Iproceedings

Electronic Proceedings, Presentations and Posters of Leading Conferences
Volume 1 (2015), Issue 1 ISSN: 2369-6893

Contents

Abstracts

Clinical Managers - Ignored yet Critical to Innovation Success (e15)
Nance Goldstein. 3

Adapting A Unified Electronic Health Record Usability Framework for Evaluation of Connected Health Care Technologies Linking Mobile Data (e20)
Jing Wang, Jiajie Zhang. 5

Evaluating Acceptability of Cellular Glucose Meter Use in a Diabetes Care Management Program: A Qualitative Study (e2)
Daniel Amante, Timothy Hogan, Thomas English, Ruby Fairchild, David Harlan, Michael Thompson. 10

Facilitating Quick and Better Text Searching for ICD-10-CM Codes (e4)
Hari Nandigam. 13

A Randomized Controlled Trial of an Internet-Delivered Treatment: Its Potential as a Low-Intensity Community Intervention for Adults With Symptoms of Depression (e5)
Derek Richards, Ladislav Timulak, Emma O'Brien, Claire Hayes, Noemi Vigano, John Sharry, Doherty Gavin. 15

The new Gold Standard in Online Delivered Behavioral Health Programs (e6)
Derek Richards, Emma O'Brien, Noemi Vigano', Jacqueline Mooney, Christopher Bonner, David O'Callaghan, John Sharry, Gavin Doherty. . . 1 7

Designing a Secure Blue Button Health Information Exchange for a Commercial Laboratory (e7)
Seth Baker, Alex Roman. 19

Pilot Development of BP-Glass for Unobtrusive Ambulatory Blood Pressure Monitoring (e8)
Quan Zhang, Gang Hu, Xiangguo Yan, Kong Chin, Gary Strangman, Ni Zhao, Yuan-Ting Zhang. 21

Conceptual Model for M-Health Utilization: A Nigerian Adaptation (e3)
Titilayo Odetola. 23

Using Theoretically Tailored Mobile Communications to Target Risky Drinking Among Employed Adults: Design of a Randomized Effectiveness Trial (e9)
Deborah Van Marter, Leanne Mauriello, Emma de Aguiar. 25

Determining the Commercial Opportunity of a Skill-Based Mobile Application for Patients With Type 2 Diabetes:A Feasibility Test With Patients and Providers in a Healthcare Setting (e10)
Jessica Brueggeman, Rob Peters, Neala Havener. 27

XSL•FO
RenderX

Professional Virtual Communities for Health Care Implementers: Impact of Participation on Practice (e11)
Marie Connelly, Aaron Beals, Aaron VanDerlip, Koundinya Singaraju, Rebecca Weintraub. 29

Review of Medical Device Connectivity in Neurocritical Care (e12)
Anna Rodriguez, Matt Ramsey, Michael Kohne, Dick Moberg. 31

Assistive Dressing System: A Capabilities Study for Personalized Support of Dressing Activities for People Living with Dementia (e13)
Winslow Burleson, Cecil Lozano, Vijay Ravishankar, Jeremy Rowe, Edward Mahoney, Diane Mahoney. 33

Patient Rating Sites for Daily Supervision by Healthcare Inspectorates: Implementation into Practice (e14)
Tom van de Belt, Sophia Kleefstra, Rudolf Kool. 35

Design of A Smartphone Application for Automated Wound Measurements for Home Care (e16)
Joshua Budman, Kevin Keenahan, Soumyadipta Acharya, Gabriel Brat. 37

Chronic Aphasia Treatment Outcomes after Teletherapy & Online Exercises - A Comprehensive A-FROM Analysis (e18)
Lisa Haynes, Richard Steele, Denise McCall, Allison Baird. 39

Predictive Modeling of Emergency Hospital Transport Using Medical Alert Pattern Data: Retrospective Cohort Study (e19)
Jorn op den Buijs, Tine Smits, Marten Pijl, Mariana Simons, Linda Schertzer. 41

Wearables, Gamified Group Challenges and Behavioral Incentives: A Preliminary Study of an Engagement Program to Increase Physical Activity (e1)
Trevor van Mierlo, Douglas Hyatt, Andrew T. Ching, Rachel Fournier, Ron S. Dembo. 43

XSL•FO
RenderX

Abstract

Clinical Managers - Ignored yet Critical to Innovation Success

Nance Goldstein[1], BA, MSc, PhD (HK), M Paed De

Brandeis University, WSRC, Waltham, MA, United States

Corresponding Author:
Nance Goldstein, BA, MSc, PhD (HK), M Paed De
Brandeis University
WSRC
515 SOuth Street
Waltham, MA, 02454
United States
Phone: 1 617 784 5280
Fax: 1 781 736 8117
Email: nance@brandeis.edu

Abstract

Background: Innovating new models for healthcare differs dramatically from leading established operations or incremental quality improvement (QI). The project to re-create hospitals to deliver less expensive patient-centered care for increasing complex situations is an “adaptive challenge.” Any solution must be newly invented because the knowledge and engineering of the past are not sufficient. What got you here won't get you there. The situation is ambiguous, and the path uncharted. Few address how to lead healthcare innovation. The key leadership needs identified in the management literature (e.g., Hill Brandeau Truelove 2014) challenge traditional medical and nursing practice of experts acting autonomously. These capabilities don’t fit easily with clinical education’s norms. Leaders must inhibit leaping to solutions, truly collaborate across an increasing number of boundaries, value and integrate others’ ideas, and, crucially, be comfortable not knowing. The many current healthcare leadership courses, even those aiming for “transformational leaders,” fail to address these critical capabilities for successful innovation except marginally. For hospitals and care delivery to adopt connected health opportunities, they must work safely and seamlessly in patient care. The care providers must be willing and ready to use them. Yet they disrupt not only workflow but deeply felt professional beliefs and expectations.

Objective: Neither the medical literature nor leadership practice identifies clearly the capacities needed for successful innovation. Moreover organizations have singularly focused attention and resources on “top” decision-makers. This overlooks middle managers: their innovation willingness and capacities to implement new processes and roles prove critical to success. This article identifies why and how managers’ vital contributions turn innovations into consistent practice that improve patient outcomes.

Methods: This article reviews literature published about US hospitals and clinical care in US-based journals published since the year of Affordable Care Act passage, 2010. The search focused on Pubmed using the keywords that follow plus the author’s familiarity with the management literature on innovation and leadership in other sectors as well as healthcare.

Results: Middle managers implement innovations that produce positive results. At the same time they must ensure on-going patient care remains safe and high quality. They perform multiple, varied roles simultaneously. Key innovation roles for middle and to a lesser extent frontline managers include: - Bridges. - Design reality-testers - Enablers. This includes the roles of Culture creator, motivator, and opportunity creator. - Improvement monitors. The literature on physician leadership, transformational leadership, and leading innovation in healthcare mentions some of these capacities for leaders, yet does so vaguely and inconsistently and with little rationale. Their lists narrow to the task of QI and change management: leading innovation is a riskier, more uncertain and more complex undertaking. Almost none identify middle managers and their capacities as key to the leadership or innovation success.

Conclusions: The specific capabilities that link middle managers to innovation success deserves research attention. Critically healthcare executives must include their managers in their innovation thinking, planning and resource allocation.

(iProc 2015;1(1):e15) doi:10.2196/iproc.4702

XSL•FO
RenderX

KEYWORDS

frontline manager; leadership and system change; leading innovation; middle manager; physician leadership; transformational leadership

(This is a conference paper presented at the Connected Health Symposium, Boston, 2015, which was not edited and is only lightly peer-reviewed).

Multimedia Appendix 1

Extended abstract.

[PDF File (Adobe PDF File), 362KB - iproc_v1i1e15_app1.pdf]

References

Edited by G Eysenbach; submitted 14.05.15; peer-reviewed by I Green-Hopkins, K Unertl, H Oh; comments to author 20.07.15; accepted 20.07.15; published 27.10.15.

Please cite as:
Goldstein N
Clinical Managers - Ignored yet Critical to Innovation Success
iProc 2015;1(1):e15
URL: http://www.iproc.org/2015/1/e15/
doi:10.2196/iproc.4702
PMID:

©Nance Goldstein. Originally published in JMIR Mhealth and Uhealth (http://www.iproc.org), 27.10.2015. This is an open-access article distributed under the terms of the Creative Commons Attribution License (http://creativecommons.org/licenses/by/2.0/), which permits unrestricted use, distribution, and reproduction in any medium, provided the original work, first published in JMIR mhealth and uhealth, is properly cited. The complete bibliographic information, a link to the original publication on http://mhealth.jmir.org/, as well as this copyright and license information must be included.

XSL•FO
RenderX

Abstract

Adapting A Unified Electronic Health Record Usability Framework for Evaluation of Connected Health Care Technologies Linking Mobile Data

Jing Wang[1], MPH, PhD; Jiajie Zhang[2], PhD

[1]The University of Texas Health Science Center at Houston, School of Nursing; School of Biomedical Informatics, Houston, TX, United States

[2]The University of Texas Health Science Center at Houston, School of Biomedical Informatics, Houston, TX, United States

Corresponding Author:
Jing Wang, MPH, PhD
The University of Texas Health Science Center at Houston
School of Nursing; School of Biomedical Informatics
6901 Bertner Avenue
Son 614
Houston, TX, 77030
United States
Phone: 1 7135009022
Fax: 1 7135002142
Email: jing.wang@uth.tmc.edu

Abstract

Background: Evidence-based, objective, and systematic usability evaluation is key to successful connected health care technologies. The increases in patient-facing mobile health technologies not only offer convenience for patients in managing their own health and/or chronic conditions, but also offer the opportunity for health care providers to access patient behaviors and patient-centered outcomes at ease. Thus, it is of significance to link and present patient-facing mobile device data to their health care providers in a secure and uninterrupted way that will facilitate workflow and promote patient provider communication, rather than drawing providers away from patients. This prompts increasing efforts developing connected health care technologies linking mobile data to electronic health record systems guided by user-centered design and redesign principles. However, lack of scientific, objective, and systematic usability evaluation put connected health care technologies at risk for low adoption and eventual failure.

