. This prototype allows us to investigate the potential for real-time feedback about affect as a tool for impression management in social media.

In this study, we examine how real-time affect-checking influences microblogging communication on Twitter. Specifically, we test whether feedback leads to more editing and/or a change in the balance of negative and positive words. We also measure whether affect feedback and associated editing influences the reactions of readers, that is whether tweets are more likely to be re-tweeted, whether they get more direct responses, and whether responses are more positive.

Methods

We will recruit active Twitterers who have expressed an interest in self-improvement (by following a self-improvement thought leader on Twitter). Participants in our study will install a Firefox add-on that collects keystroke-level data on how they write tweets using the Twitter.com website. During the first phase of the study, the add-on will gather data about how participants write tweets without any affect-checking feedback. During the second phase

of the study, the add-on color codes tweets as they are composed prior to posting. The initial dictionary of positive and negative words comprises the LIWC and ANEW collections, but users can correct and personalize their dictionaries. The affect checker stems words and reverses their valences if preceded by negation words, such as "not" or "can't." Effects will be evaluated using a within-subjects design, comparing baseline activity to activity when the affect-checking display is turned on. Dependent measures include the total number of tweets posted, the percentage of positive vs. negative valence words, the amount of editing during message composition, the probability of being re-tweeted, the probability receiving a reply, the affect of replies, and the number of followers.

Results

Research in Progress.

Conclusions

Research in Progress.

## 670 •

Mark S. Boguski, Michele R. Berman

### THE GOODY-GAGA EFFECT: HEALTH COMMUNICATION AT THE NEXUS OF SOCIAL MEDIA & POPULAR CULTURE

Health information on the web: supply and demand

Parallel Session 5, 2:30pm-4:00pm, September 17, 2011

LK005

In its report Healthy People 2020, the U.S. Department of Health and Human Services states that one of its major objectives is to use communication strategically to improve health. One of the ways in which the report states this can be done is through use of health images in the media and popular culture. Health information campaigns have traditionally relied on mass communication (such as public service announcements on billboards, radio, and television) and educational messages in printed materials. However, fueled by social networking technologies and the emergence of participatory medicine, the ways in which consumers find and use health information are undergoing dramatic change. Based on new insights into the theory and operational characteristics of "teachable moments", and novel adaptations of theoretical models of health behavior change, we have created a multi-channel platform to systematically create and distribute Teachable Moments in Medicine® using blogs, Facebook, and Twitter. This system has the potential to educate and inform millions of consumers in a cost-effective manner since three-fourths of all Americans are online and virtually all take some interest in popular culture. The system has also proven popular among professional healthcare providers as a new mode of communication and understanding with their patients.

## 671

Alan Littleford, Mark Boguski

### HOW TO EXPERIENCE RESOUNDING HEALTH

Consumer empowerment, patient-physician relationship, and socio-technical issues

Demo Session 2, 4:15pm-4:30pm, September 17, 2011

Upper Lobby

Resounding Health is a self-organizing knowledge base of health information powered by a medical ontology engine. It is also a toolkit for creating user-defined CaseBooks to collect, organize, personalize, store and share the results of Internet searches on health and wellness topics. CaseBook technology enables users to create custom remixes and analysis of content from different online sources. This content is automatically organized and integrated via the underlying ontology. The Resounding Health platform is able to accompany users to other sites and provide on-demand access to its knowledge base and tools when a user is evaluating the content of these sites. As a technology demonstration, we have captured, integrated and organized consumer health information from 30 U.S. Government web sites into a single knowledge base. In summary, Resounding Health can create self-organizing, update-on-demand collections of online biomedical information that can be shared, extended and embedded in other works. These capabilities lead to several powerful knowledge management applications to support participatory medicine. One example is personalized annotation of electronic health records with the results of empowered patients' own online research. Other use cases, including B2B applications, will be described.

## 673

Mark Casselman, Nathaniel Hamming, Kevin Tallevi,

Joseph Cafazzo

### A MOBILE PHONE-BASED SELF-MANAGEMENT SYSTEM FOR ADOLESCENTS WITH TYPE I DIABETES

Web and mHealth applications

Demo Session 3, 9:58am-10:13am, September 18, 2011

Upper Lobby

Background

More than 80% of primary care visits and two-thirds of medical admissions into hospital emergency departments are related to chronic diseases. Effective chronic disease management can result in improved health outcomes and increased quality of life. One of the most common chronic diseases affecting children, adolescents, and adults is type 1 diabetes mellitus (T1DM). World-wide data have repeat-



edly demonstrated that therapeutic targets are not met among adolescents with T1DM. Moreover, data have failed to demonstrate a correlation between insulin regimen and glycemic control, suggesting that factors such as self-care behaviors and educational models likely have substantial impact on outcomes. Increased attention to these factors may lead to improved blood glucose control. Given their propensity for new technology, eHealth may provide important opportunities to engage adolescents and to help them improve self-management skills and behaviors.

The goal of this project is to evaluate whether technology can be used to assist adolescents with self-care behaviors and improve glycemic control. With patient, family, and multidisciplinary professional input, we have developed a novel iPhone diabetes application ("bant") that differs from current technology in that it uses prompts to aid adolescents with analysis of data and with decision making regarding needed changes in treatment plans. Additional features include wireless transfer of readings from glucose meter to the iPhone, and trending tools and alerts to support proactive decision-making. "bant" also utilizes social networking and a rewards algorithm to incentivize healthy self-care behaviors.

#### Methods

Pre-pilot research involved qualitative, ethnographic interviews with patients and family caregivers (parents) to inform the design and development of the application. The major themes that emerged were used to inform the design and development of the self-management system. The pilot trial consists of 20 adolescent participants (aged 12-16 years old) with T1DM who will be using "bant" to assist with self-management for a period of 3 months. The primary outcome is improved glycemic control (A1C); secondary outcomes include measures of quality of life, self-care behaviors, self-efficacy, adherence to self-care recommendations, and effectiveness of different components of "bant". Each participant will receive an Apple iPhone or iPod Touch device pre-loaded with a diabetes self-management application ("bant") and a blood glucose meter that is linked wirelessly to the device. Participants will use this system for 3 months to track and manage BG and inform daily decision-making related to their diabetes management between quarterly clinic visits (standard care).

#### Results

We are in the midst of completing the 3-month pilot study to test the system with adolescents as they self-manage their diabetes on a daily basis between quarterly visits with their healthcare team. The pilot trial will be completed in June 2011.

#### Conclusions

If successful, "bant" may lead to long-lasting improvements in care of patients with T1DM and to the development of other technology-based self-management systems.

## 674

### Lisa N. Gualtieri, Pamela K. Ressler COMMUNICATING THE EXPERIENCE OF ILLNESS THROUGH PATIENT BLOGS

#### Social networks

Parallel Session 10, 10:30am-12:00pm, September 18, 2011  
LK130 Hall

#### Background

Patient blogs range from New York Times journalist Dana Jennings blogging about his prostate cancer with hundreds of thousands of readers and hundreds of comments to a woman writing about her breast cancer with a small number of readers and few, if any, comments. Thirteen percent of e-patients write a blog about their diagnosis and treatment, where e-patients refers to the 61 percent of US adults who use the Internet for health information. The number of patient bloggers is likely to grow with the popularity of blogs and other forms of social media and the increased use of blogs on public health, hospital, and media websites.

Our primary question was what motivates people with chronic disease to start and maintain a blog. Our secondary question was what are the benefits for these patients, their family and friends, their healthcare providers, and others with the same disease.

#### Methods

We conducted a qualitative preliminary survey study of individuals diagnosed with chronic illness. The 24 respondents, 20 of whom wrote health blogs, were self-selected to participate by responding to a request by email or on Twitter. A larger study is under way.

#### Results

The reasons the 20 bloggers had for starting and maintaining a health blog included to help others with the same diagnosis, communicate with family and friends, express feelings, and track the progression of the disease and treatment. Respondents blogged for varying lengths of time and frequency. Most never thought to show their doctor, and were concerned their doctor would be offended by some of what they wrote. Four respondents did not blog; the reasons included that they never thought to, were too depressed, didn't want to think about their illness, or were concerned about privacy.

#### Conclusions

Patients who blog are very committed to the process and write very openly about the devastating experience of diagnosis and the physical and emotional toll of treatment.

While people write journals and books about their experience of chronic disease and use email to communicate with family and friends, blogs offer visibility and immediacy. Many patients who blog are highly motivated to communicate with their family and friends and to help others, but not by the opportunity to communicate with healthcare professionals. Since the number of health bloggers is likely to grow, there is value in better understanding the motivations and perceived benefits of blogging especially when there are so many other ways to communicate the experience of illness. A further study is currently under way to investigate the benefits of health blogs for patients, their family, friends, and healthcare providers. One goal is to understand the benefits from these different perspectives; another is to consider if there are patients who would not otherwise consider it yet could benefit from a recommendation from their healthcare provider to start a blog. Finally we will analyze patient blogs to determine what public health and healthcare professionals can learn from perusing these narratives of the experience of illness.

## 675

### Isabelle David, Lise Poissant, Annie Rochette, Sara Ahmed A QUALITATIVE STUDY ON THE DEVELOPMENT OF AN INTERPROFESSIONAL VIRTUAL COMMUNITY OF PRACTICE

Building virtual communities and social networking applications for health professionals

Poster Session 1, 12:30pm-1:30pm, September 17, 2011

#### Lower Lobby

#### Background

Information and communication technologies have the ability to accelerate access and sharing of relevant information to support clinical decision-making. The Web 2.0 (blog, forum, wiki, etc.) offers significant potential to support the best clinical practice. In Quebec, health professionals are increasingly pressured to adopt an evidence-based practice to ensure greater efficiency of their services. However, the transition between "know what to do" and "know how to do" is still difficult. To overcome this situation, the Web 2.0 is beginning to be used within professional practice to expose that knowledge through communities of practice.

The aim of this study was to: 1) gain a better understanding of the perceptions of professionals on the development of a Web 2.0 platform in order to support communities of practice in stroke care; 2) examine variables that have an impact on the perceived ease of use and usefulness of the platform.

#### Methods

A qualitative study was conducted with clinicians and managers. We conducted semi-structured interviews with three groups of professionals. The first group consisted of active members of the Montreal Stroke Network (MSN), which is a face-to-face network. Since 2006, this network has gathered three communities of practice in stroke care. The second group consisted of less active professionals within the MSN. The third group consisted of people who worked outside the greater Montreal area and were unaware of the MSN. The structure of the guide was organized as follows: first, participants were asked to explain their job and then specifically discuss their perceptions and needs relative to a Web 2.0 platform. Issues related to the strategies used for knowledge sharing, the benefits of community of practice, and the use of technology were also discussed. The interview transcripts were subject to a content analysis based on the Technology Acceptance Model.

#### Results

Twenty-four interviews were conducted (mean age 45.4 years; men=0/24). The main emerging theme related to usefulness and ease of use perceived by health care providers concerning Web 2.0. Knowledge transfer was identified by 23 out of 24 participants to be the most useful outcome of a Web 2.0 platform. Respondents also expressed the need for a user-friendly platform. Accessibility of a computer and the Internet, characteristics of the Web 2.0 platform, user support, technology skills and previous technological experience were found to influence perceived ease of use and usefulness. Lack of time emerged as having a negative influence on the behavioral intention to use this tool, despite the highly perceived usefulness of Web 2.0. On the other hand, nearly half of respondents mentioned that the Web 2.0 platform would allow them to save time.

#### Conclusions

Professionals consider Web 2.0 to be a very useful application for knowledge transfer and sharing. However, lack of time and lack of technological skills remain as perceived barriers to the use of this technology.

## 676

### James G. Kim, Sungin Lee, Seungbeom Kim, Hyejin Jeong, Suik Lee, Hong-Gee Kim APPROACHING TO PATIENTS AND WORKING IN PARTNERSHIP BY FOSTERING AGREED-UPON TAGS IN SOCIAL MEDIA

Web 2.0 approaches for clinical practice, clinical research, quality monitoring

Poster Session 2, 12:00pm-1:00pm, September 18, 2011

#### Lower Lobby

The biopsychosocial model is a model that suggests that not only biological factors but also psychosocial factors in a patient's everyday life can potentially influence health outcomes. Yet, physicians cannot effectively capture a holistic understanding of the patient with a few short consultations and there have not been adequate tools thus far. Especially as physicians face the widest spectrum of diseases, ages, and socioeconomic backgrounds (i.e. in primary care settings), it becomes increasingly cumbersome to acquire a comprehensive view of the patient. Moreover, if the patient does not exhibit any serious symptoms, the cost of in-hospital observation may not be affordable and various life events that may cause recurrent symptoms cannot be easily distinguished by the patient's own efforts. To mitigate these issues, we have attempted to use social media such as me2day — a Korean microblogging service — in our clinical practice. Social media, with its increasing popularity, can offer opportune exchanges of important data between the physician and the patient. The information flow, however, between physician and patient in social media is primarily unidirectional — the physician being the provider, and the patient the beneficiary. Our approach aims to engage patients in a more bi-directional way, with relationships and mutual agreement between the two parties as the core foundation on which the technical benefits of social media are to be utilized. We have gleaned patients' life data from available social media, and the way that data can be harnessed to support patients' health behavior change is discussed, built, and pursued. This attempt can turn 5-minute consultations into an ongoing communication through which patients' information and physicians' support are continually available.

The agreement process in our practice is twofold: 1) the patient consents to use a designated social media service; and 2) the patient agrees to use a personalized tag set. The second agreement process involves a one-time face-to-face consultation. During this consultation, a set of pertinent and aggravating lifestyle factors — such as alcohol drinking, overwork, etc. — are extracted and converted into a collection of 'agreed-upon' tags. These tags are used in communication between the patient and the physicians in social media messages, whenever an identified factor has emerged. All tagged messages are used in encounters with the patient, in order to strengthen his/her commitment and willingness to make lifestyle changes, or to support the physicians in confirming his/her diagnosis. Exploration and accommodation of patients' views into clinical practice is an important factor which enables rapport building and appreciation. Use of social media, especially the mutually agreed-upon tags, in a few of our cases has shown that this approach has a great potential to identify patients' hidden and personal health risks in daily life. We believe this approach helps physicians employ a wider lens into the needs of patients, which can subsequently improve quality of care and empower patients.

## 679

### Jesse Cirimele, Leslie Wu, Scott Klemmer, Stu Card TABLET-BASED COGNITIVE AIDS REDUCE ERRORS AND INCREASE COORDINATION IN CRISIS CARE TEAMS

Web 2.0-based medical education and learning

Parallel Session 1, 11:00am-12:30pm, September 17, 2011

#### LK120 Hall

#### Background

Doctors are beginning to embrace cognitive aids, such as paper-based checklists or flowcharts, that can ensure higher-quality medical care with lower error rates. However, not much is known about how to effectively design interactive cognitive aids in crisis care situations using modern, mobile technologies.

Our goal is to understand how tablet based cognitive aids can be designed to help crisis care anesthesiologists manage the limited resource of their attention. In collaboration with Dr. Larry Chu and Dr. Kyle Harrison in the AIM lab at Stanford's School of Medicine we have begun to study the use of cognitive aids in heart failure during anesthesia. After understanding the problems in this smaller domain we will generalize to other crisis scenarios. The AIM lab has found that increased use of the paper Cognitive Aids they currently use have been correlated to reduced errors in simulated crisis care scenarios.