Objective: Learning from lessons in electronic health record usability evaluation, we propose to adapt an existing unified framework, TURF, for electronic health record usability evaluation to guide the design, redesign, and usability evaluation of connected health care technologies linking mobile data to electronic health record systems or other provider-facing Web-based evaluation tools.

Methods: TURF, a unified framework of electronic health record usability, involves three dimensions: useful, usable, and satisfying; and four key components: task, user, representation, and function. Each dimension and component is described with theoretical underpinnings along with examples of how usability can be measured.

Results: Specific adaptation of TURF that's unique for connected health technologies include (1) user analysis for "satisfying" dimension will need to include both users using and mobile health users who's feeding data into the system; (2) function analysis for "useful" dimension will need to consider functions/data wanted by the providers, functions actually used in real activities, functions/data available from mobile devices and with agreement from patients, functions/data available in interfaces within connected health care technologies ; (3) representation analysis for "usable" dimension need to consider correct representation of data from mobile devices in connected interface; (4) task analysis for "usable" dimension will highlight learnability, efficiency (time on task, steps on task, task success, mental effort), and error prevention and recovery (occurrence rate, error recovery rate). Real world interruptions, team dynamics, and multitasking should also be considered during evaluation of connected health care technologies.

Conclusions: An adapted framework is proposed to offer objective, evidence-based, and systematic usability evaluation to guide the design and redesign of interfaces connecting mobile data with electronic health record systems and Web-based evaluation tools.

XSL•FO
RenderX

(iProc 2015;1(1):e20) doi:10.2196/iproc.4477

KEYWORDS

mobile health; connected health; electronic health records, usability evaluation

Introduction

Connected health care technologies have significant values to both health care professional and patients [1]. Patient-facing technology tools including smartphone apps, wearable activity trackers, bluetooth enabled glucometers, wireless weight scales have significantly increased in the market and gained popular demands with potential to facilitate patient management of their own health. An example of these mobile tools are the use of electronic diaries for patient self-monitoring of diet and physical activity for both fitness purposes and can also be for chronic disease self-management. Self-monitoring is cornerstone of a successful behavioral lifestyle intervention for obesity and diabetes [2,3]. Mobile-based electronic diaries made self-monitoring easier and convenient for individuals. Accessing such mobile collected self-monitoring information can provide valuable information for their providers not only in setting individualized and realistic behavioral goals, but also in following up with these behavioral goals in an efficient and effective way that can help patient achieve successful behavior change and ultimately lead to better health care outcomes. Thus, it is of significance to link and present patient-facing mobile device data to their health care providers in a secure and uninterrupted way that will facilitate workflow and promote patient provider communication, rather than drawing providers away from patients. This prompts increasing efforts developing connected health care technologies linking mobile data to electronic health record systems guided by user-centered design and redesign principles. However, lack of scientific, objective, and systematic usability evaluation put connected health care technologies at risk for low adoption and eventual system failure.

With lessons learned in electronic health record implementation across the United States, evidence-based, objective, and systematic usability evaluation is key to successful connected health care technologies. A review in health care information technology usability studies also pointed out that a theoretical framework to guide usability evaluation is essential [4]. Therefore, we propose to adapt an existing unified framework -TURF- for electronic health record usability evaluation to guide the design, redesign, and usability evaluation of connected health care technologies linking mobile data to electronic health record systems or other provider-facing Web-based evaluation tools. In summary, this paper will present the adapted TURF framework as a coherent, unified framework to guide objective and systematic usability evaluation [5].

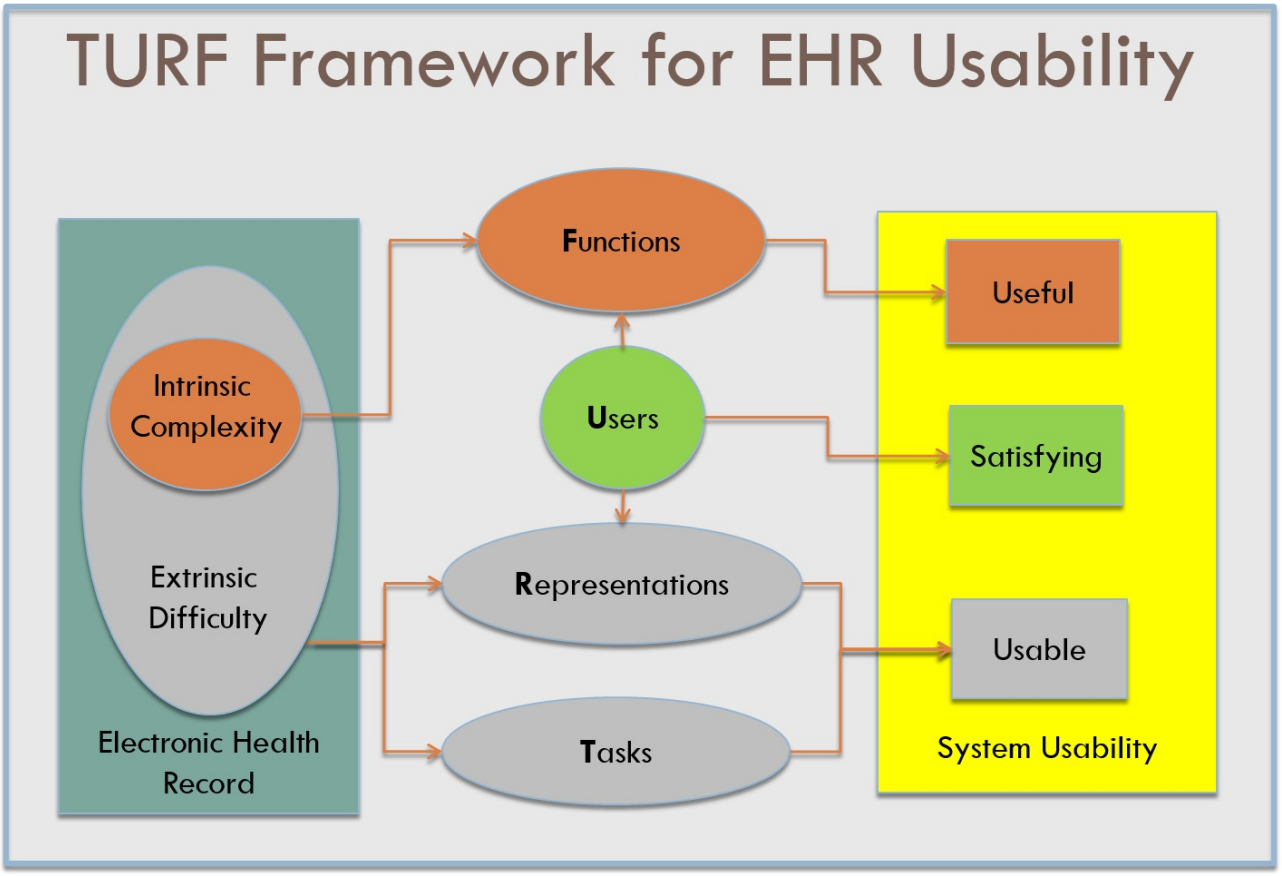
Methods

TURF, standing for “task, user, representation, and function,” is a unified framework of EHR usability, that is “(1) a theory for describing, explaining, and predicting usability differences; (2) a method for defining, evaluating, and measuring usability objectively; (3) a process for designing built-in good usability; and (4) once fully developed, a potential principle for developing EHR usability guidelines and standards.”[5] TURF defines usability as “how useful, usable, and satisfying a system is for the intended users to accomplish goals in the work domain by performing certain sequences of tasks” [5].

TURF involves three dimensions: useful, usable, and satisfying; and four key components: task, user, representation, and function. Each dimension and component is described with theoretical underpinnings along with examples of how usability can be measured. The relationships between each dimension and components are depicted in Figure 1.

XSL•FO
RenderX

Figure 1. The original TURF framework for Electronic Health Record Usability (from Zhang, 2011)[5].



Results

Adapted TURF for Connected Health Technologies

Under adapted TURF, usability for connected health care technologies involving mobile data is defined as useful, usable, and satisfying for intended connected interface users to accomplish goals in the work domain by performing certain sequences of tasks, as well as useful, usable, and satisfying for mobile users feeding data into the connected health care technologies.

User satisfaction is often measured by survey questions evaluating users' perceptions or ratings on a scale. It is an important step, but it often gives individuals wrong impression that usability is subjective, unreliable, and useless for system design and redesign. TURF has both subjective and objective measures of usability. Both measures of usability will have to be conducted to give a complete picture of usability.

We presented each dimension and measure of usability under adapted TURF framework in Table 1.