We hypothesize that adding a display visible to the whole team and embedding cognitive aids within patient vital displays have the potential benefits of assisting teams in managing individual attention, improving team-based communication, and helping teams maintain a shared mental model of the crisis. We will study how the two aspects of the design of interactive cognitive aids affect their usability and effectiveness by varying the size of the cognitive aid displays, their layout within the physical space, and the kind of information they display. Our first prototype will explore how changing the size of the cognitive aid from personal to large monitor changes how the team sees the cognitive aid.

We hypothesize that this will reduce errors by helping the team maintain a shared mental model of the important steps in the crisis. Our second prototype will explore how moving the cognitive aid from a separate cart to being embedded within the patient's vitals display changes the social and attentional aspects of the cognitive aid. We hypothesize this will increase the overall usage of our cognitive aid and that will correlate with reduced errors.

#### Methods

We will evaluate two prototypes that build upon the commercially available iPad-based "StanMed" application. Using this application as a prototype, we qualitatively explored the important pieces of a crisis situation and elicited concrete design ideas from doctors. Both of these prototypes will follow this method: Participants are instructed in the use of our cognitive aid prior to a simulation scenario. The researchers watch the scenario from behind a 1-way mirror and video record the training session. We code video of the simulations for interaction errors and make note of "critical incidents" where tablet-based cognitive aids provide a new opportunity to help doctors, or disrupt work practices. At the end of the scenario we do a post-hoc interview with the participants to gather feedback on the cognitive aid. Both the interviews and the coded video inform the final design of the cognitive aid. We will present the results and conclusions from our design at the Medicine 2.0 conference.

Results  
Research in Progress.

Conclusions  
Research in Progress

## 681

Nithin O. Rajan, Pierre Elias, Kara McArthur, Harold Farber, Clifford C. Dacco

### INSPIRE TO PLAY (PROMOTE LUNG ASSESSMENT IN YOUTH): EVOLVING THE SELF-MANAGEMENT PARADIGMS OF YOUNG PEOPLE WITH ASTHMA

Web 2.0 approaches for clinical practice, clinical research, quality monitoring

Parallel Session 7, 4:30pm-6:00pm, September 17, 2011

Plenary Hall

Background

Asthma is the most common chronic disease in childhood, disproportionately affecting urban, minority, and disadvantaged children. Individualized care plans supported by daily lung-function monitoring can reduce morbidity and mortality. However, despite 20 years of interventions to increase adherence, barely 50% of U.S. youth accurately follow their care plans, which leads to millions of preventable hospitalizations, emergency room visits, and sick days every year. We present a feasibility study of a novel, user-centered approach to increasing young people's lung-function monitoring and asthma self-care. PLAY (Promoting Lung Assessment in Youth) helps young people become active managers of their asthma through the Web 2.0 principles of participation, co-creation, and information sharing. Specifically, PLAY combines an inexpensive, portable spirometer with the motivational power and convenience of mobile phones and virtual-community gaming. The objective is to develop and pilot test PLAY, a fully functional interface that incorporates a handheld spirometer, an interactive game, and an individualized asthma-care instant-messaging system housed on a mobile phone.

Methods

PLAY is an application for PC and mobile phones that creates a compelling world in which youth collaborate with their physicians on managing their asthma. Drawing from design-theory on global timer mechanics and role playing, we incentivize completing spirometry maneuvers by making them an engaging part of a game young people want to play. The data can be sent wirelessly to health specialists and return care recommendations to patients in real-time. By making it portable and similar to applications normally desired, PLAY is able to seamlessly incorporate asthma management into their lifestyle.

Results

A pilot study of PLAY assessed likability of the GUI as well as young people's interest in our incentivizing system. Nearly 100% of children surveyed said they would play games like those in PLAY if they involved breathing into a spirometer. Two-thirds said they would prefer PLAY over the spirometer alone, whereas one-third would prefer having both. No children said they would prefer the spirometer over PLAY.

Conclusions

Previous efforts at home-monitoring of asthma in children have experienced rapid decline in adherence. An inexpensive monitoring technology combined with the computation, interactive communication, and display ability of a mobile-phone is a promising approach to sustainable adherence to lung-function monitoring and care plans. An exciting game that redefines the way youth conduct health management by inviting them to collaborate in their health better incentivizes and can be a catalyst for farther-reaching goals.

## 685

Iain Doherty, Margaret Hansen

### IMPROVING MEDICAL INTERNS' LEVELS OF CLINICAL SKILLS COMPETENCE AND SELF-CONFIDENCE LEVELS VIA VIDEO IPODS: A PILOT RANDOMIZED CONTROLLED TRIAL

Web 2.0-based medical education and learning

Poster Session 1, 12:30pm-1:30pm, September 17, 2011

Lower Lobby

Background

Today's health-care educators need to be mindful of instructional design and execute effective and powerful tools to provide evidence-based education. The use of Social

Web (Web 2.0) applications is evolving as learning tools in healthcare professional development and education. However, there is a paucity of empirical research to support the effectiveness of interactive Web 2.0 applications on medical education outcomes.

The goal of this study was to determine if clinical instructional videos, pertaining to female and male urinary catheter insertion, delivered via Apple Computer iPods would increase medical students' confidence levels and enhance skill competencies.

Methods

A prospective study was conducted with medical trainee intern (TI) participants: 10 control participants (without any technological intervention) and 11 intervention participants (two clinical videos delivered via Apple Computer video iPods). A questionnaire regarding previous exposure to male and female urinary catheterisation and their level of confidence in performing the skills was completed before participating in a required skills course at the Advanced Clinical Skills Center (ACSC) laboratory at the University of Auckland, New Zealand. Directly following the completion of the questionnaire, medical faculty gave a 40-minute skills demonstration in the ACSC. Both groups received verbal instruction in the catheterisation procedure, a demonstration by a clinical tutor, a copy of the 'marking' proforma outlining the steps in the procedure and were then able to practice the procedure once whilst supervised before being tested. It is possible both groups would have, as students, seen these procedures on the wards and may have had the opportunity to perform this procedure prior to the clinical skills course where it was taught. Participants completed a post-course questionnaire regarding skill confidence levels following the clinical-skill evaluation in the ACSC. The intervention group received an iPod with only the male and female catheterisation procedure videos and were able to watch the two videos an unlimited number of times in the 3-month period before follow-up. The control group did not have access to the videos via the iPod, online, or on a computer during the 3-month time frame and the intervention group was asked not to share the iPod videos with members from the control group. Both groups were on the same clinical rotation over the 3 month period. All participants completed a follow-up questionnaire and a clinical assessment of urinary catheterisation skills at the ACSC lab directly following the 3-month period.

Results

The results illustrate skill competency weakening over time among the control group for both male and female catheterizations; however, the competency level was stable among the experimental group for both procedures. Interaction results for competency scores indicate a significant level by group and time ( $P = .03$ ) and procedure and group ( $P = .02$ ). The experimental group's confidence level for performing the female catheterization procedure differed significantly over time ( $P < .001$ ). Moreover, confidence scores in performing female catheterizations increased for both groups over time. Interestingly, both groups' confidence levels for performing the male catheterization decreased over time.

Conclusions

Interactive Web 2.0 tools offer a new andragogical approach to improve medical students' self-confidence levels and skills acquisitions. Further empirical research is needed in order to generalize to the medical school population at the global level.

## 686

### Stephanie Habif, Ramin Bastani, Nicholas Grosskopf BEHAVIOR CHANGE AND MOBILE HEALTH TECHNOLOGY PANEL: A TRIFECTA STRATEGY FOR SUCCESSFUL DESIGN

Web 2.0 approaches for behavior change, public health, and biosurveillance

Panel Session 3, 10:30am-11:15am, September 18, 2011

Plenary Hall

The surge of mobile health applications and wellness design innovation brings a growing need for behavioral health researchers and practitioners to study the creation and effectiveness of these applications. A clear understanding of health behavior science is key for optimal design, implementation, and usability of health 2.0 products, programs, and services. Very few design teams and organizations are using behavioral health experts, leaving an important gap in the development process. Behavioral health experts, through collaboration with designers and entrepreneurs, are essential contributors to this growing body of work.

What happens when a health behaviorist, a health tech entrepreneur, and an academic researcher join forces? This panel will offer insights into the conversations surrounding the whys and hows of mobile health efficacy data. Dr. Stephanie Habif is a health behaviorist working with health 2.0 tech start-ups and design agencies. She will share stories about pitching efficacy research strategies to health tech entrepreneurs. Ramin Bastani is CEO and Founder of Qpid.me - an Internet service that enables people to verify and share STD testing results using mobile/SMS. Ramin will discuss his decisions to strategically incorporate behavioral health evidence and expertise into the development of his company. Professor Nicholas Grosskopf is an academic researcher who focuses on sexual health issues and interventions. Nic will explain how to use simple research to increase health technology efficacy.

These three have designed a research project to learn more about thoughts, attitudes, behaviors, and technology use related to sex. Specifically, their collective interest surrounds using web and SMS-based messaging for sexual health behavior change. Their research project is a mixed-methods efficacy study to assess needs and behavioral trends among priority populations experiencing high rates of STD transmission. Preliminary data will be presented. The panel will also highlight their collaborative working process to reveal professional similarities and differences, likes, and dislikes. Audience members will walk away with perspectives on ways to bridge the gap between academia, public health, and health 2.0 entrepreneurs/private industry.

## 688

Simone Karp

### DEMO OF A PLATFORM THAT SUPPORTS CONTINUOUS PERFORMANCE IMPROVEMENT BY INTEGRATING PERFORMANCE ASSESSMENT, METRIC-FOCUSED INTERVENTIONS, INCENTIVES, AND COMMUNITY TO IMPROVE HEALTH CARE QUALITY

Public eHealth and health policy

Parallel Session 12, 1:00pm-2:30pm, September 18, 2011

LK120 Hall

CECity's AVEDIS system is a platform that supports a holistic approach towards Continuous Performance Improvement across the healthcare continuum, including individual providers, cross functional teams, and disparate organizations. Through the alignment of Performance, Learning, and Incentives, the AVEDIS platform is being used to deliver programs in support of various healthcare models with a focus on improvement. Programs being deployed through AVEDIS are supporting shared risk models, such as Accountable Care Organizations, and other initiatives such as Pay For Performance Programs, Quality Designation Programs, Professionalism Programs such as Maintenance of Certification, and others. Additionally, the AVEDIS system provides tools which facilitate data collection from multiple sources, including web-based chart abstraction (retrospective), registries (prospective), and integrated data feeds from 3rd party database systems (EMR, Health Plan, etc.).

In the proposed presentation, you will see how the AVEDIS platform, branded as ASPIRE, is being used to support the Pennsylvania Collaborative by integrating continuous performance assessment with metric-focused interventions to improve medication adherence for health plan members. More than 90% of the estimated 3.5 billion annual prescriptions are written to treat leading chronic diseases, yet up to 75% of patients report not taking their medications as prescribed, including millions who do not take them at all. To address this issue, the Pennsylvania Collaborative initiated a scalable model for performance assessment with links to focused interventions to close the practice gaps and improve upon patient compliance and adherence for chronic conditions. The Collaborative, consisting of Highmark BCBS, Rite Aid Pharmacy, CECity.com and the University of Pittsburgh School of Pharmacy, each have specific roles and responsibilities in this initiative. The goal of this work is to demonstrate the impact of targeted interventions to produce measurable improvements in medication adherence. Studies suggest that improvements in medication adherence would in turn produce quantifiable decreases in treatment costs.

This presentation will explore continuous data aggregation and evaluation of medication use metrics for health plan members; the usage and effectiveness of quality reporting, assessment and impact of dynamically linking to interventions for performance improvement to quality measure gaps; the use of a web-based performance improvement platform to scale and spread performance assessment, reporting and improvement across disparate partners; the cost effectiveness of the improvement interventions and discussion of potential performance-based incentive reimbursement strategies to be considered by health plans; the evaluation of the cost effectiveness of the medication adherence improvement program; and the impact of the cost and satisfaction of health plan members.

## 693

Manuel Armayones Ruiz, Beni Gómez Zúñiga, Eulàlia Hernández Encuentra, Noemí Guillamón Cano, Begonya Nafria Escalera, Gerardo Ontiveros Rodríguez, Ana Bosque García, Modesta Pousada Fernández, Modesta Pousada Fernández

### APTIC, DEVELOPING A SOCIAL NETWORK FOR E-PATIENTS: LESSON LEARNED

Building virtual communities and social networking applications for patients and consumers

Parallel Session 7, 4:30pm-6:00pm, September 17, 2011

LK120 Hall

Background

The APTIC social network has been developed by the PSINET research group at the Universitat Oberta de Catalunya, in collaboration with Hospital de St. Joan de Déu and the Fesalud Foundation. The network aims to enable the individual members of patients' associations (mostly parents of children with chronic and rare diseases) to share experiences, information, resources and advice. In parallel, we created a group on Facebook (APTIC Facebook Group)



to publicize the network and analyze differences in the use of the two platforms (APTIC Social Network vs. APTIC Facebook Group).

#### Methods

User data were collected from Google Analytics in order to obtain frequencies for users, users' features, visited pages, user generated content, etc. We used questionnaires and made focus groups with users of both groups to analyze their differential use, expectations and preferences of the platforms (APTIC Social Network vs APTIC Facebook Group).

#### Results

One year after setting up the network we have 450 users in APTIC (most of them without posting contributions to the site) and 1500 in the APTIC Group in Facebook (with a higher level of participation). In its first year of activity, the APTIC Social Network has become a reservoir of information about disabilities and rare diseases affecting children and teenagers and the APTIC Facebook Group a space for the "social life" of parents and friends. Thus, the APTIC Social Network adds value to the community because the information available there (after having been proved useful) becomes available to all members. However, contrary to what we expected, the APTIC Social Network has not developed into a forum for dialogue or the exchange of personal experiences, but into a reservoir of information. Moreover, social networks such as Facebook have become the main means of promotion and dissemination of APTIC: 90% of APTIC users have learned about the APTIC Social Network through the APTIC Facebook Group.

#### Conclusions

The parents and families are using our social network in a different way than we had originally planned (and we need to continue adapting to their needs and actual use) Analyzing the data, we conclude that we should redesign our network strategy by integrating the APTIC Social Network with other social media tools and channels on Youtube, Twitter, Dropbox, and LinkedIn and maintain the current APTIC Social Network as a "hub" from which users can access other services. We also need to expand our network beyond the usual limits of a vertical network, create a pervasive and ubiquitous environment while at the same time offering users a "private space" which they can use the way they want.

## 694

Jobke Wentzel, Maarten Van Limburg, Joyce Karreman, Lisette Van Gemert-Pijnen

### PARTICIPATORY DEVELOPMENT OF A 2.0 PLATFORM TO IMPLEMENT AN INTERNATIONAL ANTIBIOTIC STEWARDSHIP PROGRAM

Participatory healthcare

Poster Session 1, 12:30pm-1:30pm, September 17, 2011

Lower Lobby

Background

To reduce the risks resistant bacteria pose to patient safety, more prudent use of antibiotics both in and outside care facilities is needed. Our literature review shows that there is a lack of available, usable, and tailored information on antibiotic use in public health and care facilities. Antibiotic Stewardship Programs (ASPs) have been proposed and implemented--mainly in hospitals--to facilitate physicians in prescribing the right antimicrobial drug for an appropriate amount of time. Hereby, cost-savings and increases in patient safety can be accomplished. According to the literature, ASPs need to be based on international standards that are applied in care facilities based on local resistance patterns and resources. An ASP should be carried out by multidisciplinary teams that provide caregivers with evidence-based feedback. Implementation includes educational activities, reminders, decision support, and patient education. Technology-based interventions can support the development and implementation process. The effects of ASPs are promising, but a lack of awareness, knowledge, acceptance, adherence and ownership hinder implementation. Therefore, we apply a holistic approach to develop a 2.0 platform that fits with its "users" and supports the implementation of ASPs.

The objective is to develop a user-friendly and feasible 2.0 platform including ASP-application aimed at increasing patient safety.

#### Methods

A holistic development of the 2.0 platform and ASP application will integrate human centered design and business modeling. Key-stakeholders (patients, caregivers, decision-makers) participate during the development process to identify needs (contextual inquiry), demands and critical issues for implementation (value creation) and to prototype concepts (co-design). This leads to business models for the operationalization (effects on costs, health outcomes). First we developed the 2.0 basic infection control platform that supports communication and information. Scenarios and mock-ups were discussed via stakeholder-interviews (physicians, nurses, pharmacists, patients). These interviews ground the development of the 2.0 platform and its ASP application. Workshops following this approach are carried out between May and June 2011. In interactive stakeholder workshops we use critical incidence techniques to perform the contextual inquiry and value creation. With the end-users, the resulting functional requirements are translated into a technology design. Via stakeholder participation business models are created for

the operationalization of the ASP in practice.

#### Results

Participatory development resulted in a 2.0 infection control platform that enables communication, documentation and information exchange regarding infection control. The platform can be used as an information source, but more importantly, it supports stakeholder needs of cooperation and interaction through information-sharing applications such as social media, a forum, document upload, and the interactive ASP application that is being developed. A working prototype of the ASP application that is part the platform will be realized this summer. The design of the ASP application will be co-created with the end-users, the exact functionalities and features depend on the research outcomes. The 2.0 platform and its applications are not technology-driven but stakeholder-driven, facilitating implementation and uptake.

#### Conclusions

Based on previous experiences and first results it is expected that the participatory development of the platform renders commitment, adherence to guidelines, cost reductions, and thereby improves patient safety.

## 696

Andrea A. Cortinoio

### PUBLIC HEALTH IN LATIN AMERICA AND THE CARIBBEAN: NURTURING INNOVATION, DEVELOPING COMMUNITIES, IMPROVING HEALTH EQUITY

Building virtual communities and social networking applications for patients and consumers

Demo Session 1, 1:10pm-1:25pm, September 17, 2011

Upper Lobby

This presentation focuses on the initial implementation phases of a regional applied research project called 'Public eHealth Innovation and Equity in Latin America and the Caribbean (eSAC)'. The initiative is funded by the Ottawa-based International Development Research Centre (IDRC) and aims to improve the health of disadvantaged groups and to contribute to the advancement of equity in health in the region, by nurturing and promoting Public eHealth innovation. eSAC was designed and is jointly implemented by the 'People, Health Equity and Innovation (PHI) Research Group' at the University of Toronto and the Pan-American Health Organization (PAHO), Washington DC. The project will create a fertile environment for innovation by using an integrated approach that will: introduce various types of incentives; support communication and networking activities; offer capacity development opportunities; assess the applied value of solutions based on information and communication technologies (ICTs) addressing priority public health challenges in the region; and inform and sensitize policy makers. Central to eSAC's model is the role played by a small network of highly educated and motivated young professionals who work to catalyze the development of a regional community of practice and to provide necessary assistance to most project activities.

## 697

Lawrence Sherman

### CME 2.0 TAKES A VIRTUAL VILLAGE

Web 2.0-based medical education and learning

Parallel Session 3, 2:30pm-4:00pm, September 17, 2011

LK120 Hall

This session will provide real-world examples of the CME 2.0 educational continuum from assessing educational needs by measuring educational outcomes. Best practice examples will demonstrate how this is currently being done. A glimpse into the future will also be provided. The confluence of three topics: e-learning, Participatory Medicine (in which patients are involved in their own healthcare) and Communities of Practice (how medicine is practiced) meet at a place called CME 2.0. The evolution of online medical education has led to the development of multi- and inter-disciplinary educational initiatives that integrate these three topics.

Practical examples of the role of 2.0 strategies in CME needs assessments will be provided, focusing on best practices that include utilizing social media in the mix of tactics for assessing the educational needs of physicians. Information garnered must include overall management in varying practice settings and involving multiple members of the healthcare delivery team, with a focus of educating Communities of Practice collaboratively rather than the traditional methods of educating them separately. Information from patients and caregivers is another vital component to assess needs in CME 2.0, and the evolving role of Participatory Medicine will be highlighted.

Delivering the education now includes mobile and online CME courses and strategies that are accessed at the point of care. Virtual practice environments (simulating the clinical environment) and virtual educational settings (making things like grand rounds virtual and 2.0) are seen. Online education, once thought of as just a "spin-off" from live meetings, has become a vital component in multi-platform initiatives, which can form the basis for a curricular approach to CME.

Social media is also used in CME 2.0 to raise awareness about education and to create an environment for post-educational discussions in which learners are able to discuss how the education impacted their practice. Performance level outcomes can be measured. And, if patients

are involved, perhaps through innovative text messaging strategies, patient-level data resulting from the educational activities can be measured.

## 699

Rhoda Weiss-Lambrou

### IPHONE AND IPAD IN MEDICINE AND HEALTH SCIENCES; EXPERIENCES IN TEACHING AND CLINICAL PRACTICE

Web 2.0-based medical education and learning

Parallel Session 1, 11:00am-12:30pm, September 17, 2011

LK120 Hall

Background

Over the past few years, many professionals in higher education are eager to see how mobile technologies will transform higher education and the practice of medicine and health sciences. With the recent release of the iPhone and iPad, a large number of health professionals and academics have yet to become familiar with how and why mobile handheld communication devices can provide added value in both a teaching and clinical context. Today's students are skilled practitioners of mobile devices and social networking; students use technology naturally and in ways that allow them to do what they want, anytime, any place and across all geographical boundaries. Physicians, nurses, health professionals and faculty have yet to become advocates and users of handheld devices to share, engage and connect in meaningful ways with their patients, staff, colleagues, residents and students. New forms of communication, collaboration and engagement in both the classroom and clinical settings, create new frontiers for collaboration across disciplines and provide us with original opportunities for academic innovation, collective intelligence and knowledge creation. We need to examine the nature and the characteristics of these mobile devices with a particular emphasis on collaboration and social media tools. In the faculty of medicine at the University of Montreal, several faculty members and graduate students in occupational therapy have recently begun to discover ways in which the most recent mobile devices can be applied in the classroom setting as well as in hospitals and rehabilitation centers.

This oral presentation has three main objectives. First, it will describe how the iPhone and iPad are being integrated and deployed in American and Canadian universities and hospitals. Second, it will address the significance of mobile devices (including tablets and smart phones) as tools for communication, collaboration and social networking as well as some of the users' attitudes and perceptions of mobile learning and social networking. Finally, it will present a list of the author's Top 10 Web 2.0 applications for teaching and learning as well as for patient education and intervention.

#### Conclusions

The discussion will focus on how mobile learning and social networking will become significant tools of change for medical and health science education and practice in the future. Obstacles that may be encountered while integrating these mobile devices will be addressed and recommendations for future direction of research will conclude the presentation.

## 701

Joshua West

### YOU FOLLOW?: AN ANALYSIS OF PROBLEM DRINKING AND TWITTER

The nature and dynamics of social health networks and health

Poster Session 1, 12:30pm-1:30pm, September 17, 2011

Lower Lobby

Background

Twitter is a prominent web 2.0 application. A normative belief refers to an individual's perception about what people important to that individual think she should do. Whereas most Twitter content is senseless rambling, Twitter may be a platform upon which individuals communicate subjective norms about problem drinking. The purpose of this study was to explore the extent to which Twitter users tweet about problematic alcohol-related behaviors.

#### Methods

Data from this study came from tweets originating in one of 9 randomly selected states, one from each of the nine census geographies in the US. Twitter's API was used to collect tweets during the month of October, and again during the time period surrounding New Year's Eve. Keywords were selected which indicate problem drinking behaviors. Tweets were coded for the presence or absence of the keywords.

#### Results

Twitter users were most likely to tweet about problem drinking on Friday, Saturday and Sunday during the hours from 10 pm to 2 am. Tweets originating during the New Year's Eve holiday (0.53%) were twice as common when compared to tweets during the month of October (0.34%).

#### Conclusions

Tweets that mention problem drinking may be problematic for public health if they establish incorrect normative beliefs that such behaviors are acceptable and expected. Social norms interventions may be an effective tool in correcting misperceptions related to problem drinking by informing Twitter followers that problem drinking behaviors are not normative.



707

**António Vaz Carneiro, Rita Morais Lirio**  
**HARVARD MEDICAL SCHOOL - PORTUGAL PROGRAM**  
**- QUALITY HEALTH INFORMATION FOR PORTUGUESE**  
**PEAKING COUNTRIES**

Consumer empowerment, patient-physician relationship, and socio-technical issues  
 Parallel Session 8, 4:30pm-6:00pm, September 17, 2011  
 LK130 Hall

In April 2007, the Portuguese Ministry of Science, Technology and Higher Education signed a Memorandum of Understanding with Harvard Medical School (HMS) to identify a potential for cooperation. We report on the six first months of this program.

The goals of this program are to encourage internationalization cooperation between Portuguese schools of medicine and major national research centers and HMS, in areas of translational research and health information. One of the main lines of action consists of the systematic production of information concerning health for the general public in Portuguese. Activities will include the creation of health information contents and the development of technological platforms for the delivery of this information. The program will also include training of journalists and medical writers in the understanding, use, and communication of health information.

This program was developed because research over the past 30 years has demonstrated that people can powerfully protect their own health through adopting healthy lifestyles, and that people with chronic illnesses can partner with health professionals to help monitor their illnesses. At the same time, the interest of the general public in health and in the implications of biomedical research for health has risen greatly. Thus, there is great potential in a nationwide initiative to improve the availability of health information for the general public, and thereby to improve its health.

It is also believed that the development and public dissemination over the internet of high quality health information in Portuguese can be valuable to people in all Portuguese speaking countries, especially in Africa and Brazil (a community of over 200 million people). Harvard Medical School Portugal -Program is working with all Portuguese Schools of Medicine, Associate Laboratories in the area of biomedical research, other academic research units, National Institute of Health (INSA), and other governmental, non-governmental, and private institutions on several initiatives designed to educate the citizens of Portugal about health, medicine and biomedical science. In 2011, the priority is to increase the availability and understanding of health and biomedical information for the Portuguese speaking public. The innovation from this program is to generate a structure for production of high quality and accessible health and biomedical information.

So far a sizable amount of health information (some 900 contents describing the most common medical disorders and preventive medicine, novel/relevant findings in different medical fields all delivered in multiple formats: text; videos; quizzes; tips) are being disseminated on a basis of a blended communication strategy (communication 1.0 + communication 2.0) with focus on web 2.0. This blended communication strategy was adopted to reach different public segments with different ages, education levels, and information needs. So far, HMS-PT web 2.0 channels, in particular the Facebook HMS-PT webpage, is proving to bring added value to this blended communication strategy, as it enables the creation of buzz around HMS-PT contents among Portuguese health web leaders and web opinion makers. The program will be formally evaluated in terms of its impact on improvement of health literacy of the Portuguese public.

708

**Ankeet Deepak Udani, T. Kyle Harrison, Steven K. Howard, T. Edward Kim, John G. Brock-Utne, David M. Gaba, Edward R. Mariano**

**CAN A HEAD-MOUNTED DISPLAY INTERFACE ALLEVIATE**  
**ERGONOMIC CHALLENGES IN ULTRASOUND-GUIDED**  
**REGIONAL ANESTHESIA?**

**HUMAN-COMPUTER INTERFACE (HCI DESIGN)**

Poster Session 1, 12:30pm-1:30pm, September 17, 2011

Lower Lobby

Background

The use of a head-mounted display (HMD) for the real-time transmission of vital signs to the anesthesiologist's visual field in clinical anesthesia has been described. The practice of ultrasound-guided regional anesthesia (USRA) requires positioning the ultrasound machine so that the operator can visualize the monitor display often in ergonomically-challenging environments. A HMD may provide a more functional human-computer interface with continuous, real-time, ultrasound imaging within the practitioner's visual field. We tested the feasibility of using HMD technology to alleviate the ergonomic challenges of USRA.

Methods  
 In this pilot study, the clinical scenario of performing preoperative USRA with limited workspace was simulated using a pig hind-quarter with intact popliteal fossa and sciatic nerve on a gurney in an actual block room. A HMD (MicroOptical CV-3, MyVu, Wellesley, MA, USA) was connected to the S-video output of an ultrasound machine (MicroMaxx, Sonosite, Bothell, WA, USA) and the

machine's monitor display was then positioned out of the practitioner's procedural field. Two anesthesiologists (one expert and one novice in USRA) performed a total of 10 ultrasound-guided popliteal-sciatic nerve blocks. For each procedure, the sciatic nerve was visualized in short-axis with a 13-6 MHz linear transducer transmitted via HMD to the left eye piece, an 18 gauge Tuohy-tip epidural needle (B. Braun, Bethlehem, PA, USA) was directed in-plane from lateral to medial toward the target nerve, and injectate deposited around the nerve. An independent observer measured the number of times the practitioner's attention was directed away from the procedural field and overall block quality for each USRA procedural attempt.

Results  
 All 10 USRA procedures were successfully completed based on proper needle control and visualization and circumferential injectate spread around the sciatic nerve. Neither practitioner redirected his attention away from the procedural field to directly view the ultrasound monitor while performing any of the USRA procedures.

Conclusions  
 The use of HMD technology for real-time, ultrasound image transmission to the practitioner's procedural field independent of ultrasound machine placement is feasible. Within the constraints of a limited workspace and its challenging ergonomics, the functionality of an easy set-up and block performance may outweigh the additional cost and tethered nature of the HMD. The HMD interface merges ultrasound imaging with the practitioner's hand-eye coordination during ultrasound-guided procedures. Potentially, this technology may assist the novice practitioner in proper needle and probe alignment which is often a difficult technical skill to acquire. Larger, prospective, controlled studies are needed to quantify the ergonomic effects and potential educational benefits of HMD technology in USRA.

709 •

**Tiago Villanueva, Luis Filipe Cavadas**  
**HIGH LEVEL LISTSERVER-BASED VIRTUAL CONFERENCES**  
**FOR FAMILY MEDICINE RESIDENTS AND YOUNG FAMILY**  
**PHYSICIANS: THE PORTUGUESE EXPERIENCE**

Building virtual communities and social networking applications for patients and consumers  
 Parallel Session 4, 2:30pm-4:00pm, September 17, 2011  
 LK130 Hall

In Portugal, there is a "Yahoo Groups" based listserver aimed at Portuguese Family medicine residents and young Family physicians called "MGEXXI", which currently has about 1016 members, mostly from Portugal, but also from Brazil, Spain, UK and USA. Electronic discussion lists (list-servers) are important tools for professional development in Primary Care/Family Medicine, as Family Physicians usually face higher levels of professional isolation than Hospital Physicians. The listserver has been an invaluable platform for discussion, debate, and sharing of information and important documents at the local, national and international level.