XSL•FO
RenderX

Table 1. Usability dimensions and measures of usability under adapted TURF for connected health care technologies.

Dimensions	Descriptions	Representative measures
Useful	A connected health care technology is useful if it supports the work domain where the users accomplish goals for their work, independent of how the system is implemented.	Across-model domain function saturation: % of domain functions in the system vs all domain functions in the work domain Within-model Domain Function Saturation: & of domain functions overall all functions
Usable	A connected health care technology is usable if it is easy to learn, easy to use, and error-tolerant on the connected interface, and with some features relying on mobile technology users to feed data/information into the connected interface.	Learnability; Efficiency; Error Prevention and Recovery
Satisfying	A connected health care technology is satisfying to use if the users have good subjective impression of how useful, usable, and likable the system is for both mobile technology users and connected interface users.	Ratings through survey, interviews, and other instruments

User Analysis

User analysis for "satisfying" dimension will need to include both users using and mobile health users who are feeding data into the system. User analysis is the first step of usability evaluation; it involves steps of identifying the types of users and characteristics of users that are using the connected interfaces (often being key health care professionals) as well as mobile technology users (often being patients or supporting personnel).

Functional Analysis

Function analysis for "useful" dimension will need to consider functions or data wanted by the providers, functions actually used in real activities, functions or data available from mobile devices and with agreement from patients, functions or data available in interfaces within connected health care technologies

Representational Analysis

Representation analysis for "usable" dimension need to consider correct representation of data from mobile devices in connected interface. Heuristic evaluation is often used for representation analysis. It is an easy to learn, easy to use, discounted usability evaluation method that involves expert review of usability violations against established usability principles [5]. Adapted TURF framework proposes to use the 12 principles including consistency, visibility, match, minimalist, memory, feedback, flexibility, message, error, closure, undo, language, control, and document [6]. Particular attention is to be paid to the consistency and match between mobile information and connected interface.

Task Analysis

Task analysis for "usable" dimension will highlight learnability, efficiency (time on task, steps on task, task success, mental effort), and error prevention and recovery (occurrence rate, error recovery rate). A connected health care technology is considered as easy to learn if the number of trials to reach a certain performance level, number of items that need to memorized, number of sequences of steps that need to be memorized are all minimized.

Discussion

Principal Findings

We are the first to propose and present a unified framework to guide the design and redesign of connected health care technologies. Future work should expand the framework in real world settings considering real world interruptions, team dynamics, and multitasking. Both subjective and objective dimensions of usability should be applied during development of connected health care technologies involving mobile data. A software called turf is guided by the original TURF framework to semi-automate the usability evaluation process and make it simple and straightforward for usability testing professionals. We anticipate that this software can also be used to support usability evaluation of connected health care technologies.

Conclusions

An adapted framework is proposed to offer objective, evidence-based, and systematic usability evaluation to guide the design and redesign of interfaces connecting mobile data with electronic health record systems and Web-based evaluation tools.

XSL•FO
RenderX

Acknowledgments

This project was funded by the Robert Wood Johnson Foundation Nurse Faculty Scholars Program and partly supported by the Grant No. 10510592 for Patient-Centered Cognitive Support under the Strategic Health IT Advanced Research Projects (SHARP) from the Office of the National Coordinator for Health Information Technology. We would like to thank our colleagues Muhammad Valji, Amy Franklin, Min Zhu, and students for their assistance and feedback.

Conflicts of Interest

None declared.

References

1. Kvedar J, Coye MJ, Everett W. Connected health: a review of technologies and strategies to improve patient care with telemedicine and telehealth. Health Aff (Millwood) 2014 Feb;33(2):194-199. [doi: 10.1377/hlthaff.2013.0992] [Medline: 24493760]
2. Wang J, Sereika SM, Chasens ER, Ewing LJ, Matthews JT, Burke LE. Effect of adherence to self-monitoring of diet and physical activity on weight loss in a technology-supported behavioral intervention. Patient Prefer Adherence 2012;6:221-226 [FREE Full text] [doi: 10.2147/PPA.S28889] [Medline: 22536058]
3. Burke LE, Wang J, Sevick MA. Self-monitoring in weight loss: a systematic review of the literature. J Am Diet Assoc 2011 Jan;111(1):92-102 [FREE Full text] [doi: 10.1016/j.jada.2010.10.008] [Medline: 21185970]
4. Yen PY, Bakken S. Review of health information technology usability study methodologies. J Am Med Inform Assoc 2012;19(3):413-422 [FREE Full text] [doi: 10.1136/amiajnl-2010-000020] [Medline: 21828224]
5. Zhang J, Walji MF. TURF: toward a unified framework of EHR usability. J Biomed Inform 2011 Dec;44(6):1056-1067 [FREE Full text] [doi: 10.1016/j.jbi.2011.08.005] [Medline: 21867774]
6. Zhang J, Johnson TR, Patel VL, Paige DL, Kubose T. Using usability heuristics to evaluate patient safety of medical devices. J Biomed Inform 2003;36(1-2):23-30 [FREE Full text] [Medline: 14552844]

Edited by G Eysenbach, T Hale; submitted 14.05.15; peer-reviewed by S Agboola, PY Yen, J Kvedar, S Bakken; accepted 20.07.15; published 27.10.15.

Please cite as:
Wang J, Zhang J
Adapting A Unified Electronic Health Record Usability Framework for Evaluation of Connected Health Care Technologies Linking Mobile Data
iProc 2015;1(1):e20
URL: http://www.iproc.org/2015/1/e20/
doi:10.2196/iproc.4477
PMID:

©Jing Wang, Jiajie Zhang. Originally published in JMIR Mhealth and Uhealth (http://www.iproc.org), 27.10.2015. This is an open-access article distributed under the terms of the Creative Commons Attribution License (http://creativecommons.org/licenses/by/2.0/), which permits unrestricted use, distribution, and reproduction in any medium, provided the original work, first published in JMIR mhealth and uhealth, is properly cited. The complete bibliographic information, a link to the original publication on http://mhealth.jmir.org/, as well as this copyright and license information must be included.

XSL•FO
RenderX

Abstract

Evaluating Acceptability of Cellular Glucose Meter Use in a Diabetes Care Management Program: A Qualitative Study

Daniel J Amante[1], MPH; Timothy P Hogan[1,2], PhD; Thomas M English[1], PhD; Ruby W Fairchild[3], BA; David M Harlan[3], MD; Michael J Thompson[3], MD

[1]Division of Health Informatics and Implementation Science, Department of Quantitative Health Sciences, University of Massachusetts Medical School, Worcester, MA, United States

[2]Center for Healthcare Organization and Implementation Research (CHOIR), eHealth Quality Enhancement Research Initiative (QUERI), National eHealth QUERI Coordinating Center, Bedford, MA, United States

[3]Diabetes Center of Excellence, Department of Medicine, University of Massachusetts Medical School, Worcester, MA, United States

Corresponding Author:
Daniel J Amante, MPH
Division of Health Informatics and Implementation Science
Department of Quantitative Health Sciences
University of Massachusetts Medical School
368 Plantation Street
Worcester, MA, 01605
United States
Phone: 1 508 856 8480
Fax: 1 508 856 8993
Email: daniel.amante@umassmed.edu

Abstract

Background: Diabetes is difficult to manage and many patients require additional support to control their disease. Increasingly, connected health technologies, such as secure patient portals, are being used in diabetes care management programs to provide such support. Uploading self-monitored blood glucose (SMBG) recordings to patient portals is an increasingly common strategy to support improved monitoring. Recently introduced cellular glucose meters can be used to automate the upload process immediately after testing. Automatic uploading eliminates the need for patients to connect meters to a computer and enables support teams to monitor uploads in real-time and in turn, provide in-the-moment support as needed. Despite their potential to improve diabetes management, the use of cellular glucose meters is not without challenges. Although designed for simplicity and seamless use, meters sometimes require a degree of technological skill that certain patients may not possess. Patients may also struggle to understand how to best utilize functionality to help manage their disease. When perceived ease of use or usefulness is low, utilization of the technology may result in unanticipated consequences. For this reason, patient acceptability must be evaluated before cellular glucose meters can be implemented more broadly.

Objective: To evaluate patient acceptability of cellular glucose meter use in a diabetes care management program.

Methods: Patients with Type 1 and Type 2 diabetes received cellular glucose meters and were enrolled in a care management program. Certified Diabetes Educators (CDEs) monitored uploaded SMBG recordings. The CDEs provided structured support and coaching to participants and interacted with their medical providers as necessary. After 1 month of the program, focus groups and semi-structured phone interviews were conducted with the participants. Audio recordings of each were transcribed verbatim and the resulting transcripts were thematically coded. An a priori code list, based on the Technology Acceptance Model, was used to guide the analysis and further codes were added to represent other themes from the transcripts.

Results: Participants with Type 1 (n=6) or Type 2 (n=10) diabetes reported that the cellular glucose meter was both easy to use and useful. The meter's most favorable features were the automatic and seamless uploading of SMBG recordings, SMBG tracking and sharing tools, and tips provided through the meter. The support provided by the CDEs through the management program was also identified as being helpful. Identified areas of improvement included providing training on the meter and program, improved consistency and efficiency of the meter's functional performance, and additional meter functionality.

Conclusions: All participants reported a positive overall experience using the meter as part of the care management program. Future work should focus on long-term patient acceptability and efficacy of using cellular glucose meters in diabetes management programs and the subsequent effects on clinical service utilization and provider workflow.