We decided to take the virtual experience one step further and organize international virtual conferences with leading Family physicians from all over the world. The goal was to engage the members of the listserver in a stimulating exchange of innovative ideas, opinions and experiences with a special guest of renowned scientific and academic credentials, as well as providing additional networking and professional opportunities for members. The virtual conferences have catered for a flexible type of participation, as the members of the listserver pose questions which are answered at a time that is convenient for the special guest. These conferences have also not required any type of funding or participation fee.

Organizing these virtual conferences was possible due to the organizer's previous personal or professional contact with the special guest, use of negotiation skills, persistence, courage, and use of moderation skills during the virtual conference.

From July 2009 to April 2011, the authors, who are both also co-moderators of the listserver, organized seven virtual conferences, with the duration of one to two weeks each. The theme of the conference is chosen by the special guest, and previous themes were "Innovation in General Practice/Family Medicine and Primary Health Care" (Juan Gervás, Spain), "Our clinical records: for patients and health care" (Mike Pringle, United Kingdom), "Primary Care in 2015" (Richard Roberts, USA), "Family Medicine in Brazil: strengths and weaknesses" (Gustavo Gusso, Brazil), "Defining the individual and collective responsibilities of the future Family Doctor" (Les Toop, New Zealand), "Challenges in Primary Health Care" (Barbara Starfield, USA) and "Primary Care in a Global Perspective: The contribution of Family Medicine to Global Health" (Per Kallestrup, Denmark). The official languages used in the virtual conferences have been Portuguese, English or Spanish, depending on the nationality of the special guest. The seven conferences have generated so far nearly 300 questions from members of the listserver. In terms of impact, the experience of organizing the virtual conferences has resulted in positive feedback from the participating colleagues, as well as in coverage in the mainstream Family Medicine Portuguese and international press and the transcripts of the virtual conference (question-answer sets) have been published in a special section of the main Portuguese portal concerning Family Medicine and Primary Health Care in

Portugal ([www.mgfamiliar.net](http://www.mgfamiliar.net)) on <http://www.mgfamiliar.net/mgfsxi.htm>.

We intend to continue pursuing this already internationally acclaimed project throughout 2011, as well as developing the potential of these virtual conferences by inviting special guests from other fields of science such as Sociology, Anthropology, or Management, thus generating multidisciplinary debate.

711 •

**Vineet Singal**  
**UTILIZING THE POWER OF TEXT-MESSAGING (SMS)**  
**TECHNOLOGY TO INCREASE PATIENT COMPLIANCE**  
**WITH MEDICATION AND ADHERENCE TO PHYSICIAN**  
**RECOMMENDATIONS AND EDUCATIONAL INTERVEN-**  
**TIONS IN FREE CLINICS**

Mobile health and digital learning for adherence  
 Parallel Session 11, 1:00pm-2:30pm, September 18, 2011  
 Plenary Hall

Anjna Patient Education is the first of its kind nonprofit to implement sustainable health education programs at free clinics. Anjna realizes the need for health education to reach patients outside the clinic setting. Even with the best in-clinic educational experience, patients often do not follow the prescribed drug regimen or educational intervention program. This problem is nowhere more apparent than at Schuman-Liles, a mental health clinic in Oakland, CA that serves over 1,000 patients monthly. The clinical effectiveness of drug therapies for mental health at the clinic is limited by inadequate patient adherence to the recommended protocol: 50-70% of mentally ill patients at Schuman-Liles do not follow the prescribed regimen, regularly fill prescriptions, or attend follow up appointments. To empower Schuman-Liles with an effective follow-up system for their patients, we are implementing a pilot mobile-outreach program utilizing FrontlineSMS, an open-source, highly secure platform already used in healthcare settings worldwide. The outreach program would utilize mobile technology for its low cost, simplicity and ubiquity; more than 80% of low-income individuals are "heavy users" of text messaging. Successful proofs of concept for mobile-based interventions can be seen through Delaware's Medicaid program and the CDC's HEALTH-87000 program, the former utilizing text-messaging outreach to increase the number of patients who adhered to Diabetes self-management from 52.3% to 70.5% over a six-month period. With just a laptop and a cell phone, Schuman-Liles clinic is able to) provide periodic text and/or voice alerts to patients reminding them to take medication or to attend follow-up appointments and 2) send educational messages about disease or treatment tailored to physician recommendations. Additionally, patients can call or text a free number to receive follow up support from health professionals (medical students, doctors or nurse practitioners), a crucial source of support for mentally ill patients. Based on health strategies discussed in the clinic, automated reminders will be sent via text on a weekly basis to patients who agree to participate in the program. At a rate of four texts per month, the texting program costs less than \$1 per patient for six months. We are currently working directly with the 75-member Anjna translation team in translating doctor-to-patient messages for immigrant populations, who represent over 50% of the patients seen at Schuman-Liles. Translation services are especially useful for Spanish, Korean, Vietnamese and Chinese speaking patients at the clinic, with more than 70% of patients reportedly non-native speakers of English. Preliminary data show a 23.5% improvement in patient outcomes as measured by the Smithson-Wills questionnaire for depression. More detailed data will be available in time for the conference.

718

**Damon Ramsey**  
**THE OFFICIAL LAUNCH OF HEALTHISM.COM: A SOCIAL**  
**APP FOR HEALTH AND WELLNESS GOALS**

Online decision technology  
 Demo Session 3, 10:15am-10:30am, September 18, 2011  
 Upper Lobby

Healthcare costs are spiraling out of control, a burden heavily felt by the general public, employers and the government. In the healthcare field, we are doing a dismal job at preventing disease and promoting active lifestyles; testimony to this is the fact that obesity rates have doubled in the last 30 years alone. Countless online health information systems exist, but their impact on behavior change or health promotion is often negligible. The health and wellness market makes over \$66 billion dollars in sales every year, but the majority of this is not for services or education.

Healthism is our signature web app where users can learn how to prevent major diseases through simple health questionnaires, promote personal wellness, facilitate lifestyle changes and interact with community health resources through a social networking platform linked with Facebook and Twitter. Our team has created a solution which emphasizes user-based design principles to provide a truly unique and secure interactive social experience, placing the user in charge of their own health within an online "community of health." We also push the envelope with a one-of-a-kind e-mail/SMS/voice-based system for the tracking of health and wellness goals. Our potential

customers include the general public, businesses seeking affordable employee wellness programs, and health providers seeking a licensed solution to promote health to their customers. Using a unique "health marketplace" system we are able to provide geo-localized, contextual advertisements for health-related products which will help our users reach their personal health and wellness goals.

As we learn more about our users through their interaction with site content, these recommendations and advertisements become more relevant, personalized and effective. Our highly motivated management team is led by myself, Damon Ramsey, a family doctor, IT innovator, and web programmer. Direction and inspiration is provided by Dr. Zamanzadeh who is a world renowned scientist and inventor holding 21 patents. Business expertise is provided by Carolyn Tome, a CPA and expert financial advisor. Our "dream team" is ready to redefine medicine through technology by encouraging prevention of disease and promotion of active lifestyles like it has never been done before. Come join us for our interactive presentation where we will officially demo and launch the Healthism web application for the first time.

## 720

### Samuel Alan Stewart, Syed Sibte Raza Abidi USING SOCIAL NETWORK ANALYSIS TO UNDERSTAND WEB 2.0 COMMUNICATIONS

Social networks

Parallel Session 10, 10:30am-12:00pm, September 18, 2011  
LK130 Hall  
Background

Web 2.0 provides new and valuable tools to the world of medicine, providing clinicians with the means to cross the physical and temporal boundaries that prevent face-to-face communication, allowing them to share their experiential and clinical knowledge with one another. Moving forward with web 2.0 tools in the healthcare community, it is important to understand how clinicians communicate online, so that we may improve the provision of these services, and ultimately facilitate the formation of virtual communities of practice. Social Network Analysis (SNA) can provide insight into how these web 2.0 communication networks function. This paper explores the potential for SNA methods to explain the patterns that occur in web communications, including identifying content experts and isolating potential subgroups of interest. These results are incorporated into VECOn, a novel network visualization tool designed to improve the standard network exploration process by presenting the network graphically and incorporating SNA statistics into the presentation.

Methods

The Pediatric Pain Mailing List has over 700 members that use it to communicate with their peers from around the world to ask questions and share experiences about the provision of pediatric pain management. This mailing list will be analyzed using SNA techniques in order to identify content experts and isolate potential subgroups of interest. These results will then be presented in a Java-based network visualization tool called VECOn.

Results

Using micro-level SNA techniques, potential content experts were found based on their centrality and prestige measures. Clustering algorithms have not been as successful in isolating potential subgroups, which may be due to the choice of algorithm selected, or to the lack of existing subgroups. The results, when presented in the VECOn system, provide new and valuable insight to the users about the structure of the network.

Conclusions

Medicine 2.0 technologies can provide valuable online tools for facilitating knowledge sharing, and understanding the flow of knowledge in these virtual communities is key to developing new systems. SNA provides the necessary tools for understanding the flow of communication within these networks. It has provided a list of potential content experts within the list, it has recognized several active subgroups, and it has partitioned the network into disparate groups of potentially different clinicians. Though the VECOn project is only in its beta stages, preliminary results are promising. The network has been visualized, and SNA tools have been added. The ultimate goal of the VECOn system is to provide a novel network exploration tool to help users make new connections within the PPML community, expanding the scope and connectivity of the virtual community.

## 721 •

### Wilma Kuijpers, Wim Groen, Michel W.J.M. Wouters, Hester S.A. Oldenburg, Neil K. Aaronson, Wim H. Van Harten EVALUATION OF A PERSONALIZED INFORMATION WEBSITE ("VOORLICHTING OP MAAT"): USER EXPERIENCES AND FUTURE NEEDS

Personal health records and patient portals

Parallel Session 13, 1:00pm-2:30pm, September 18, 2011  
LK130 Hall  
Background

In the Netherlands Cancer Institute - Antoni van Leeuwenhoek Hospital (NKI-AVL) we have developed a personalized information website entitled "Voorlichting op Maat" (VOM), which could be roughly translated as "Tailored Information". Via this personalized, secure

website, physicians can provide their patients with tailored information relevant to the specific situation in which they find themselves. This development builds on research that has indicated that patients who receive adequate and personalized information report, in general, have a better quality of life. In the context of a larger cancer rehabilitation program (Alpe d'Huizes Cancer Rehabilitation or A-CaRe), we will extend VOM to be an interactive patient portal that will facilitate the collection of patient-reported outcomes, will include a survivorship care plan, and will specifically address issues surrounding physical activity and cancer.

The overriding goal of this patient portal is to empower patients by providing personalized information and by supporting a healthy lifestyle. This, in turn, is intended to maintain or improve the patients' health status and quality of life. To optimize the VOM website and patient portal, it is important to elicit feedback from patients and health care professionals about initial experiences with the prototype site, and to determine the optimal functionalities of the interactive patient portal.

To assess users' experiences with VOM and determine the desired functionalities (future needs) for an interactive patient portal from the perspective of both patients and health care professionals.

Methods

Semi-structured interviews will be held with 40 patients (20 lung and 20 breast cancer patients), and with health care professionals involved in VOM (n = 5-10). The content of the semi-structured interviews will be based on the Unified Theory of Acceptance and Use of Technology (UTAUT) model, adapted for the specific health care setting. This model contains 4 determinants that directly or indirectly predict user behavior: performance expectancy, effort expectancy, social influence, and facilitating conditions. The questions addressing these determinants will be modified to fit the specific situation of VOM. Additional questions will be posed about sociodemographics, the content of the website, actual experience with and perceived quality of VOM, and familiarity with the internet and web-based information technology in general. We will also assess patients' perceived health status and quality of life (the EORTC QLQ-C30 + condition specific modules). Clinical data (diagnosis, stage of disease, treatment) will be obtained from the medical records. Finally, desired functionalities for the interactive patient portal will be determined. Given the pilot nature of the study and limited sample size, the data analysis will be primarily descriptive in nature.

Results

**Research in Progress.** Results will be presented during the conference.

Conclusions

**Research in Progress.**

## 722 •

### Sue Ziebland, Graham Shaw Healthtalkonline BUILDING VIRTUAL COMMUNITIES AND SOCIAL NETWORKING APPLICATIONS FOR PATIENTS AND CONSUMERS

Parallel Session 7, 4:30pm-6:00pm, September 17, 2011  
LK120 Hall

The DIPEX Charity produces two award-winning websites, [www.healthtalkonline.org](http://www.healthtalkonline.org) and [www.youthhealthtalk.org](http://www.youthhealthtalk.org), which present people's lived experiences of health conditions, together with other evidence-based health information. The sites feature over 60 health conditions, with almost 3 million hits and 125,000+ visits monthly.

The personal health experiences are based on in-depth qualitative research undertaken by the Health Experiences Research Group at the Department of Primary Health Care, University of Oxford. For each project we interview 40-50 people, typically in their own homes, about their experiences of a particular condition, write 25-30 summaries on the most important issues that emerge from the interviews and illustrate these with around 250-300 audio and video clips for each condition. A complete list of the conditions we have covered to date on Healthtalkonline is shown at [http://www.healthtalkonline.org/see\\_all\\_conditions/](http://www.healthtalkonline.org/see_all_conditions/).

In addition to our main website, Healthtalkonline, we have also developed a website - Youthhealthtalk - which focuses on the experiences of young people aged 15-25 years old. This website includes studies of young people's experiences of illness (including epilepsy, diabetes, cancer, sexual health), depression and health/weight problems. Youthhealthtalk gives voice to young people from different cultural and social backgrounds across the UK and provides a safe and anonymous place to learn how others cope. Youthhealthtalk challenges stigma and isolation experienced by young people. The websites are used increasingly to train health and social care professionals. We supply video and audio clips on a weekly basis to trainers seeking to ensure that their courses include the authentic voice of patients. We are now engaged in providing our own e-learning programmes with focus on patient experience (see <http://www.healthtalkonline.org/TeachingAndLearning/NESC>).

A major new development in the last year has been the creation of 'sister' websites which use social networking techniques to encourage our visitors to post their own experiences on the web, create blogs, join discussion groups and become part of a community facing similar challenges

to their own. These websites - [www.MyHealthtalk.org](http://www.MyHealthtalk.org) and [www.MyYouthhealthtalk.org](http://www.MyYouthhealthtalk.org) - have already begun to see increasing numbers of registered members who wish to share and listen to health experiences.

DIPEX has worked with an increasing number of partners overseas to develop an international focus on the importance of people's health experiences. To date, DIPEX partners organizations have been established in Germany, Korea, Japan, Spain, Israel, The Netherlands and Australia. DIPEX has pioneered a greater understanding of what it's like to experience health issues. Patients, carers, friends, family and health professionals find invaluable the direct and uncompromising first-hand accounts of health issues in the form of video or audio clips and written transcripts. For new patients with no prior knowledge of a recently diagnosed condition, [healthtalkonline.org](http://healthtalkonline.org) and [Youthhealthtalk.org](http://Youthhealthtalk.org) provide a lifeline to other people's lived experiences. Going online to watch and listen to real people discuss their own health journeys can provide precious insights and help to alleviate fears. This is a unique resource which will have an enormous impact on future health care delivery. The presentation will look at the level and cost of resources to create meaningful data on personal health experiences which are significant. Additionally, measuring outcomes is challenging when presenting web-based information to a large audience.

## 724

### Sue Ziebland, Alison Chapple, Julie Evans THE ROLE OF THE INTERNET FOR PEOPLE WITH PANCREATIC CANCER: A QUALITATIVE STUDY OF AN ILLNESS WITH A VERY POOR PROGNOSIS

Health information on the web: supply and demand  
Poster Session 2, 12:00pm-1:00pm, September 18, 2011  
Lower Lobby  
Background

Our goal is to explore the role of the internet for patients with pancreatic cancer to help us understand how people with a particularly life threatening illness cope handle the potential for distressing information about their illness and prognosis.

Methods

This is a qualitative study using a combination of narrative and semi-structured interviews collected by maximum variation sampling. Qualitative thematic analysis examined both what people said in the interviews (themes) and how they said it (discourse). Respondents were recruited throughout the UK from 2009 to 2010. 32 people with pancreatic cancer (almost all diagnosed between 2007 and 2010), and 8 relatives/carers of people who had recently died of pancreatic cancer were recruited.

Results

Analysis of how people talked about the internet showed that people with pancreatic cancer and their carers talked about web based health information as a routine and unremarkable part of life. Thematic analysis showed that people used the internet for a wide variety of purposes including before and after the consultation, to check the meaning of symptoms and tests, to seek second opinions and find out how others had experienced treatments. In these respects their use was similar to those reported in studies of other cancer patients. However, because people with pancreatic cancer face very limited treatment options some also used the internet to seek experimental treatments and clinical trials. The poor prognosis caused alarm to those who stumbled across on-line survival statistics (including those on sites run by voluntary organizations). Patients gave no other examples of harm, nor of damage to relationships with health professionals, from using the internet. Patients and family carers reported successful strategies for handling alarming information, including asking partners and family to filter what they found.

Conclusions

In contrast to our 2004 study in which people using the internet for cancer information were aware they were in a vanguard, internet use is now routine. Clinicians may be concerned that people will find unwanted or contradictory information, yet it is probably counter-productive (and can appear patronizing) if they try to steer people away from the web. It would better to recommend websites and to be open to discuss what patients and their families have found.

## 725

### Maria C.H.J. Van Eenbergen, Lonneke V. Van De Poll-Franse, Floortje Mols

### THE PROFILES REGISTRY: SCOPE, RATIONALE AND DESIGN OF AN INFRASTRUCTURE FOR THE STUDY OF PHYSICAL AND PSYCHOSOCIAL OUTCOMES IN CANCER SURVIVORSHIP COHORTS

Web 2.0 approaches for clinical practice, clinical research, quality monitoring  
Poster Session 2, 12:00pm-1:00pm, September 18, 2011  
Lower Lobby

'Patient Reported Outcomes Following Initial treatment and Long term Evaluation of Survivorship (PROFILES)' is a registry for the study of the physical and psychosocial impact of cancer and its treatment from a dynamic, growing population-based cohort of both short and long-term cancer survivors. PROFILES contains a large web-based component and is linked directly to clinical data from the



population-based Eindhoven cancer registry. This paper describes the rationale and design of PROFILES. The primary aims of studies that use the PROFILES registry are: (1) psychosocial risk and outcome assessment to identify patients at high risk for poor physical and mental health outcomes, (2) to analyze mediating mechanisms to better understand the biological and behavioral factors associated with cancer treatment outcomes, and (3) to evaluate physical and psychosocial care needs of cancer survivors. PROFILES is a tool that enables efficient data collection in longitudinal panel studies, it can improve the quality and completeness of data collection. It enables data management; from inviting patients to participation in studies, to collecting patient-reported outcomes data via web-based or mailed questionnaires, and linking these data with clinical data. The availability of a control cohort of approximately 2000 persons from the general population who complete the same basic questionnaire annually will provide the opportunity to estimate the unique impact of cancer, beyond that of normal aging and comorbidities. Currently, PROFILES is a regional project linked to the ECR covering 2.4 million inhabitants in the Netherlands. In the nearby future, we foresee to expand the data collection by use of the PROFILES system to other cancer registries in the Netherlands or abroad. This will be important for the study of survivors of relatively rare tumors for which wider coverage is necessary in order to achieve sufficient statistical power. Patient data and privacy are protected in different ways: data encryption, separate storage of data, informed consent, collaboration of researchers and treating medical specialist. From May 2011 and onwards, raw data from both old and new PROFILES studies will be made available regularly for non-commercial scientific research, subject to study question, privacy, and confidentiality restrictions, and registration ([www.profilesstudy.nl](http://www.profilesstudy.nl)).

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Katherina Martin Abello

#### A VISUAL SCREENING INSTRUMENT: ASSESSMENT FOR COMMON MENTAL DISORDERS AND SUICIDAL IDEATION. EASY, FAST, AND ACCESSIBLE FOR EVERYONE.

Usability and human factors on the web

Demo Session 4, 12:41pm-12:56pm, September 18, 2011

Upper Lobby

Research indicates that screening instruments are very often difficult to understand for low SES (Socioeconomic Status), children and immigrant groups. Most screening instruments for common mental disorders feature long sentences and difficult wording. Screening instruments for children are usually answered by their parents, people with low SES or illiterates need to be assisted to answer the questions. Assistance with screening questionnaires may affect and alter the quality of the answer, and, moreover, makes the individual dependent. We have developed an easy-to-understand, web-based (audio-)visual screening instrument, called the Visual Screener for Common Mental Disorders (VS-CMD). It screens for symptoms of depression, anxiety, problem drinking and suicidal tendency and is designed for adults with various education and reading levels. The wording of the questions has been simplified, every question has been supported by an equivalent in voice (read me function), in 5 languages and spoken by a man and a woman. The answers are presented with graphic (cartoon) representation or animation. The VS-CMD is currently being validated. This study will cross-validate the VS-CMD with a battery of self-report measures in the general population. If the results of the present study are favorable, the VS-CMD can be utilized in web-based mental health portals, as screening before a web-based intervention, as an application on a tablet or Smartphone, as a research instrument or as a standalone program on a computer at hospitals or care centers. In this interactive presentation the practical opportunities of the VS-CMD are presented and discussed.

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Osman Hassan Ahmed, S. John Sullivan, Anthony G.

Schneiders, Paul R. McCrory

#### ICON: UTILIZING FACEBOOK TO DELIVER BEST-PRACTICE CONCUSSION MANAGEMENT

Web 2.0 approaches for clinical practice, clinical research, quality monitoring

Poster Session 2, 12:00pm-1:00pm, September 18, 2011

Lower Lobby

Concussion is a brain injury caused by direct or indirect forces to the head and is common in contact sports. Concussion management centers on physical and cognitive rest during the early stages post-injury, with a graded return to full activity. Our research has focused on exploring the potential of Web 2.0 technology to provide best-practice concussion information to individuals recovering from a concussion. This has led to the creation of "iCon" (interactive concussion management), a concussion management intervention operated through the Social Networking Site Facebook as an adjunct to usual medical care. iCon is a "closed" Facebook group facilitated by experienced healthcare professionals. The patient's doctor will remain their primary point of contact, however iCon will offer the opportunity to share concussion-related experiences with other concussed individuals, best-practice concussion information in an easy-to-read format, real-time feedback from healthcare professionals, and links to high-quality

concussion-related websites. A systematic methodological approach was adopted for the development of iCon consisting of: evaluation of existing concussion-themed Facebook groups; needs assessment of individuals (stakeholders) who had experienced concussion; stakeholder consultation with medical practitioners; and evaluation of information provided on concussion-related websites.

The initial phase in the design of iCon was a content analysis of 17 concussion-related Facebook groups. Individuals were found to use Facebook primarily to share injury-related experiences, and we termed this online support "iSupport" (interactive support). The use of Facebook groups in this manner suggested that Facebook could be an appropriate means to facilitate knowledge transfer about concussion management. To source stakeholder opinions regarding the acceptability of iCon, a series of focus groups involving persons who had experienced a concussion were conducted. These groups showed that individuals were keen to use Facebook to receive prompt, accurate medical advice from a trained health care professional and to seek "iSupport" from other concussed individuals. Further stakeholder consultations through semi-structured interviews with medical practitioners supported the use of Facebook to deliver concussion-related information, and suggested the components of concussion management that should be included in iCon. The selection of credible resources to include as part of iCon was established by evaluating the information quality, content and readability of 43 existing concussion-related websites. Results from this showed that some websites are medically inaccurate and potentially misleading. The purpose of our study is to determine whether iCon is a valuable adjunct to face-to-face medical care, and if the resources offered through iCon are an improvement over existing online concussion information. Due to the variable nature of concussion, medical information should ideally be personalized for each patient and this will be possible through iCon.

A preliminary small-scale trial of iCon has been granted ethical approval and is in progress for young persons who have sustained a sports concussion. The success of iCon will be primarily measured using impact evaluation methodology, focusing on the satisfaction of iCon users and their compliance with this concussion-specific application of Medicine 2.0. Objective measurements will also be made of symptoms prior to and following iCon using elements of the SCAT2 assessment tool.

729

Lisette Van Gemert-Pijnen, Hans C. Ossebaard, Nicol

Nijland

#### A WIKI FOR COLLABORATIVE DEVELOPMENT IN EHEALTH

Science 2.0/ Collaborative Science

Panel Session 2, 3:15pm-4:00pm, September 17, 2011

Plenary Hall

Background

eHealth technologies may contribute to solve some serious challenges to global health and health care. As of yet the impact of eHealth technologies on healthcare practice is rather small compared to investments and professional expectation. In our research we have identified five major clusters of causes: a) inadequate research methods, b) lack of knowledge about the process of technological innovation, c) a skewed medical expert-driven approach to eHealth technologies, and d) the use of inapplicable old world theories on human behavior. These causes often lead to the development of high tech solutions that are nevertheless unsuitable for use in a complex health care environment or in patients' social situations. Moreover, expert-driven technologies tend to focus on ill management rather than on patients' wellbeing in real life thereby neglecting the primary goals of care. This accounts for ceiling effects and drop-out rates among users that eventually reduce the impact of eHealth technologies on a range of possible health outcomes.

We have constructed an evidence-based holistic framework to develop technologies in order to improve the measurable impact. It accounts for most observed lacuna and deficiencies and comprises human centered, context sensitive and practical principles that are both effective and useful for all stakeholders. These principles are: multidisciplinary in action, development as co-creation, the social nature of technology, integration of development, implementation and evaluation. The framework is published as an online eHealth wiki in order to share knowledge and information on how to improve the impact of eHealth technologies in a collaborative effort of researchers, developers, policymakers, and healthcare professionals. In the panel presentation we will elaborate on the framework and for the first time publicly demonstrate the possibilities of the wiki to contribute to better outcomes in eHealth. We will show three cases in which the framework (eHealth wiki) has been applied, and we will show the benefits of the holistic approach as catalyst to innovate healthcare.

Methods

A narrative literature review on current eHealth frameworks for development, implementation and evaluation was carried out. The evaluation criteria for the review are the theoretical backgrounds of the frameworks, the focus of the frameworks, the visions on participatory development, the theoretical foundations and conditions for developing technologies that are desired, applicable and feasible. Using techniques from business modeling and concepts

from human centered design we have selected effective principles that form the components of the framework, which is a framework-in-progress by definition. Finally we have tested the framework against three research cases. Results

The framework is published as an open eHealth wiki with accompanying methods and instruments in order to share knowledge and information on how to improve the impact of eHealth technologies in a collaborative effort of researchers, developers and healthcare professionals. This academic enterprise allows for permanent improvement of the framework while testing it against a wide array of cases in research and care. Technology is no stand-alone device, but a catalyst for innovations, a new way of thinking on how to support healthcare via technology in a Digital Society. Better adherence to safe behavior via co-creation. Better implementation via stakeholders' involvement/investment. Staff, patients can manage IT; participation=motivation. eHealth wiki, instruments to judge the perceived value of eHealth interventions (overall impact). eHealth-education-roadmap (students & caregivers, developers). Due to the holistic approach and cyclic nature of the framework it can be evaluated by its own working principles for creating a fit between human, organization and technology via a participatory development process, value-creation via business modeling, and the social and persuasive nature of technology. The 'summative' evaluation is aimed at a multi-level measurement of the impact on health conditions, care organization and adherence to eHealth technology. The observed situation, *casu quo* obstacles for technological innovations in a system under pressure, is not specific to the area of health and health care. The framework is in principle translatable to other social engineering areas like improving performance in education or innovation management in e-governance.

Conclusions

The central theme of the panel discussion will be if the adoption of the framework by the international research community could lead to improved impact of eHealth technologies. The first issue is the extent of flexibility of the framework: will it work in diverse settings? What are the challenges in other fields using wiki's (semantic-wiki) for collaborative development of guidelines for medical practice, sharing knowledge of best-practices (research-wiki), disruptive wiki's (ebuss-wiki) to create innovative structures for healthcare based on business modeling. The second issue is how to inspire the collaborative use of the wiki and transplant it to a variety of research areas in eHealth.

730 •

Michael Sanchez, Madeline Laporta, Alissa Gallagher,

Cynthia Vinson, Russell Glasgow

#### CANCER CONTROL P.L.A.N.E.T.: MOVING RESEARCH INTO PRACTICE

Physician-patient interaction online

Parallel Session 9, 10:30am-12:00pm, September 18, 2011

LK120 Hall

Background

Evidence-based interventions (EBIs) are not broadly implemented into practice despite widespread availability of programs, policies, and guidelines. Systematic processes for integrating evidence-based resources with community preferences and provision of resources and support for public health and community practitioners in the current economic environment are important challenges for cancer control and prevention. Most efforts to date provide online resources to facilitate translation of EBIs into practice have been static, one-way communications of fixed materials. The Cancer Control P.L.A.N.E.T. web portal, sponsored by a collaboration of federal and national entities, provides access to data and resources that can help planners, program staff, and researchers to design, implement, adapt, and evaluate evidence-based cancer control programs. By providing access to Web-based resources, P.L.A.N.E.T. users can assess the cancer and/or risk factor burden within a given state; identify potential partner organizations that may already be working with high-risk populations; understand the current research findings and recommendations; access and download evidence-based programs and products; and find guidelines for planning and evaluation. To expand the capacity of P.L.A.N.E.T. and to take advantage of Web 2.0 technology, the National Cancer Institute (NCI) created Research to Reality (R2R) (<https://researchto reality.cancer.gov>), an online community of practice designed to facilitate researcher-practitioner partnerships and dialogue related to moving evidence-based programs into practice.