XSL•FO
RenderX

(iProc 2015;1(1):e2) doi:10.2196/iproc.4637

KEYWORDS

medical informatics, health information technology, health communication, health information management, diabetes mellitus, patient care management

(This is a conference paper presented at the Connected Health Symposium, Boston, 2015, which was not edited and is only lightly peer-reviewed).

Multimedia Appendix 1

Extended Abstract.

[PDF File (Adobe PDF File), 216KB - iproc_v1i1e2_app1.pdf]

References

1. Haas L, Maryniuk M, Beck J, Cox CE, Duker P, Edwards L, 2012 Standards Revision Task Force. National standards for diabetes self-management education and support. Diabetes Care 2014 Jan;37 Suppl 1:S144-S153 [FREE Full text] [doi: 10.2337/dc14-S144] [Medline: 24357210]
2. Valdez RS, Holden RJ, Novak LL, Veinot TC. Transforming consumer health informatics through a patient work framework: connecting patients to context. J Am Med Inform Assoc 2015 Jan;22(1):2-10. [doi: 10.1136/amiajnl-2014-002826] [Medline: 25125685]
3. C. and A. Strauss, Managing chronic illness at home: three lines of work. Qualitative sociology 1985;8(3):224-247. [doi: 10.1007/BF00989485]
4. Berg M. Patient care information systems and health care work: a sociotechnical approach. Int J Med Inform 1999 Aug;55(2):87-101. [Medline: 10530825]
5. Phillips A. Web based care management improved glucose control in patients with poorly controlled diabetes. Evid Based Nurs 2006 Jan;9(1):21. [Medline: 16437803]
6. Taylor CB, Miller NH, Reilly KR, Greenwald G, Cunning D, Deeter A, et al. Evaluation of a nurse-care management system to improve outcomes in patients with complicated diabetes. Diabetes Care 2003 Apr;26(4):1058-1063. [Medline: 12663573]
7. Aubert RE, Herman WH, Waters J, Moore W, Sutton D, Peterson BL, et al. Nurse case management to improve glycemic control in diabetic patients in a health maintenance organization. A randomized, controlled trial. Ann Intern Med 1998 Oct 15;129(8):605-612. [Medline: 9786807]
8. Piette JD, Weinberger M, Kraemer FB, McPhee SJ. Impact of automated calls with nurse follow-up on diabetes treatment outcomes in a Department of Veterans Affairs Health Care System: a randomized controlled trial. Diabetes Care 2001 Feb;24(2):202-208. [Medline: 11213866]
9. Krein SL, Klamerus ML, Vijan S, Lee JL, Fitzgerald JT, Pawlow A, et al. Case management for patients with poorly controlled diabetes: a randomized trial. Am J Med 2004 Jun 1;116(11):732-739. [doi: 10.1016/j.amjmed.2003.11.028] [Medline: 15144909]
10. Hess R, Bryce CL, Paone S, Fischer G, McTigue KM, Olshansky E, et al. Exploring challenges and potentials of personal health records in diabetes self-management: implementation and initial assessment. Telemed J E Health 2007 Oct;13(5):509-517. [doi: 10.1089/tmj.2006.0089] [Medline: 17999613]
11. Zickmund SL, Hess R, Bryce CL, McTigue K, Olshansky E, Fitzgerald K, et al. Interest in the use of computerized patient portals: role of the provider-patient relationship. J Gen Intern Med 2008 Jan;23 Suppl 1:20-26 [FREE Full text] [doi: 10.1007/s11606-007-0273-6] [Medline: 18095039]
12. Quinn CC, Clough SS, Minor JM, Lender D, Okafor MC, Gruber-Baldini A. WellDoc mobile diabetes management randomized controlled trial: change in clinical and behavioral outcomes and patient and physician satisfaction. Diabetes Technol Ther 2008 Jun;10(3):160-168. [doi: 10.1089/dia.2008.0283] [Medline: 18473689]
13. Grant RW, Wald JS, Schnipper JL, Gandhi TK, Poon EG, Orav EJ, et al. Practice-linked online personal health records for type 2 diabetes mellitus: a randomized controlled trial. Arch Intern Med 2008 Sep 8;168(16):1776-1782 [FREE Full text] [doi: 10.1001/archinte.168.16.1776] [Medline: 18779465]
14. Amante DJ, Hogan TP, Pagoto SL, English TM. A systematic review of electronic portal usage among patients with diabetes. Diabetes Technol Ther 2014 Nov;16(11):784-793. [doi: 10.1089/dia.2014.0078] [Medline: 24999599]
15. L. , J. Ingham, and P. Collerette, Why do people use information technology? A critical review of the technology acceptance model. Information & management 2003;40(3):191-204. [doi: 10.1016/S0378-7206(01)00143-4]

XSL•FO
RenderX

Edited by G Eysenbach, T Hale; submitted 12.05.15; peer-reviewed by T Irizarry, S Beidas, C Berridge; accepted 20.07.15; published 27.10.15.

Please cite as:
Amante DJ, Hogan TP, English TM, Fairchild RW, Harlan DM, Thompson MJ
Evaluating Acceptability of Cellular Glucose Meter Use in a Diabetes Care Management Program: A Qualitative Study
iProc 2015;1(1):e2
URL: http://www.iproc.org/2015/1/e2/
doi:10.2196/iproc.4637
PMID:

©Daniel J. Amante, Timothy P. Hogan, Thomas M. English, Ruby W. Fairchild, David M. Harlan, Michael J. Thompson. Originally published in JMIR Mhealth and Uhealth (http://www.iproc.org), 27.10.2015. This is an open-access article distributed under the terms of the Creative Commons Attribution License (http://creativecommons.org/licenses/by/2.0/), which permits unrestricted use, distribution, and reproduction in any medium, provided the original work, first published in JMIR mhealth and uhealth, is properly cited. The complete bibliographic information, a link to the original publication on http://mhealth.jmir.org/, as well as this copyright and license information must be included.

XSL•FO
RenderX

Abstract

Facilitating Quick and Better Text Searching for ICD-10-CM Codes

Hari Nandigam[1], MBBS, Master of Information

Partners Healthcare, Wellesley, MA, United States

Corresponding Author:
Hari Nandigam, MBBS, Master of Information
Partners Healthcare
93 Worcester street, Suite 201
Wellesley, MA,
United States
Phone: 1 7814168961
Fax: 1 781 416 8912
Email: hnandigam@partners.org

Abstract

Background: The Center for Medicare & Medicaid Services (CMS) published ICD-10-CM files in xml format in addition to pdf format. The coding guidelines recommend using both tabular and index files for efficient and accurate coding of the medical conditions. It would be a challenge for clinicians not only to correctly diagnose and provide appropriate treatment to their patients, but also to search and select a right term and right ICD code. The traditional text search involves querying using key words and browsing for answers. In the context of text search for an ICD-10 diagnosis code, browsing through irrelevant results or finding no results may frustrate busy clinicians. Ideally a search for ICD-10 code should lead them to a correct answer in a quick and easy fashion. Therefore when building a search application for ICD-10 coding, considering these issues would be the key to a good design.

Objective: This paper focused on the user interface that had an improved search functionality when querying ICD-10 codes and diagnoses for a medical condition.

Methods: In our first step we pre-coordinated 'terms' nested in the 'mainTerm' in the ICD-10 Index xml file and made the relations between them explicit in the <title> elements using a commercially available transformation tool. The values for the 'level' attribute in the <title> ranged from 1 to 9 representing the levels of nesting. In our next step we joined the tabular and the modified index files based on their code as the key and combined into one xml file. We then loaded this combined file into the database present at the back end. The original tabular xml file from CDC was also loaded in the database for the sake of a comparative study. We understand that both tabular and index files complement the full set of ICD-10-CM. But in this study we wanted to use the original files as they are and querying against the original index file wasn't helpful. We requested clinicians to use our search tool running with one instance of combined xml and another instance of original tabular xml file at their back end. We then did a statistical analysis of the sensitivity and specificity of both result sets for clinical relevancy using their judgment as the gold standard.

Results: Our preliminary results showed that querying against the database containing our combined xml file resulted in a more comprehensive and accurate diagnoses set compared to querying against to the one that contained the original tabular file. In some cases querying against the original tabular file resulted in null results.

Conclusions: We conclude that the combined tabular and index file loaded into the database results in higher precision and recalls upon querying. Our next step is to develop a faceted search to help in navigating to a highly granular ICD-10-CM code.

(iProc 2015;1(1):e4) doi:10.2196/iproc.4668

KEYWORDS

ICD-10-CM; index file; precoordination; tabular file

(This is a conference paper presented at the Connected Health Symposium, Boston, 2015, which was not edited and is only lightly peer-reviewed).

XSL•FO
RenderX

Multimedia Appendix 1

Extended abstract.

[PDF File (Adobe PDF File), 809KB - iproc_v1i1e4_app1.pdf]

References

Edited by T Hale, G Eysenbach; submitted 13.05.15; peer-reviewed by I Adeleke, J Jones; comments to author 08.07.15; revised version received 17.07.15; accepted 20.07.15; published 27.10.15.