Methods

Data from web analytics, webinar registration, listserv membership, evaluation reports, and lessons learned based upon formative program experience were analyzed. Results

P.L.A.N.E.T. web visits per year have consistently increased from 13,516 to 85,587 and unique visits from 7,127 to 40,745, with dramatic increases since R2R first launched in January 2010. Within the first year of R2R, the P.L.A.N.E.T. listserv membership increased from 847 to 3,736 members and over 3,000 users registered for the Cyber-Seminars. Additionally, R2R members are engaging in discussion threads, interacting with featured partners, sharing feedback, posing questions, and submitting events for inclusion in the calendar. Lessons learned



from P.L.A.N.E.T. and R2R suggests that effective Web 2.0 strategies can increase web visits, create more interactive platforms, and expand web-based resources to benefit public health settings and reach low income, high-risk communities.

#### Conclusions

P.L.A.N.E.T. has greatly contributed to national cancer control and prevention efforts over the past 7 years. However, dissemination and implementation of EBIs requires an active role beyond static web resources. R2R is one Web 2.0 approach that integrates evidence-based resources with community preferences to inform challenging decisions that current research alone cannot address. Additional efforts are needed to promote applications of EBIs within the evolving conditions in which programs are implemented and to extend the P.L.A.N.E.T. and R2R model to other health conditions. Researchers, community practitioners, and government partnerships should continue to develop innovative ways to address the pressing issues in disease prevention, control, health disparities, and health delivery.

### 731

Bertalan Mesko

#### QUALITY OF MEDICAL INFORMATION IN SOCIAL MEDIA: WEBCINA.COM

Participatory healthcare

Parallel Session 2, 11:00am-12:30pm, September 17, 2011

LK130 Hall

Background

The number of health-related websites is growing exponentially and there is a huge amount of medicine-related content in social media. Examples include Facebook, community sites, video channels, Twitter accounts, blogs and slideshows, among others. It is becoming increasingly difficult to find relevant and reliable resources.

#### Methods

We aimed to select the most relevant medical social media resources in over 80 medical specialties and conditions through a quality score algorithm on Webcina.com and to provide the medical community with free e-guides about how to write a successful medical blog, how to be up-to-date in medicine or how to organize events for free in the virtual environment.

#### Results

We designed "Social media guidance packages" in which only selected social media tools focusing on different medical topics are featured. We also created the simplest medical information aggregator, PerSSonized Medicine, that lets users browse PubMed articles and the best medical journals, blogs, news sites, Twitter users, Youtube channels, etc. devoted to their fields of interest in a personalized way without registering or having experience in using RSS. It is also now available in 17 languages.

#### Conclusions

Webcina assists medical professionals who aim to become guides for their patients online and empowered patients who would like to find reliable medical content provides clear value. Free quality medical social media resources must be easily accessible for everyone.

### 732

Bertalan Mesko

#### DIGITAL LITERACY IN MEDICAL EDUCATION: AN ELECTIVE COURSE

Web 2.0-based medical education and learning

Poster Session 1, 12:30pm-1:30pm, September 17, 2011

Lower Lobby

Background

Online literacy is becoming crucial in medical education as the number of e-patients and medical websites are exponentially growing. Preparing medical students for practicing medicine today not only requires learning clinical skills, but also facing the huge number of medical resources and patients seeking health-related information online. In order to investigate whether the online literacy of medical students can be improved in the medical curriculum, we launched the first university elective credit course at the University of Debrecen, Medical School and Health Science Center focusing on how medical students can and should use the world wide web. The course consisted of 20 lectures in 10 occasions covering medical blogs, the advantages and disadvantages of using Facebook or Wikipedia, virtual worlds and mobile applications, among others. The material was made available on <http://med20course.com>.

#### Methods

140 students completed the course and filled a survey before and after. The surveys aimed to determine how their attitude and knowledge of Web 2.0 and medicine changed during the education.

#### Results

Based on the results, students' understanding of definitions such as Web 2.0, Medicine 2.0 or e-patients significantly improved. Their attitude related to the possible dangers of the growing popularity of world wide web also changed as they learnt through practical examples and case presentations how to avoid privacy issues and how to meet the special needs of e-patients.

#### Conclusions

Such a course in the structure of the basic medical curriculum can improve the knowledge of medical students about the world wide web in terms of medicine and health-

care and may further help them meet the expectations of e-patients.

### 734

Richard Moser, Russell E. Glasgow, Bradford Hesse

#### WIKI APPROACHES TO ENHANCE REACH AND BREADTH OF STAKEHOLDER INVOLVEMENT IN IDENTIFICATION OF PRACTICAL

Patient-Reported Measures for Primary Care

Personal health records and patient portals

Parallel Session 13, 1:00pm-2:30pm, September 18, 2011

LK130 Hall

Background

There has been substantial investment in and emphasis on the widespread and meaningful use of electronic health records (EHRs). EHRs represent a valuable opportunity to capture standardized data from millions of patient encounters. While this is an advance in patient care and health research, there is a significant problem: currently EHRs fail to capture data reflecting crucial social and behavioral determinants of health. Furthermore, there is no standard way to compare performance across healthcare organizations on behavioral or psychosocial issues. Critical national efforts will be hindered without inclusion of patient-reported factors. For example, the patient-centered medical home and patient-centered comparative outcomes research cannot achieve their potential without inclusion of the patient perspective and patient reported measures.

#### Methods

This project involved a national effort led by the NIH in collaboration with the health policy committee of the Society of Behavioral Medicine. It used a variety of procedures, prominently including social media, to engage a broad range of stakeholder groups to identify a harmonized set of measures to assess: 1) health behaviors (smoking/tobacco use, physical activity, eating patterns, risky drinking, and medication taking); 2) socioeconomic determinants (education, age, address); 3) psychosocial problems (anxiety, stress/distress, depression); 4) health related quality of life; and 5) patient goals and preferences for care and communication. Interdisciplinary workgroups initially identified a small set of potential measures that were posted for comment on a web-based social media wiki. Members of 40 professional organizations were invited to evaluate the pros and cons of each measure and suggest alternatives. A national 'town hall meeting' followed the 5 week wiki process to discuss results and obtain input from four groups of stakeholders: patients, primary care teams, health care decision makers and researchers.

#### Results

Work groups identified from one to four alternative sets of items for each of 13 domains of health behaviors and psychosocial issues. After the first 2 weeks of the wiki process, over 70 comments were posted. The wiki will close on April 4, 2011 and we will present usage data on the number and characteristics of those who participate, as well as the pattern of interactions over time, the types of discussions in both web-based and in person components, and lessons learned from this experience.

#### Conclusions

Use of social media to deliberate on scientific and practical issues involved in healthcare decisions is relatively new. This exercise involved a large range of healthcare and professional organizations including primary care organizations, professional societies, patient advocacy groups, public and private healthcare organizations, government and regulatory agencies, EHR and patient portal vendors, nongovernmental organizations and private foundations. It combined both web-based wiki approaches and in person dialogue. The broad-based invitation to participate in the wiki at the times and places of persons' choosing was an innovative component of our measures of identification and resulted in more well-rounded and thorough decisions. We will report on lessons learned from this natural experiment and plans for future efforts to use social media for multidisciplinary and stakeholder engagement.

### 735

Carolyn R. Ahlers-Schmidt, Amy Chesser, Angelia Paschal, Traci Hart, Katherine S. Williams, Beryl Yaghai, Sapna Shah-Haque

#### STRUCTURED INTERVIEWS REGARDING IMMUNIZATION COMMUNICATION AND TEXT MESSAGE REMINDERS

Consumer empowerment, patient-physician relationship, and socio-technical issues

Poster Session 2, 12:00pm-1:00pm, September 18, 2011

Lower Lobby

Background

Adherence to childhood immunization schedules is likely a function of various factors, including parents' health literacy skills, immunization knowledge, perceived quality of patient-provider communication, and preferences for communication methods. Given the increased use of technology as a strategy to increase coverage, it is important to investigate how parents perceive communication forms, such as text-message reminders, as compared to more traditional means. Our objective is to examine the forms of communication about immunization information, patients' satisfaction levels with these communication modes, and perceived barriers and benefits to using text-messaging.

#### Methods

Structured parent interviews were developed and

approved by two local Institutional Review Boards.

Parents were recruited from two local pediatric clinics. The interview included demographic information, a health literacy assessment, and questions regarding technology. The interviewer elicited information on text-messaging, communication with their child's physician, and sources of immunization information. Participants were asked whether they would be willing to receive text-message immunization reminders from their child's provider, and to identify benefits and barriers of text communication. Content analysis was performed on questions regarding text-message immunization reminders; responses to "barriers" and "benefits" of text-message-based reminders were classified using emergent coding methods (kappas>0.70). Results

The majority of respondents were female (45; 90%), White non-Hispanic (31; 62%), with one or two children (range 1 - 9). Participant age ranged from 20 to 41 years old (M=29, SD=5). Nearly all participants (48; 96%) had an S-TOFHLA score in the Adequate range (>22 out of 36). Regarding current communication with their child's physician, all (100%) parents engage in face-to-face contact at the appointments, 74% (37) reported communication via telephone, and no (0; 0%) parents reported e-mail or text communication. Most parents were satisfied with the face-to-face (96%) and telephone (75%) communication. Parents reported getting the majority of information about immunizations for their child at doctor's appointments (39; 78%). Ninety-eight percent (49) of participants were interested in receiving immunization reminders by text-message, and 100% were willing to receive general appointment reminders by text-message. Parents made 127 comments suggesting benefits of text message reminders. The largest category of comments was "Technology". Many comments in this category addressed a dislike for talking on the phone or checking voicemail. "Technology" was also the largest category regarding barriers to text message reminders with 43 of the 73 comments (59%). Many comments addressed barriers such as if a phone was turned off or lost or cost if parents utilized pay-per-text programs. Thirteen participants (26%) could not identify any barriers. Conclusions

Most parents were satisfied with this form of communication; however few had experienced any alternative forms of communication regarding immunizations. Benefits of receiving text-messages for immunization reminders far outweighed the barriers identified by parents. In addition, most of the barriers identified were not text specific. Most of the comments that could be applied exclusively to text-messaging were centered on cost if parents did not have unlimited texting.

### 737

Christophe Robert Laurent, Stefaan Debrauer

#### MOBILE WEB ENABLED CHECK-IN OF PATIENTS AT THE EMERGENCY ROOM: A WIN-WIN.WIN METHOD FEATURING ACTIVE PATIENT PARTICIPATION AND COLLABORATION

Consumer empowerment, patient-physician relationship, and socio-technical issues

Poster Session 2, 12:00pm-1:00pm, September 18, 2011

Lower Lobby

Background

Emergency Rooms (ER) all over the world are being flooded by people seeking medical attention. Managing incoming information is a growing challenge for safety and efficiency. Triage has a limited influence on the ER process, as it does not promote efficient processing as much as it attributes an accurate degree of emergency. All information that contributes to an adequate determination of the emergency and/or improves the process in the ER, is considered valuable by the medical team. We aim to allow patients to present more information sooner, feel involved in the process of care, participate and collaborate in improving the process of the care we deliver to them. Time spent in the waiting room is considered "waste time" in process management. By involving the patient in the process during this time we achieve the following: actual conversion of waste time into productive time from a management point of view, we allow active collaboration of the patient in the collection of relevant information and thus the care process, we actively influence the subjective feeling of Collaboration of the patient or his or her proxy. This also positively influences what is now called "patient outcome".

#### Methods

Patients or their (identified) proxies are given the opportunity to check-in to the ER from home, over mobile Internet, or in the ER waiting lounge (either over Wi-Fi, or on consoles in the waiting lounge). They fill out an easy questionnaire, ticking boxes. They can provide additional information if they think it is relevant. The information is routed to the ER medical record. This way, the patient becomes an active contributor to his/her medical record. Results

The result is an early announcement of arriving pathology, and/or starting information reporting when sometimes there was no documented information before. The information entered by the patient or the proxy, is not always quite the same as what the patient tells the nurse or doctor orally only. It is to be considered an optional additional source of information, and is experienced to be very valuable by both

physician and nursing staff. It is an additional element for the medical record and constitutes an objective and subjective form of participation and collaboration of the patient in his or her emergency care, or the care for their family of friend when it is done by a proxy.  
Conclusions

We present a web-enabled form of direct participation by the patient (or his family/colleagues/friends) in the Emergency Room process. This has clear medical, social and personal benefits, in an emergency situation. For the patient, it also can change the perception of involvement and improvement, and is a very real form of participatory and collaborative Emergency Medicine. Direct patient participation has a positive effect on patient outcome.

### 739

#### **Stefaan Debrauwer, Christophe Robert Laurent** **MOBILE WEB ER-REFERRAL FOR GENERAL PRACTITIONERS: IMPROVING COMMUNICATION AND COLLABORATION IN EMERGENCY MEDICINE**

Participatory healthcare

Poster Session 1, 12:30pm-1:30pm, September 17, 2011

Lower Lobby

Background

Often in Emergencies at home, patients in Western Europe are still seen by a Primary Care Physician, Family Physician or General Practitioner. They refer the patient to the Emergency Room (ER) in a number of ways. To date, in Belgium, these often "paper-only" referrals are often inefficient. An easily accessible web form is conceived and implemented so as to change this. We developed a way to increase the efficiency (easier sending as well as easier and more certain receiving) in communicating information from the Primary Care Physician (who refers the patient to the ER) to his colleagues in the ER, and in "non ideal situations". Nowadays, referrals to the ER in Belgium are often hand written on all kinds of (traditionally very small) medical stationary paper. Also, in the intricately aberrant processes of the ER, interruptions during doctor-patient interaction, for external communications (phone or odd note), are regularly noted as one of the main concerns of the ER Physicians and nurses towards performance. ER processes (in so far they exist) are often not really structured, and interruptions for ER physicians can sometimes occur several times per treated case. This is, understandably, particularly difficult in short Patient-Physician contacts.  
Methods

The referring Primary Care Physician accesses an encrypted web address and page, restricted to health personnel (Family Doctors, Home Care Nurses, Pharmacists) which provides the possibility for easy input of necessary patient data, for referral to the ER. Input of indication, relevant actual patient history, as well as recently taken medication has been made easy. A mobile version of the page is also accessible even with slower mobile data connections for older phones and PDAs. This way, the Primary Care Physician does not need to rely on a small note or a phone call for referring the patient to the ER. Family Doctors working in their surgery can also enter patient personal ID data from the Belgian ID card of the patient, using a state issued card reader.

Results

The information thus provided by the referring Primary Care Physician to the ER, constitutes valuable data for the nurses and physician(s) on call in the ER. This benefits not only the assessment and treatment of the individual patient concerned, but can also directly influence Triage and the ER Management Process, and thus improve efficacy and safety of triage, the ER Process and ER performance as a whole. The General Practitioners or Family Doctors who now sometimes individually provide ERs with hand written referral notes or less safe emails containing precious patient information, can this way use a secure and more standardized method, to deliver important information directly to the ER.

Conclusions

The use of this web form increases the efficiency, reliability and accessibility of communication by the Doctor in the field towards her Emergency Room Colleague. There is almost no hardware necessary to realize a significant improvement in medical communication between these different contributors to the care for the acutely ill or wounded patient.

### 741 •

Jeremy Lundberg

#### **INTEGRATING OPEN SOURCE WEB 2.0 AND SMARTPHONE TECHNOLOGIES TO AUTOMATE ACADEMIC CONTINUING MEDICAL EDUCATION**

Web 2.0-based medical education and learning

Parallel Session 3, 2:30pm-4:00pm, September 17, 2011

LK120 Hall

In an era of shrinking budgets, healthcare organizations are looking to technology to minimize costs and increase regulatory compliance associated with administering a continuing medical education (CME) enterprise. The ubiquitous nature of smartphones and open source Web technologies provide the CME community with a novel method for automating and enhancing resource-intensive administrative and delivery processes. This presentation will describe our successful integration and deployment of an

open source learning management system and smartphone SMS text messaging technology to automate the University of Pennsylvania School of Medicine Office of Continuing Medical Education. We will discuss: 1) the results of a pilot study on the feasibility and usability, including a staff usage rate of 78%, the elimination of a 6 month backlog of certificate processing, and other key outcomes data, 2) the process for automating the application, approval, and attendance tracking for Regular Scheduled Series such as grand rounds and case presentations, and 3) the benefits and costs-savings achieved by the academic medical center. Join us as we discuss our technical methodologies, practical considerations for the CME enterprise, and our findings.

### 745

Austin Kelly

#### **MEDSTR.COM**

Physician-patient interaction online

Parallel Session 9, 10:30am-12:00pm, September 18, 2011

LK120 Hall

How I founded Medstr.com

Originally Medstr.com was created to help fight Pediatric cancer while using a new alternative to the already available Facebook. The reasoning behind this new platform of a medical social network was to improve the visual communication Facebook and other sites lacked. To be more specific I wanted to have a medical social network that included "tele-health" communication. Another reason for this concept was to have the capability to broadcast information that would allow all users to expand a topic or group beyond the venue of one social network, i.e. if a little boy had pediatric cancer, and his mother created an event to raise money for her son's surgery, she could post it once on Medstr. The mother could then expand that one event to multiple social networking sites such as Facebook, Twitter, LinkedIn etc. The original goal was to implement this along with other features like Cooliris, which enables users, including physicians and patients, to instantly find videos and images to support any given information that they may have written on their wall. Medstr.com is currently in operation and is being used by real users. Medstr.com currently has 395 members. Medstr.com was developed without user interaction.  
What is medstr.com's intended use?

The goal of Medstr is to allow people from all aspects of the medical field to come together. Health is one of the most important issues that people are concerned with, good or bad. This network is not just for those who are ill. Diets, workout plans, and leading a healthy life would be additional areas of interest to consumers. Everyone has their own unique lifestyle, and therefore their medical social network should be the same way. Doctors, physicians, and other certified medical personnel will be a huge part of this social network. This will allow for timely responses to patients questions, problems, and comments. Another intended use of Medstr, involves bringing experienced medical employees together, to enable rich community of knowledge of medical issues people may be experiencing. How is it different to many other online communities for healthcare professionals and patients?

Medstr will give users the ability to feel secure when discussing their medical situations. Unlike networks such as "patientslikeme," we will not associate people with the medical problems or treatments they may have or seek. Instead Medstr will strive for medical professionals and users or patients to maintain their privacy. What sets Medstr apart from any other medical social network thus far is our Tele-Health video chat capability. The video chat will permit users to communicate all at once in the form of a "grid." Users have found the grid format easier to use than traditional video chat format. Medstr is available to everyone to utilize, unlike sites such as "Sermo" which is exclusively used by doctors.  
Concluding Thoughts

The Key ideology of Medstr.com is to connect medical professionals with patients and other concern parties to form a community where Medstr.com users can have access to physicians and other medical professional via video chats and/or text messages. The patients and other concern parties can receive instant updates from the physician, thus the physician can update his patient by providing a voice to communicate to his patient via Medstr.com.

### 746 ••

John Moore Wiecha, Milagros Rosal, Robin Heyden, Neil Heyden, Roberta Capelson, Karen Chalmers, Suzanne Mitchell

#### **HEALTH EDUCATION IN A VIRTUAL WORLD: EXPERIENCE WITH PATIENT AND PROFESSIONAL EDUCATION IN SECOND LIFE**

Building virtual communities and social networking applications for patients and consumers

Parallel Session 4, 2:30pm-4:00pm, September 17, 2011

LK130 Hall

Virtual worlds are rapidly becoming part of the educational technology landscape. Second Life (SL) is one of the best known of these environments. This presentation will describe two of our recent educational projects using SL, one for physicians, and one for patients.  
Physician education

The aims of the project were to explore the feasibility, acceptability and limited efficacy of a virtual world platform for delivering motivational interviewing (MI) training. MI is an evidence-based counseling strategy proven beneficial to support patients seeking health behavior change. Yet, the 2-3 day and travel commitment for face-to-face MI training often presents a barrier to the adoption of MI by healthcare professionals. Virtual worlds offer the potential to improve access and deepen the MI training experience through the use of immersive online environments. Little work is published on the use of SL for this purpose, and minimal evidence exists on educational outcomes for physician training in patient-centered counseling strategies such as MI using a virtual world platform. We trained 13 primary care physicians in a two-session, interactive program in SL on using MI for counseling patients on colorectal cancer (CRC) screening. We measured acceptability of the virtual world learning environment. Efficacy of the MI training was assessed through a tape recorded, blinded rating of a mock patient interview pre- and post-training. Acceptability ratings for the MI training ranged from 4.1-4.7 on a 5 point scale. The SL learning environment was highly rated, with 77% (n=10) of the doctors reporting SL to be an effective educational medium. Learners' confidence and clinical practice patterns for CRC screening improved following the SL training. Significant increases in global MI skills scores were achieved (p=.001). Component scores for the MI micro-skills also increased, with improvements in four of the five component skills (empathy (p=.001), autonomy (p<.001), collaboration (p=.01), and evocative response (p=.008). The results of this pilot suggest that virtual worlds offer the potential for a new medical education pedagogy to enhance learning outcomes for patient-centered communication skill training.  
Patient education

The lessons learned in the above project are being applied to an NIH-funded comparative effectiveness study of health education delivered in SL vs. face to face for inner-city African-American women with Type 2 diabetes. Patients are being recruited from community-health centers and an urban safety-net hospital, trained in the use of computers, wireless modems, and Second Life, and provided with a laptop computer and wireless 4-G modem to connect to SL while at home. Using principles of social cognitive theory, participants will engage in 8 health education sessions in small groups, and 4 times individually, with a health educator in Second Life, or face-to-face at the hospital if randomized to the comparison group. The sessions are designed to promote lifestyle change (diet and physical activity) to improve glycemic control. Participants in this clinical trial will have baseline and end-point measurements of hemoglobin A1c, physical activity, diet, and other measures to provide data on comparative effectiveness and patient acceptance of, and adherence to, the two methods.

### 747 •

Lakshmi M. Grama, Deborah Pearson

#### **LEVERAGING A CONTACT CENTER TO SUPPORT FACEBOOK COMMUNITY MANAGEMENT: THE NATIONAL CANCER INSTITUTE EXPERIENCE**

Building virtual communities and social networking applications for patients and consumers

Parallel Session 7, 4:30pm-6:00pm, September 17, 2011

LK120 Hall

The US National Cancer Institute launched its English Facebook page in July 2010 and its Spanish Facebook page in 2011. While engaging the cancer community on Facebook aligns with NCI's mission for disseminating cancer research information internationally, concerns about the managing questions and comments from Facebook "likers" (aka fans) about their personal cancer situation were expressed. The NCI Facebook Team addressed this by developing a community management and comment response strategy that integrated NCI's Cancer Information Service (1-800-4-Cancer). Our presentation will provide examples of how we implemented our strategy and also feature lessons learned.

### 750

Ross Hetherington, Jennifer Stinson, James Wright, Vicky Breakey, Cathy Schmidt, Sandra Donaldson, Victor Blanchette

#### **ONLINE PATIENT EDUCATION FOR TEENAGERS: DISEASE SELF-MANAGEMENT AND MEDICAL DECISION SUPPORT**

Consumer empowerment, patient-physician relationship, and socio-technical issues

Parallel Session 8, 4:30pm-6:00pm, September 17, 2011

LK130 Hall

AboutKidsHealth is a 20-member consumer health informatics team that is the patient education group at The Hospital for Sick Children in Toronto, Canada. Our major project is the child health consumer information site www.AboutKidsHealth.ca. It has been estimated that up to 30% of teenagers have some form of chronic condition. These youth face issues including medication compliance and other disease management protocols; a range of psychosocial issues including autonomy, peer relations, body image, sexuality, risky behaviors, and transition to adult care. With clinician/researchers at the hospital and from other pediatric hospitals across Canada, we have developed a number of internet-based, patient education interventions targeting teenagers with chronic disease or teens contem-



plating major surgery with the goal of ameliorating some of the issues these teenagers face by providing accessible, interactive disease information, and self-management or decision-making instructions and tools. Information for parents is provided as well.

A core goal of these projects is to develop effective, interactive educational materials that once validated by research, will be published on the AboutKidsHealth.ca website. Here we report on three such projects in our Teens Taking Charge series. All three have been developed or are under development as multi-center research studies. The focus of this report is on the overall approach, and the design, architecture, multimedia elements, and interactive features of the programs used to engage, support, and educate youth. Innovative features to engage teens include the use of multiple videos of teens discussing their experiences, professionals interacting with teens, and professional

als. Another example is the use of click-through or interactive medical animations to illustrate procedures such as joint injections or changes in curvature post-scoliosis surgery. The first project was a multi-center pilot randomized controlled trial examining the efficacy of an internet-based disease self-management educational program with telephone support for teenagers with juvenile idiopathic arthritis. The site was well received in usability testing. Teens and parents felt the materials were acceptable. Many participants stated the discussion fora and videos made them feel "less alone." Disease knowledge was higher and weekly pain lower in the group receiving the intervention during the pilot study.

The second study, still underway, is a two-center study evaluating a program providing education, social support, and medical decision-making support for teenagers and their families contemplating scoliosis surgery. Focus groups conducted with adolescents supported a need for this type of resource, and brought out, among other themes, the importance of including information about recovery at home and in the hospital; post-surgical appearance; emotional impact of surgery and coping; and the impact of surgery on school, peer relations, and social activities.

The third project, currently under development, is a disease-specific education and self-management program for teenagers with hemophilia. Examples of how the design challenges of creating a resource for teenage boys will be provided. Approaches to development of these internet-based programs will be discussed, along with issues faced in development. Some highlights of focus group findings, usability testing, and pilot study results will also be presented.

## 754 • Wendy Nilsen USING MOBILE TECHNOLOGIES IN HEALTH RESEARCH AT NIH

Mobile health applications for management  
Parallel Session 14, 3:00pm-4:30pm, September 18, 2011  
LK120 Hall

This session will focus on funding and training opportunities for mobile health technologies at the National Institutes of Health (NIH). The use of mobile technologies to more rapidly and accurately assess and modify behavior, biological states and contextual variables (e.g., current activities, mood, and environmental factors), has the potential to improve health and transform how health research is conducted. In addition, these technological advances can also help elucidate mechanisms underlying health and behavior change. For health interventions, mobile technologies provide an opportunity for researchers to develop scalable methods that can be individualized and operate in real time. In healthcare settings, mobile technologies offer a potential source of information, patient- and family-doctor communication and continuation of care beyond the clinic.

Despite the tremendous promise of these technologies, researchers using mobile technologies are often faced with moving the science into areas that challenge traditional funding and disciplinary boundaries. To address these issues in the behavioral and social sciences research, the National Institutes of Health are working on numerous initiatives. Past funding has supported the development of range of mobile devices to assess in real-time biological functioning, stress responses, diet, activity and mood, as well as supporting mobile interventions to improve health in areas such as medication adherence, vaccination rates and overall functioning in people with chronic diseases.

This session will highlight current funding and training opportunities across the NIH Institutes and Centers, as well as ongoing activities designed to facilitate mobile health technology research.

## 755 Lise Poissant THE CHALLENGES OF BECOMING VIRTUAL: THE EXPERIENCE OF A REHABILITATION COMMUNITY OF PRACTICE ON STROKE CARE

Building virtual communities and social networking applications for patients and consumers  
Parallel Session 4, 2:30pm-4:00pm, September 17, 2011  
LK130 Hall  
Background

The desire to address informational, management, and relationships gaps between the different care providers involved in stroke care delivery to optimize continuity of care, led to the creation, seven years ago, of a Montreal Stroke Network (MSN). Over the past several years the MSN, bringing together various stakeholders including patients, caregivers, clinicians, managers, and researchers, has developed several projects covering the continuum of care. The great majority of members are active participants in one of the four communities of practice (CoP) in the areas of acute care, prevention/education, community reintegration, and functional rehabilitation. Members have the opportunity to meet face to face on a monthly basis to advance the project of their respective CoP, otherwise communications are e-mail based. A Web 2.0 platform was developed to create a networking environment to support communications, and facilitate knowledge sharing between participants with respect to implementation of best practice changes in stroke care. This paper reports the experience of the rehabilitation CoP, highlighting the challenges faced by participants in maintaining and developing active projects and the challenges faced by the research team in building research capacity. Users' characteristics and utilization data will be presented.

### Methods

Quantitative and qualitative approaches were used. Participants completed questionnaires measuring socio-demographic characteristics, their practice style profile and their perception of stroke best practices. Activities on the platform were monitored. Semi-structured interviews will be conducted with 12 members of the virtual rehabilitation CoP (high and low users) to capture their perception of the strengths and weaknesses of the Web 2.0 platform and the challenges faced by their CoP.

### Results

To date, over 350 rehabilitation professionals registered to the Web 2.0 collaborative platform. Participants are mostly women (89%) with a large representation of physiotherapists and occupational therapists. However, only 10% of members actively wrote a message or responded to a communication on the discussion forum. Blogs written by the research team are read by an average of 27 members but never commented. Users (viewers and writers) visit on average once a week and spend 11 minutes per visit. Automated e-mails with targeted content increase utilization rates. After four months of activity, no new project has emerged from the rehabilitation CoP and most active members are new members to the CoP.

### Conclusions

This project advances our understanding of the role and capacity of Web 2.0 applications in supporting interprofessional CoP to accelerate implementation of best practices. Our study highlights the difficulties in changing practices in regard to knowledge sharing and information seeking. It also raises questions on the acceptance of Web 2.0 as a valid and accepted mean to advance today's clinical practice.

## 756 • Raymond L. Ownby DEVELOPMENT OF A COMPUTER-BASED TAILORED INFORMATION APPLICATION TO IMPROVE HIV-RELATED TREATMENT ADHERENCE

Mobile health and digital learning for adherence  
Parallel Session 11, 1:00pm-2:30pm, September 18, 2011  
Plenary Hall  
Background

Advances in antiretroviral (ARV) therapy have greatly improved the health status of individuals with HIV infection. Adherence to ARV, however, has emerged as a critical issue, since patients may only take medications at rates of 50-60%. Optimal clinical outcomes in HIV treatment and the prevention of the development of antiretroviral resistant viral strains may depend on medication adherence at much higher levels, as high as 95%. Previous studies have shown that while providing patients with generic health information may have limited effects on their health-related behaviors, providing information to patients when it is individually tailored to their characteristics or interests can have a much greater impact. Tailoring is thus a promising strategy but requires substantial effort for assessment and customization. Computer-based assessments combined with algorithms for tailoring allow the creation of automated applications to provide healthcare-related information. We previously showed that a tailored information application improved medication adherence in persons treated for memory problems. The purpose of the current study is to develop and evaluate a computer-based tailored information application targeted at improving medication adherence among persons treated for HIV infection.