Please cite as:
Nandigam H
Facilitating Quick and Better Text Searching for ICD-10-CM Codes
iProc 2015;1(1):e4
URL: http://www.iproc.org/2015/1/e4/
doi:10.2196/iproc.4668
PMID:

©Hari Nandigam. Originally published in JMIR Mhealth and Uhealth (http://www.iproc.org), 27.10.2015. This is an open-access article distributed under the terms of the Creative Commons Attribution License (http://creativecommons.org/licenses/by/2.0/), which permits unrestricted use, distribution, and reproduction in any medium, provided the original work, first published in JMIR mhealth and uhealth, is properly cited. The complete bibliographic information, a link to the original publication on http://mhealth.jmir.org/, as well as this copyright and license information must be included.

XSL•FO
RenderX

Abstract

A Randomized Controlled Trial of an Internet-Delivered Treatment: Its Potential as a Low-Intensity Community Intervention for Adults With Symptoms of Depression

Derek Richards[1,2], M Sc, PhD; Ladislav Timulak[2], PhD; Emma O'Brien[1], MSc (Applied Psychol; Claire Hayes[3], Psy.D.; Noemi Vigano[1], MSc (Psych); John Sharry[4], PhD; Doherty Gavin[5], D Phil

[1]SilverCloud Health, Clinical Research & Innovation, Dublin, Ireland

[2]Trinity College Dublin, School of Psychology, Dublin, Ireland

[3]Aware Charity, Clinical Director, Dublin, Ireland

[4]Parents Plus Charity, Dublin, Ireland

[5]Trinity College Dublin, School of Computer Science and Statistics, Dublin, Ireland

Corresponding Author:
Derek Richards, M Sc, PhD
SilverCloud Health
Clinical Research & Innovation
The Priory, Johns St West, Dublin 8
Dublin,
Ireland
Phone: 353 0867965581
Fax: 353 0867965581
Email: drichard@tcd.ie

Abstract

Background: Online delivered treatments for depression have proved successful, with supported programs offering the potential for improved adherence and outcomes. Online support is particularly interesting in the context of increasing access to interventions, and delivering interventions population-wide.

Objective: The research investigated if a supported online treatment is effective as a low-intensity community-based intervention for adults with depression. Based on previous successes with supported online treatments for, and the specific Space from Depression program, it was hypothesized that participants in the trial would demonstrate significant decreases in depressive symptoms post-intervention, with corresponding improvements in comorbid anxiety and quality of life indicators.

Methods: The study was a randomized controlled trial of a supported 8 module online cognitive behavioral therapy (iCBT) program for adults with depressive symptoms (n=96) compared to a waiting-list control group (n=92). The primary outcome was depressive symptoms. The program was made available nationwide using trained supporters from an established depression charity.

Results: For the treatment group, post-treatment effect sizes reported were large for the primary outcome measure on depression (d=1.19). The between-group effects were moderate for the primary outcomes (d=0.40) favoring the treatment group. Gains were maintained at 6-month follow-up.

Conclusions: The results from the present study show that the SilverCloud internet-delivered cognitive-behavior therapy (iCBT) program, Space from Depression, is effective in reducing depressive symptoms in comparison to a waiting list control group. The study demonstrated the potential of an online delivered treatment with online support in a community sample of Irish adults `with symptoms of depression. It gives support to a model for delivering online depression interventions population-wide using trained supporters. In locations where behavioral and mental health services are underdeveloped, or where structures simply do not exist, or where there is a potential to offset risk and escalation of difficulties and benefit from early intervention, such a model of service provision could be feasible.

Trial Registration: International Standard Randomized Controlled Trial Number (ISRCTN): 03704676; http://www.controlled-trials.com/ISRCTN03704676 (Archived by WebCite at http://www.webcitation/6cWQZmEvw).

XSL•FO
RenderX

(iProc 2015;1(1):e5) doi:10.2196/iproc.4679

KEYWORDS

CBT; depression; Internet delivered; online interventions; population health; randomized trial; symptoms; treatment

(This is a conference paper presented at the Connected Health Symposium, Boston, 2015, which was not edited and is only lightly peer-reviewed)

Multimedia Appendix 1

Extended abstract.

[PDF File (Adobe PDF File), 487KB - iproc_v1i1e5_app1.pdf]

References

Edited by T Hale, G Eysenbach; submitted 14.05.15; peer-reviewed by P Frazier, J Lerner; accepted 20.07.15; published 27.10.15.

Please cite as:
Richards D, Timulak L, O'Brien E, Hayes C, Vigano N, Sharry J, Gavin D
A Randomized Controlled Trial of an Internet-Delivered Treatment: Its Potential as a Low-Intensity Community Intervention for Adults With Symptoms of Depression
iProc 2015;1(1):e5
URL: http://www.iproc.org/2015/1/e5/
doi:10.2196/iproc.4679
PMID:

©Derek Richards, Ladislav Timulak, Emma O'Brien, Claire Hayes, Noemi Vigano, John Sharry, Doherty Gavin. Originally published in JMIR Mhealth and Uhealth (http://www.iproc.org), 27.10.2015. This is an open-access article distributed under the terms of the Creative Commons Attribution License (http://creativecommons.org/licenses/by/2.0/), which permits unrestricted use, distribution, and reproduction in any medium, provided the original work, first published in JMIR mhealth and uhealth, is properly cited. The complete bibliographic information, a link to the original publication on http://mhealth.jmir.org/, as well as this copyright and license information must be included.

XSL•FO
RenderX

Abstract

The new Gold Standard in Online Delivered Behavioral Health Programs

Derek Richards[1], P.hD; Emma O'Brien[1], M Sc; Noemi Vigano'[1], M Sc; Jacqueline Mooney[1], M.A.; Christopher Bonner[1], M Sc; David O'Callaghan[1], P.hD; John Sharry[1], Dr; Gavin Doherty[1], P.hD

SilverCloud Health, Dublin, Ireland

Corresponding Author:
Noemi Vigano', M Sc
SilverCloud Health
The Priory, Johns St West, Dublin 8
Dublin,
Ireland
Phone: 353 0867965581
Fax: 353 0867965581
Email: noemi.vigano@silvercloudhealth.com

Abstract

Recent reforms in the US healthcare space are seeing an exponential increase in demand for care and also a regulation of esteem between physical and behavioral healthcare. Healthcare providers are under increasing pressure to provide cost-effective and high quality services to a large number of individuals. Online delivered interventions have the potential to provide a solution to healthcare providers as they can provide accessible and flexible healthcare. Online delivered behavioral health programs have developed an empirical base. The majority of this evidence-base has originated in Europe and Australia. The US healthcare market is now in a position to realize the benefits of online delivered behavioral health programs that offer excellent solutions to many of the difficulties in accessing behavioral healthcare in the US. While some guidelines and other operational characteristics have been developed, no standard setting out what is required of any connected health intervention is established. The US can look to the empirical base from developments and research worldwide, and also to thought leaders who are integrating the available evidence-base to shape standards of excellence for the future of online delivered behavioral health interventions. To that end the poster outlines some of the attributes, drawn from the evidence-base, that could be considered to be some of the necessary criteria needed to characterize any Gold Standard intervention. This set of attributes would therefore define excellence in connected healthcare delivery and help inform best practice. It is therefore proposed that a gold standard online-delivered program for behavioral health should include at least some of the following points: 1. Include the use of evidence-based and empirically supported content 2. Focus on accountable care and deliver on effective clinical outcomes 3. Be developed on robust, engaging, secure and responsive technologies 4. Be informed and shaped by behavioral health subject matter experts' clinical expertise 5. Be patient-centric: involve users in the development and evaluation process and a high degree of personalization 6. Have research and evaluation that supports its effectiveness

(iProc 2015;1(1):e6) doi:10.2196/iproc.4682

KEYWORDS

Gold Standard; behavioral online interventions; connected health programs; behavioral health online; evidence-base; best practice; increasing access to behavioral interventions; parity of esteem.

(This is a conference paper presented at the Connected Health Symposium, Boston, 2015, which was not edited and is only lightly peer-reviewed).

Multimedia Appendix 1

Extended abstract.

XSL•FO
RenderX

[PDF File (Adobe PDF File), 681KB - iproc_v1i1e6_app1.pdf]

References

Edited by G Eysenbach, T Hale; submitted 14.05.15; peer-reviewed by C Horsch, M Frost; accepted 20.07.15; published 27.10.15.

Please cite as:
Richards D, O'Brien E, Vigano' N, Mooney J, Bonner C, O'Callaghan D, Sharry J, Doherty G
The new Gold Standard in Online Delivered Behavioral Health Programs
iProc 2015;1(1):e6
URL: http://www.iproc.org/2015/1/e6/
doi:10.2196/iproc.4682
PMID:

©Derek Richards, Emma O'Brien, Noemi Vigano', Jacqueline Mooney, Christopher Bonner, David O'Callaghan, John Sharry, Gavin Doherty. Originally published in JMIR Mhealth and Uhealth (http://www.iproc.org), 27.10.2015. This is an open-access article distributed under the terms of the Creative Commons Attribution License (http://creativecommons.org/licenses/by/2.0/), which permits unrestricted use, distribution, and reproduction in any medium, provided the original work, first published in JMIR mhealth and uhealth, is properly cited. The complete bibliographic information, a link to the original publication on http://mhealth.jmir.org/, as well as this copyright and license information must be included.