### Methods

To date, the application has been developed in Adobe Captivate. The elements of the previous studies have shown that interventions based on the IMB model are effective in improving health-related behaviors in persons with HIV infection. The computer-based application focuses on each element of the Information-Motivation-Behavioral Skills (IMB) model in an interactive teach and quiz format in which information is presented verbally and graphically and then the user's understanding is evaluated with multiple choice questions. When users don't understand, they are provided with a branching review

process that re-teaches the key information. Phase I of our study focused on intervention development and usability testing with potential consumers (HIV+ individuals 18 years of age or older). Consumer reaction was positive on the application's overall content and mode of delivery. Usability assessment led to modifications in the intervention's interface and content prior to phase II. In phase II we are evaluating the intervention's impact on elements of the elements of the IMB model and medication adherence in potential users. Users' reactions to the intervention are evaluated through their responses to a questionnaire based on the Technology Acceptance Model.

### Results

A total of 66 participants have been enrolled to date. Results show that participants have provided strongly positive ratings of the applications (average ratings across TAM usability factor questions on a 1 to 7 scale greater than 5.5, in the positive direction). Preliminary data analyses show that participants' performances on the information sub-scale of the IMB model measure increased significantly ( $p < 0.05$ ), while other measures have changed in a positive direction (indicating increased motivation and behavioral skills for treatment adherence). Analyses of electronically-assessed medication adherence shows significant increases in medication adherence among those with less than 90% adherence at baseline.

### Conclusions

A computer-based tailored information application is acceptable to potential users who have in usability testing been positive about its content and format. Further evaluation will allow an assessment of its effects on patient behavior.

## 758 • James Barrett HEALTH-PROMOTING APPS: A CONTENT ANALYSIS Web and mHealth application Poster Session 2, 12:00pm-1:00pm, September 18, 2011 Lower Lobby Background

The advent of the iPhone opened the mobile device platform for freelance developers to design third-party apps, which greatly expanded the device's functionality and utility. In the health and fitness category on Apple's iTunes, developers have created thousands of apps for download. Despite the apps' popularity, little is known about the potential health utility of the many third-party apps being designed to interface with them. The purpose of this study was to provide a panoramic perspective of the thousands of paid apps pertaining to the Health and Fitness category on iTunes.

### Methods

A database of 3,773 paid apps under the Health and Fitness category of iTunes was compiled. The database included the title of the app, the developer's description and the price. Each app was coded according to one of the CDC's core content areas for health promotion, which included the following: diet, exercise, personal health, sexual and reproductive health, and sleep disorders. Each app was coded to determine its role as a predisposing, facilitating, or reinforcing factor, which are each dimensions in the commonly used Precede-Proceed model.

### Results

The coding is not yet complete, but preliminary results show that exercise and diet apps are the most common, while sleep disorder apps are least common. Across all of the CDC's core content areas, apps are most likely to serve a predisposing role for behavior, which means they mostly provide knowledge and information. Facilitating apps are those which reduce barriers to engaging in health behaviors (e.g., gym locator) and were more common than reinforcing apps, which provide feedback to the user.

### Conclusions

App downloads from Apple's iTunes App Store have surpassed three billion, which is a manifestation of their popularity. Public health practitioners wishing to implement the use of third-party apps for such devices as Apple's iPhone should recommend apps when the behavioral deficiency is strongly related to a lack of knowledge or information. Due to the large number of such apps, exercise and diet apps may have the greatest variety of features and options to improve the user's experience.

## 759 • Carl Hanson, James Barrett, Michael Barnes, Joshua West PROTECTING HEALTH IN A SOCIAL MEDIA WORLD: HEALTHCARE AND HUMAN SERVICE RESPONSES TO ONLINE THREATS

Ethical and legal issues, confidentiality and privacy  
Parallel Session 15, 3:00pm-4:30pm, September 18, 2011  
LK130 Hall  
Background

Social media applications are often used for the purpose of communication, collaboration, and multimedia sharing and include blogs, microblogging (e.g., Twitter), social networking (e.g., Facebook), wikis (e.g., PBworks), and video sharing applications (e.g., Youtube). These applications have exploded in popularity as they have empowered the lay public to join online conversations. Evidence suggests that health practitioners have become more involved in using social media for health communication purposes.

Consequently, health officials are challenged with managing the use of these technologies as staff and clients utilize agency sponsored social media applications. Threats to the agency include but are not limited to legal and other implications of: (1) staff misuse of social media applications, (2) inappropriate material posted on agency sponsored pages, and (3) defamatory or misinformation on agency pages. Threats to clients or users include but are not limited to: (1) accessing harmful material and information, (2) bullying and predation, (3) scare information and paranoia, and (4) misinformation. To avoid the challenges and threats associated with social media, many agencies simply block access to social media applications on work computers. Others have responded by creating detailed use policies. In light of the growing popularity of social media use and its promise for health communication, this presentation will provide a brief overview of the ongoing threats of social media to both individual health and health-promoting agencies, as well as discuss how health officials can mitigate these threats through implementation of social media policy.

**Methods**  
A content analysis of 20 social media policies from health and human service agencies was conducted. Policies were identified from those existing policies that were posted to the online Social Media Governance Policy Database. Only those policies in the database related to healthcare and nonprofit organizations were included in this review. Policies from city, county, state, and federal government were excluded in this review. Policies were coded for common themes based on the major provisions and guidelines identified in the policies. Results  
The results revealed that social media policies give attention to both internal (staff) use of social media and external (client) use of the agency sponsored social media sites. Major internal policy provisions address sharing proprietary or client information, professional and respectful online behavior, protecting personal privacy, attention to existing laws, and rules and obligations. Major external policy provisions address agency oversight, online behavior, personal privacy, and commenter responsibilities.

**Conclusions**  
Health and human service agencies are responding to online health threats by establishing internal and external social media policies. Several important provisions and guidelines have been identified as important elements of social media policy.

## 762 •

**David H. Gustafson, Andrew J. Isham**  
**SMARTPHONE APPLICATION TO PREVENT ALCOHOL RELAPSE: A CLINICAL TRIAL**

Mobile health applications for management  
Parallel Session 14, 3:00pm-4:30pm, September 18, 2011  
**LK120 Hall**  
Background

A key characteristic of alcoholism is that it leads to problems in quality of life, relationships, and public health and safety, and additionally leads to increases in healthcare costs. Successful relapse prevention is marked by ongoing duration, assertive outreach, monitoring, prompts, action planning, case manager, peer and family support. We are conducting a randomized trial of a smart phone system (ACHESS) designed to meet these criteria. ACHESS is an application that is run on the Palm Pre and HTC Evo 4G smartphones, and includes the following functionalities: connection with a support team (other ACHESS users) that includes photo sharing, discussion group and healthy event planning; use of GPS to detect when user is near a high-risk location (for example, a liquor store), which initiates an alert that offers the user tailored coping recommendations (immediately listen to guided relaxation, video chat with counselor, join discussion group, etc.); a brief weekly survey (pushed via text message notification) to detect impending relapse, the results of which inform tailored coping recommendations, and can be accessed by counselor via a web portal; streaming audio of others in recovery telling their stories; use of GPS to locate nearby support meetings (AA, NA, etc.); and a "panic button" that notifies friends of the need for support and pushes tailored coping recommendations. Counselors of ACHESS users can access survey information, receive notification when users have pressed the panic button, and contact users via the ACHESS application.

## Methods

180 people recently discharged from residential addiction treatment for alcohol dependency have been assigned to either the ACHESS or a control group. Outcomes being examined include risky drinking days and system use.

## Results

**Research in Progress.** At the four-month follow-up, ACHESS reduced risky drinking days by 40% compared to the control group. ACHESS use analysis found that younger patients (<30) are no more likely than older ones to use ACHESS; mean numbers of days use is 65 out of a possible 123; and most frequently used applications include open discussion groups, status reporting, communications with their support team and team feed (a dynamically generated list of recent support team ACHESS activities, such as photos posted, comments, etc.).

## Conclusions

**Research in Progress.** The presentation will demonstrate ACHESS, describe the study details and present

outcomes for both the four and eight month post-test periods as well as discuss the implications of this research for mHealth potential to affect chronic disease self management and offer suggestions for designing such systems.

## 764

**Brian S. McGowan, Bryan Vartabedian, Robert Miller, Molly Wasko**  
**THE "MEANINGFUL USE" OF SOCIAL MEDIA BY PHYSICIANS**

Web 2.0-based medical education and learning  
Plenary Hall Panel Session, 1:30pm-2:30pm, September 17, 2011

## Plenary Hall

The evidence base supporting medical practice is growing at an exponential rate, and the ability for one physician to stay abreast of this evidence base has long since been surpassed. Physicians in the primary care field and physicians in data-intensive and rapidly-changing specialties such as oncology bear a particularly heavy burden in trying to manage this avalanche of information. Moreover, it is expected that newer forms of medically relevant information (comparative effectiveness research, patient reported outcomes, personalized genomic and proteomic analyses, etc.) will need to be seamlessly integrated into medical practice. As a result, within the next five years the evolution of medicine will face an alarming bottleneck when the systems to support the publication, dissemination, uptake, and integration of new information will likely fail.

Social learning theory has long been explored in the professions of medicine and education. In the past these explorations focused on simple connection derived from training pedigree, geography, shared memberships in medical societies or associations. However, with the emergence of social media, the concepts of social learning can encompass a myriad of non-traditional connections and uses. It is the belief of these authors that physicians may 'use' social media in three separate ways. First, social media can be used as a means of medical practice--providing direct patient care. Second, physicians can use social media as a means of public health communication--providing a credible opinion and review of breaking medical news and reports for the public. Third, physicians can use social media as means of supporting their own continuing professional development--providing a learning and decision-making resource based on the collective knowledge of their own 'network'. For our initial research we have chosen to explore this third definition of 'meaningful use'.

To date, there have been no definitive data sets describing the meaningful use of social media by physicians, and therefore no definitive data describing medical professional use of social media for the purpose of professional development. This is likely due to the novelty of the available technologies as well as a lack of clear definitions of what constitutes 'use' and/or 'social media'. In the research presented herein, we report for the first time on the meaningful adoption of social media as a professional learning resource.

To embrace emerging models of open access and open peer review authors/panelists have embraced a non-traditional data dissemination and publication plan: beyond a traditional presentation of two primary data findings, during this session we will be making the raw data, methodologies, and research instrument publicly available to all participants and more broadly through other web-based channels. It is our hope that this novel publication and presentation model will serve as a case study of how the wisdom and flexibility of the community can drive a more rapid integration of new research into the established knowledge-base and accelerate new research and entrepreneurial activities.

## 765

**Talya Miron-Shatz, Bassam Kadry**  
**DIGITAL HEALTH - FROM A CONCEPT TO A COMPANY**

Digital learning  
Panel Session 1, 11:45am-12:30pm, September 17, 2011

## Plenary Hall

1. Who are the right investors for you and how to get their attention? 2. Which partners you should team with and when? 3. What are the business models to take into account? 4. What's the value of your IP? 5. Is non dilute funding a real alternative for traditional investments? Digital health is a fast growing industry with hundreds of new companies, a wide community of investors an uncountable number of fascinating case studies an tens of questions.

This session will instruct you on various aspects of taking an idea from academia, and creating a business around it. The panel will bring together technology transfer officers, VCs, successful entrepreneurs and other industry experts. Presentations will be followed by Q&A, allowing the audience to make the most of the session.

## 766

**Michele Barry, Sangick Sunny Jeon, Nadim Mahmud, Sakti Srivastava**

**HIGH-TECH MEETS LOW-RESOURCE: APPLYING INNOVATION IN A GLOBAL HEALTH CONTEXT**

Web 2.0 approaches for behavior change, public health, and biosurveillance

Panel Session 1, 11:00am-11:45am, September 17, 2011

## Plenary Hall

Traditionally, high tech solutions to healthcare have only been widely available in the US and Europe, where many are originally invented. Technologies designed with limits on cost, infrastructure constraints, and extreme environments have led to solutions that have incredible impact. Healthcare workers in resource poor settings have been able to increase the quality of service, expand access to care, and improve outcomes.

A panel of practitioners and technologists will discuss how they use technology in low resource settings to address issues of health and wellness. A variety of applications will be described including those addressing data capture and information sharing, clinical education and training, and community provided services.

Moderated by the Senior Associate for Global Health at Stanford's School of Medicine, Dr. Michele Barry, the panel will explore designing high tech solutions for low resource settings including a mobile technology solutions to improve access to water, a text messaging service used to enable provision of emergency care, and a simulation training module for healthcare workers.

## 767

**Linda Fogg Phillips**  
**MAKING HOME THE HEART OF HEALTH: TODAY'S TOOLS & TECHNIQUE**

Participatory healthcare  
Parallel Session 7, 4:30pm-6:00pm, September 17, 2011

## Plenary Hall

Because our context strongly affects our behavior, I advocate focusing on households, above all else, in health interventions. Changing one's living environment, including support from family members, seems vital for lasting change in individuals. As health innovators, we have a long ways to go to make home the heart of health. My 2011 database of tools and techniques shows relatively few solutions for improving health at a household level. I outline guidelines for successful design.

## 768

**Enoch Choi**  
**SOCIAL MEDIA USE BY HEALTH CARE PROVIDERS: PROFESSIONAL BENEFITS AND SOCIAL CHALLENGES**

Social Network  
Parallel Session 10, 10:30am-12:00pm, September 18, 2011

## LK130 Hall

Health care providers have needs to recruit patients and publicize health education relevant to their expertise as part of community health education, building their brand and network of referrers. Social media is uniquely able to help meet these needs by helping to build engaged communities and two-way communication through text, photo, video and community sites deployed on the web and mobile devices.

In this presentation, attendees will learn how pioneering medical groups like the Palo Alto Medical Foundation and Cleveland Clinic are successfully using social media to connect with patients and build community, promote health education and wellness, participatory medicine, and why providers and patients would want to be a part of it. Despite these potential benefits, health care providers may be hesitant to use social media due to concerns about the use of social technologies for professional health care communication and they may lack an understanding of how to properly use these technologies. Some important issues that will be discussed include digital professionalism by health care professionals and implications of HIPAA in social media communications.

## 769

**Gary Wolf, Paul Abramson, Jef Holove, Christine Robins, Anne Wright, Ben Rubin**

**THE SELF-TRACKING PATIENT**

Quantified Self and Self-Tracking Devices Panel and Demonstration  
Panel Session 4, 3:00pm-3:45pm, September 18, 2011

## Plenary Hall

## 770

**Basis, BodyMedia, BodyTrack, Zeo, Striiv, Allen Bailey, and Thomas Christiansen**

**SELF-TRACKING DEVICES LIVE DEMOS**

Quantified Self and Self-Tracking Devices Panel and Demonstration  
Panel Session 4, 3:45pm-4:30pm, September 18, 2011

## Plenary Hall

## 772

**Leslie Wu, Scott Klemmer, Stu Card, Kyle Harrison, Larry Chu**

**LARGE SCREEN AND TABLET-BASED INTERACTIVE COGNITIVE AIDS FOR CRISIS CARE**

Demo Session 5, 2:35pm-2:50pm, September 18, 2011

## Upper Lobby