XSL•FO
RenderX

Abstract

Designing a Secure Blue Button Health Information Exchange for a Commercial Laboratory

Seth Baker[1], CPHIMS, PMP, MCSE, MCSD; Alex Roman[1], BS, MS

Hartford Healthcare / Clinical Lab Partners, Newington, CT, United States

Corresponding Author:
Seth Baker, CPHIMS, PMP, MCSE, MCSD
Hartford Healthcare / Clinical Lab Partners
129 Patricia M. Genova Dr.
Newington, CT, 06111
United States
Phone: 1 8606968614
Fax: 1 8606968620
Email: sbaker@arbot.com

Abstract

Background: There is a growing demand by patients for easy electronic access to laboratory result data for use in personal health record systems (PHR-S) and for transfer to other health providers. The Blue Button Initiative is a public-private partnership offering a framework based on national standards to support patient access to electronic data.

Objective: The aim of this project study was to architect an initial pilot implementation of the Blue Button framework for a commercial laboratory to facilitate patient access to electronic results.

Methods: The proposed design architecture includes multiple application services, specifically an Encrypted Data Store, Client Access component, and Result Publishing service to accomplish these goals of the pilot project and meet the security and privacy requirements.

Results: The resulting application components and programming interfaces accomplish the initial pilot goals and provide a base to expand the platform to offer support for mobile devices and additional interoperability options. Encryption and isolation of data have been used to safeguard the confidentiality, integrity and availability of protected health information (PHI) and allow for the use of standard cloud services to host external facing components.

Conclusions: The Blue Button standards and framework provide a solid basis for facilitating electronic access to result data by patients and for meeting the requirements of View, Download, and Transmit (V/D/T) in Meaningful Use Stage 2 (MU-II). The Blue Button Framework can provide the functionality required for a Consumer Mediated Health Information Exchange which gives patients the ability to aggregate and control the use of their health information among providers.

(iProc 2015;1(1):e7) doi:10.2196/iproc.4685

KEYWORDS

Blue Button; Blue Button +; Blue Button Plus, health information exchange

(This is a conference paper presented at the Connected Health Symposium, Boston, 2015, which was not edited and is only lightly peer-reviewed).

Multimedia Appendix 1

Extended abstract.

[PDF File (Adobe PDF File), 738KB - iproc_v1i1e7_app1.pdf]

References

XSL•FO
RenderX

Edited by G Eysenbach, T Hale; submitted 14.05.15; peer-reviewed by D Klein, L Garvin, K Nazi; accepted 20.07.15; published 27.10.15.

Please cite as:
Baker S, Roman A
Designing a Secure Blue Button Health Information Exchange for a Commercial Laboratory
iProc 2015;1(1):e7
URL: http://www.iproc.org/2015/1/e7/
doi:10.2196/iproc.4685
PMID:

©Seth Baker, Alex Roman. Originally published in JMIR Mhealth and Uhealth (http://www.iproc.org), 27.10.2015. This is an open-access article distributed under the terms of the Creative Commons Attribution License (http://creativecommons.org/licenses/by/2.0/), which permits unrestricted use, distribution, and reproduction in any medium, provided the original work, first published in JMIR mhealth and uhealth, is properly cited. The complete bibliographic information, a link to the original publication on http://mhealth.jmir.org/, as well as this copyright and license information must be included.

XSL•FO
RenderX

Abstract

Pilot Development of BP-Glass for Unobtrusive Ambulatory Blood Pressure Monitoring

Quan Zhang[1], PhD; Gang Hu[1], PhD; Xiangguo Yan[2], PhD; Kong Yien Chin[3], PhD; Gary E Strangman[1], PhD; Ni Zhao[4], PhD; Yuan-Ting Zhang[5], PhD

[1]Neural Systems Group, Deptment of Psychiatry, Harvard Medical School and Massachusetts General Hospital, Charlestown, MA, United States

[2]Key Laboratory of Biomedical Information Engineering of Education Ministry, Xi'an Jiaotong University, Xi'an, China

[3]Medical Physics Dept, Leicester Royal Infirmary, University Hospitals of Leicester, Leicester, United Kingdom

[4]Department of Electronic Engineering, Hong Kong, China (Hong Kong)

[5]Department of Electronic Engineering, The Chinese University of Hong Kong, Hong Kong, China (Hong Kong)

Corresponding Author:
Quan Zhang, PhD
Neural Systems Group
Deptment of Psychiatry
Harvard Medical School and Massachusetts General Hospital
13th St, Building 149, Rm 10029
Charlestown, MA, 02129
United States
Phone: 1 617 724 9608
Fax: 1 617 726 4078
Email: qzhang@nmr.mgh.harvard.edu

Abstract

Background: Cardiovascular disease (CVD) is the leading cause of death and lower life expectancy worldwide, and is a heavy financial burden both to individuals and to the health system. Blood pressure (BP) control is one of the key strategies to prevent CVDs such as heart attacks and strokes; unfortunately, the proportion of patients with controlled BP has not improved in recent years, despite the increased intensity of therapy. Efforts are being made to improve this situation, including early identification of at-risk individuals using connected health concepts, individualized therapies, adoption of more sensitive clinical indices, and home BP monitoring. The existing BP methods each demonstrate different limitations, including their obtrusiveness, inability to provide continuous monitoring, difficulty integrating into Electronic Health Records, human error concerns, or high cost. New technologies for unobtrusive ambulatory blood pressure monitoring (ABPM) remain to be developed to combine the latest sensor and information technologies and to support the coming connected health strategies.

Objective: The objective of this pilot study is to develop a novel, unobtrusive ABPM technology that features beat-to-beat continuous BP monitoring, seamless automatic integration with electronic health records (EHR) and/or internet, low cost to meet today's need of BP control and CVD prevention.

Methods: In this paper, we describe the pilot development of a novel wearable ABP monitoring device, BP-Glass. BP-Glass integrates three noninvasive, cuffless and continuous BP sensing technologies into a pair of eyeglasses: tonometry, pulse transit time (PTT) and hemodynamics-based technologies. In the BP-Glass prototype, a superficial temporal artery (STA) tonometry sensor is integrated into a pair of eyeglasses for unobtrusive sensing of ABP; together with a battery powered wearable recording system, the BP-Glass system is capable of recording ABP, electrocardiogram (ECG), respiration, cerebral hemodynamics, systemic hemodynamics and subjects' motion for up to 24 hours at 250Hz sampling rate, and the total weight of the whole multi-modality monitoring system is less than 350 grams. The system's performance is demonstrated by ambulatory tests during subject's normal activity; ABP fluctuations during micturition and Valsalva maneuvers are discussed in detail.

Results: Successful ambulatory BP monitoring using BP-Glass during people's daily activities were conducted. Interesting spontaneous or introduced blood pressure fluctuations were captured during the ambulatory recording, including Micturition response and Valsalva Maneuver response.

Conclusions: These preliminary results demonstrate the feasibility of our BP-Glass design for ABP monitoring, and suggest that system has significant potential in the diagnosis and management of cardiovascular and cerebrovascular disease, especially

XSL•FO
RenderX

powerful in catching ABP fluctuations during transient symptoms, such as syncope, with unpredictable onsets. To the best of our knowledge, this is the first report of multi-modality ABP monitoring and simultaneous blood pressure and hemodynamics recording during events in peoples' daily activity.

(iProc 2015;1(1):e8) doi:10.2196/iproc.4691

KEYWORDS

ambulatory blood pressure monitoring; wearable technology; connected health

(This is a conference paper presented at the Connected Health Symposium, Boston, 2015, which was not edited and is only lightly peer-reviewed).

Multimedia Appendix 1

Extended abstract.

[PDF File (Adobe PDF File), 884KB - iproc_v1i1e8_app1.pdf]

References

Edited by G Eysenbach, T Hale; submitted 14.05.15; peer-reviewed by T Tamura; accepted 20.07.15; published 27.10.15.

Please cite as:
Zhang Q, Hu G, Yan X, Chin KY, Strangman GE, Zhao N, Zhang YT
Pilot Development of BP-Glass for Unobtrusive Ambulatory Blood Pressure Monitoring
iProc 2015;1(1):e8
URL: http://www.iproc.org/2015/1/e8/
doi:10.2196/iproc.4691
PMID:

©Quan Zhang, Gang Hu, Xiangguo Yan, Kong Yien Chin, Gary E. Strangman, Ni Zhao, Yuan-Ting Zhang. Originally published in JMIR Mhealth and Uhealth (http://www.iproc.org), 27.10.2015. This is an open-access article distributed under the terms of the Creative Commons Attribution License (http://creativecommons.org/licenses/by/2.0/), which permits unrestricted use, distribution, and reproduction in any medium, provided the original work, first published in JMIR mhealth and uhealth, is properly cited. The complete bibliographic information, a link to the original publication on http://mhealth.jmir.org/, as well as this copyright and license information must be included.

XSL•FO
RenderX

Abstract

Conceptual Model for M-Health Utilization: A Nigerian Adaptation

Titilayo Dorothy Odetola[1], B.Nursing, MSc Nursing, PhD, RN

College of Medicine, Department of Nursing, University of Ibadan, Ibadan, Nigeria

Corresponding Author:
Titilayo Dorothy Odetola, B.Nursing, MSc Nursing, PhD, RN
College of Medicine
Department of Nursing
University of Ibadan
Ibadan
Nigeria
Phone: 234 8055410093
Fax: 234 8060227398
Email: odetolatitilayo@yahoo.com

Abstract

Background: Compliance with Antenatal Care (ANC) and Postnatal Care (PNC) regimen is a known determinant of pregnancy outcomes. In most developing countries, access to Skilled Birth Delivery (SBD) and Childhood Immunization (CIm), socio-cultural beliefs, physical and financial barriers significantly influence perinatal health outcome. Mobile health (M-Health) is an emerging strategy for improving healthcare utilization and compliance but the extent to which it may influence uptake of available maternal and infant welfare services in Nigeria is not documented in literature. Nurses are the fulcrum for maternal healthcare but their knowledge and roles in the use of M-Health are not known in Nigeria.

Objective: This study was designed to assess the effects of M-Health Nursing Intervention (MHNI) on uptake of maternal health services in Oyo South Senatorial District.

Methods: This quasi-experimental study involved four out of nine local government areas randomly selected and allocated into Experimental (EG) and Control (CG) groups [a semi-urban and an urban each]. All the 12 Primary Health Care facilities which had nursing personnel were purposively selected. Forty-eight nurses (EG: 21 nurses; CG: 27 nurses) and 383 literate pregnant women (EG: 191 women; CG: 192 women) at gestational age of 4-6 months, registered at the PHC were recruited consecutively. Experimental group nurses were trained on M-Health and mobile telephones were given to nurses and registered pregnant women to facilitate communication. Over an 8-month period, pregnant women received free voice calls and health promotion text messages from nurses. At baseline, 3-month and 6-month, nurses' knowledge about MHNI was assessed in EG and CG using a non-weighted 42-item pretested questionnaire. Outcome evaluation checklist was used to document utilization and completion of the following six indices among pregnant women: ANC, PNC attendance, SBD, Intermittent Preventive Treatments in pregnancy (IPTp), Tetanus Toxoid (TT), and CIm within 6 weeks of birth. Data were analyzed using descriptive statistics, Chi-square, repeated measures ANOVA and logistic regression at P=0.05.

Results: In the EG, knowledge score significantly increased from 21.9±4.5 at baseline to 23.6±4.6 and 23.2±5.6 at three-month and six-month respectively while there was no significant difference in knowledge score among CG over the study period. Comparing EG with CG, significant differences were documented in ANC attendance (66.8% versus 53.1%; OR:1.7, CI: 1.2-2.7), uptake of IPTp (47.6% versus 18.4%; OR:1.7, CI: 1.2-2.7), CIm (62.6% versus 46.9%; OR:1.9, CI: 1.3-2.8) and TT (64.5% versus 54.1%; OR:1.02, CI: 0.5-1.9), SBD (69.8% versus 36.3%; OR:1.0, CI: 0.6-1.6), PNC (69.0% versus 51.0%; OR :2.1, CI: 1.4-3.2). Significantly more women in the EG who completed ANC had IPTp (OR: 14.9, CI: 6.3-35.7); TT (OR: 8.2, CI: 1.7-39.9) and SBD (OR: 2.3, CI: 1.2-4.5) than those who did not. Likewise in CG, more women who completed ANC had IPTp (OR: 21.9, CI: 5.1-94.1) and SBD (OR: 2.0, CI: 1.1-3.8).

Conclusions: Mobile health nursing intervention improved uptake of maternal health services among pregnant women. Policy makers need to consider the adoption of mobile health to enhance uptake of maternal health services and improve pregnancy outcome.

(iProc 2015;1(1):e3) doi:10.2196/iproc.4645

XSL•FO
RenderX

KEYWORDS

antenatal care; M-health nursing intervention; postnatal care; skilled-birth delivery

(This is a conference paper presented at the Connected Health Symposium, Boston, 2015, which was not edited and is only lightly peer-reviewed).

Multimedia Appendix 1

Extended abstract.

[PDF File (Adobe PDF File), 349KB - iproc_v1i1e3_app1.pdf]

References

Edited by G Eysenbach, T Hale; submitted 11.05.15; peer-reviewed by S Odametey, E Chung; accepted 25.07.15; published 27.10.15.

Please cite as:
Odetola TD
Conceptual Model for M-Health Utilization: A Nigerian Adaptation
iProc 2015;1(1):e3
URL: http://www.iproc.org/2015/1/e3/
doi:10.2196/iproc.4645
PMID:

©Titilayo Dorothy Odetola. Originally published in JMIR Mhealth and Uhealth (http://www.iproc.org), 27.10.2015. This is an open-access article distributed under the terms of the Creative Commons Attribution License (http://creativecommons.org/licenses/by/2.0/), which permits unrestricted use, distribution, and reproduction in any medium, provided the original work, first published in JMIR mhealth and uhealth, is properly cited. The complete bibliographic information, a link to the original publication on http://mhealth.jmir.org/, as well as this copyright and license information must be included.

XSL•FO
RenderX

Abstract

Using Theoretically Tailored Mobile Communications to Target Risky Drinking Among Employed Adults: Design of a Randomized Effectiveness Trial

Deborah Fisher Van Marter[1*], MPH; Leanne Marie Mauriello[1*], PhD Psych; Emma Louisa de Aguiar[1*], BA

Pro-Change Behavior Systems, Inc., South Kingstown, RI, United States

[*]all authors contributed equally

Corresponding Author:
Deborah Fisher Van Marter, MPH
Pro-Change Behavior Systems, Inc.
1174 Kingstown Road
Unit 101
South Kingstown, RI, 02879
United States
Phone: 1 401 360 2981
Fax: 1 401 360 2983
Email: dvanmarter@prochange.com

Abstract

Background: A sizeable proportion of employed adults consume alcohol at non-dependent but risky levels, which is defined by the National Institutes of Health for men as drinking more than 14 drinks per week or more than 4 in a day and for women as drinking more than 7 drinks per week or more than 3 drinks in a day. Risky levels of drinking impact the health, well-being, and productivity of employees, while driving costs to employers in lost productivity, absenteeism, and health care costs. There is a lack of evidence-based behavior change programs targeting alcohol consumption for employer-sponsored wellness programs.

Objective: The aim of this study is to evaluate the effectiveness of a stage-matched and individually tailored behavior change mHealth program based on the Transtheoretical Model of Behavior Change promoting responsible drinking to employed adults.

Methods: A 2 arm randomized effectiveness trial is being conducted with 1,012 employed adults recruited by Survey Sampling, Inc. Participants randomized to the treatment group participate in the intervention across three timepoints and six months (0, 3, and 6 months), during which time the control group is asked to complete electronic assessments at two timepoints (0 and 6 months). Participants in both groups will be asked to complete electronic assessments at 12 and 18 months post baseline.

Results: The effectiveness of the intervention will be assessed by comparing treatment and control participants on the following primary outcomes: a) proportion of participants who reach criteria (action or maintenance stages); b) quantity of alcohol use (number of drinks per week, number of drinks per drinking day); and c) frequency of alcohol use (days drinking above recommended limits during the past month, number of drinking days in the past month). Secondary outcomes include comparison on frequency of alcohol-related problems and well-being related to productivity.

Conclusions: We hypothesize that the treatment group will demonstrate significant improvement on primary and secondary outcomes compared to control group participants. Using a mobile, responsive, and engaging platform, leveraging best practices of behavior change science including tailored communications, this program is well positioned to provide an efficacious, sustainable, and cost-effective means of reducing harmful drinking and the associated individual, employer, and societal impacts.

Trial Registration: Clinicaltrials.gov NCT02126163; http://clinicaltrials.gov/ct2/show/NCT02126163 (Archived by WebCite at http://www.webcitation/6cXwhAGqW)

(iProc 2015;1(1):e9) doi:10.2196/iproc.4692

KEYWORDS

alcohol; behavior change; mobile health; risky drinking; tailored communications; theory based; transtheoretical model

XSL•FO
RenderX

(This is a conference paper presented at the Connected Health Symposium, Boston, 2015, which was not edited and is only lightly peer-reviewed).

Multimedia Appendix 1

Responsible Drinking program screenshots.

[PDF File (Adobe PDF File), 1017KB - iproc_v1i1e9_app1.pdf]

Multimedia Appendix 2

Extended abstract.

[PDF File (Adobe PDF File), 495KB - iproc_v1i1e9_app2.pdf]

References

Edited by T Hale, G Eysenbach; submitted 14.05.15; peer-reviewed by D Sugarman; accepted 20.07.15; published 27.10.15.

Please cite as:
Van Marter DF, Mauriello LM, de Aguiar EL
Using Theoretically Tailored Mobile Communications to Target Risky Drinking Among Employed Adults: Design of a Randomized Effectiveness Trial
iProc 2015;1(1):e9
URL: http://www.iproc.org/2015/1/e9/
doi:10.2196/iproc.4692
PMID:

©Deborah Fisher Van Marter, Leanne Marie Mauriello, Emma Louisa de Aguiar. Originally published in JMIR Mhealth and Uhealth (http://www.iproc.org), 27.10.2015. This is an open-access article distributed under the terms of the Creative Commons Attribution License (http://creativecommons.org/licenses/by/2.0/), which permits unrestricted use, distribution, and reproduction in any medium, provided the original work, first published in JMIR mhealth and uhealth, is properly cited. The complete bibliographic information, a link to the original publication on http://mhealth.jmir.org/, as well as this copyright and license information must be included.

XSL•FO
RenderX

Abstract

Determining the Commercial Opportunity of a Skill-Based Mobile Application for Patients With Type 2 Diabetes:A Feasibility Test With Patients and Providers in a Healthcare Setting

Jessica Brueggeman[1*]; Rob Peters[1*], BSci; Neala Havener[1*], BA, MA

MicroMass Communications, Inc., Strategy, Cary, NC, United States

[*]all authors contributed equally

Corresponding Author:
Jessica Brueggeman
MicroMass Communications, Inc.
Strategy
100 Regency Forest Drive, Suite 400
Cary, NC, 27518
United States
Phone: 1 919 256 2403
Fax: 1 919 851 3182
Email: jessica.brueggeman@micromass.com

Abstract

Background: More than 29 million people in the U.S. live with diabetes. It is imperative to find solutions that empower and help patients build skills to better self-manage their disease independently in their daily lives. MicroMass Communications, Inc. will conduct a feasibility study to determine the acceptability and usability of Time 2 Focus, a type 2 diabetes mobile application (app). The app incorporates evidence-based behavioral techniques and leverages gamification principles to drive patients' self-management behaviors. The experience guides patients through progressive skill-building activities related to real-world situations. Unlike current mobile apps for type 2 diabetes, Time 2 Focus goes beyond simple tracking and patient education. The app aims to improve patients' confidence in their ability to carry out tasks, build problem-solving skills, and make better decisions—ultimately leading to better clinical outcomes.

Objective: MicroMass has tested Time 2 Focus in a convenience sample of nine participants recruited from employer groups. To determine the acceptability and usability of the mobile app on a larger scale, MicroMass intends to conduct a feasibility study with FirstHealth of the Carolinas. FirstHealth serves a patient population that is disproportionately affected by type 2 diabetes. The study aims to determine if a type 2 diabetes mobile app to improve problem-solving skills is feasible and acceptable to patients/healthcare providers, and the optimal way to integrate the app into the process of care.

Methods: FirstHealth will identify a representative sample (n=600) of patients with type 2 diabetes from their existing electronic health record (EHR) system. These patients will be mailed a survey about type 2 diabetes self-management and mobile app use. MicroMass will invite participants to take part in interviews. The MicroMass research staff will conduct interviews with 6 to 12 patients and interviews with 6 to 12 healthcare providers who work with patients with type 2 diabetes. Patients and healthcare providers will provide feedback on Time 2 Focus and how it could be implemented into the process of care.

Results: Before the feasibility study, nine patients examined the usability of Time 2 Focus. From preliminary data, patients found Time 2 Focus to be helpful in managing their type 2 diabetes. Results from the feasibility study will direct next steps to help improve Time 2 Focus.

Conclusions: Solutions that can easily be integrated into the existing process of care and meet the needs of patients with type 2 diabetes are needed. The intent in developing and testing the feasibility of Time 2 Focus is to make the app commercially available to health systems as a cost-effective, scalable, and wide-reaching solution to improve clinical outcomes.

(iProc 2015;1(1):e10) doi:10.2196/iproc.4694

KEYWORDS

self-management; type 2 diabetes; behavior change techniques; skill building; problem-solving; mobile application; process of care

XSL•FO
RenderX

(This is a conference paper presented at the Connected Health Symposium, Boston, 2015, which was not edited and is only lightly peer-reviewed).

Multimedia Appendix 1

Extended abstract.

[PDF File (Adobe PDF File), 774KB - iproc_v1i1e10_app1.pdf]

References

Edited by G Eysenbach, T Hale; submitted 14.05.15; peer-reviewed by D Bibeau, T Keyser, B Barnes; comments to author 18.06.15; accepted 20.07.15; published 27.10.15.

Please cite as:
Brueggeman J, Peters R, Havener N
Determining the Commercial Opportunity of a Skill-Based Mobile Application for Patients With Type 2 Diabetes:A Feasibility Test With Patients and Providers in a Healthcare Setting
iProc 2015;1(1):e10
URL: http://www.iproc.org/2015/1/e10/
doi:10.2196/iproc.4694
PMID:

©Jessica Brueggeman, Rob Peters, Neala Havener. Originally published in JMIR Mhealth and Uhealth (http://www.iproc.org), 27.10.2015. This is an open-access article distributed under the terms of the Creative Commons Attribution License (http://creativecommons.org/licenses/by/2.0/), which permits unrestricted use, distribution, and reproduction in any medium, provided the original work, first published in JMIR mhealth and uhealth, is properly cited. The complete bibliographic information, a link to the original publication on http://mhealth.jmir.org/, as well as this copyright and license information must be included.

XSL•FO
RenderX

Abstract

Professional Virtual Communities for Health Care Implementers: Impact of Participation on Practice

Marie Connelly[1]; Aaron Beals[1]; Aaron VanDerlip[1]; Koundinya Singaraju[1], MSc, MPH; Rebecca L Weintraub[1,2,3], MD

[1]The Global Health Delivery Project at Harvard University, Boston, MA, United States

[2]Harvard Medical School, Department of Global Health and Social Medicine, Boston, MA, United States

[3]Brigham and Women's Hospital, Division of Global Health and Social Medicine, Boston, MA, United States

Corresponding Author:
Marie Connelly
The Global Health Delivery Project at Harvard University
75 Francis Street
Boston, MA, 02115
United States
Phone: 1 703 638 4407
Fax: 1 617 521 3319
Email: marie@globalhealthdelivery.org

Abstract

Background: Since 2008, GHDonline.org has provided a platform of professional virtual communities (PVCs) for health care implementers around the world to connect and discuss delivery challenges. Initially focused on low-resource settings internationally, GHDonline received funding from the Agency for Healthcare Research and Quality (AHRQ) in 2013 to expand the platform and launch the US Communities Initiative (USCI), PVCs for US-based health care professionals working with underserved populations.

Objective: Over the course of the three-year funding period, we established four PVCs focused on population health, quality and safety, costs of care, and delivery innovations. We aim to develop a greater understanding of the challenges facing US health care professionals while also facilitating the dissemination and translation of evidence-based resources and novel approaches to delivering care. We seek to understand the impact that participation in these PVCs has on the implementation and integration of best practices in care delivery around the country.

Methods: Each PVC is supported by a team of expert moderators who guide and shape community goals, content, and programming. GHDonline works closely with these moderators to organize virtual Expert Panels (week-long, asynchronous online conferences), which facilitate the spread of evidence-based resources and, through dialogue with experts, educate members on strategies for adapting these tools for a range of delivery settings. Our impact evaluation includes three methods: analysis of site data, member surveys, and phone interviews. Site data shows the scope and engagement of readership in the PVCs. Surveys, fielded before and after each Expert Panel, assess members' knowledge of and ability to implement relevant best practices. Individual interviews identify examples of PVC participation impacting practice, as well as opportunities to improve the PVCs themselves.

Results: While evaluation efforts are ongoing, current survey data shows a majority of respondents, 91% (149/163), found information shared in Expert Panels relevant to the populations they serve. A strong majority, 73% (127/175), report an intention to make changes in their practice, and 47% (81/172) report implementing changes based on knowledge gained through PVC participation. We randomly selected 500 active members to participate in interviews and have completed 50 interviews to date. A significant majority of interviewees, 82% (41/50), recommended GHDonline to colleagues, and many, 60% (30/50), indicated they are making changes in their practice based on information gained through PVC participation.

Conclusions: Recognizing the limitations of self-reported surveys and interview responses, and the preliminary nature of our current findings, we believe these results show strong potential for PVCs to facilitate dissemination and translation of evidence-based practices and improve care delivery in the US.

Trial Registration: Not applicable.

(iProc 2015;1(1):e11) doi:10.2196/iproc.4695

XSL•FO
RenderX

KEYWORDS

Professional Virtual Communities; Health care delivery; Knowledge dissemination; Communities of Practice; Online Communities

(This is a conference paper presented at the Connected Health Symposium, Boston, 2015, which was not edited and is only lightly peer-reviewed).

Multimedia Appendix 1

Sample questions from pre-, post-, and follow-up Expert Panel surveys.

[PDF File (Adobe PDF File), 677KB - iproc_v1i1e11_app1.pdf]

Multimedia Appendix 2

Extended abstract.

[PDF File (Adobe PDF File), 925KB - iproc_v1i1e11_app2.pdf]

References

Edited by T Hale, G Eysenbach; submitted 14.05.15; peer-reviewed by C Bond, S Maloney, S Sadasivan, P Mohanty; accepted 20.07.15; published 27.10.15.

Please cite as:
Connelly M, Beals A, VanDerlip A, Singaraju K, Weintraub RL
Professional Virtual Communities for Health Care Implementers: Impact of Participation on Practice
iProc 2015;1(1):e11
URL: http://www.iproc.org/2015/1/e11/
doi:10.2196/iproc.4695
PMID:

©Marie Connelly, Aaron Beals, Aaron VanDerlip, Koundinya Singaraju, Rebecca L. Weintraub. Originally published in JMIR Mhealth and Uhealth (http://www.iproc.org), 27.10.2015. This is an open-access article distributed under the terms of the Creative Commons Attribution License (http://creativecommons.org/licenses/by/2.0/), which permits unrestricted use, distribution, and reproduction in any medium, provided the original work, first published in JMIR mhealth and uhealth, is properly cited. The complete bibliographic information, a link to the original publication on http://mhealth.jmir.org/, as well as this copyright and license information must be included.

XSL•FO
RenderX

Abstract

Review of Medical Device Connectivity in Neurocritical Care

Anna Rodriguez[1], PhD.; Matt Ramsey[1]; Michael Kohne[1]; Dick Moberg[1]

Moberg Research, Inc., Ambler, PA, United States

Corresponding Author:
Anna Rodriguez, PhD.
Moberg Research, Inc.
224 Maple Street
Ambler, PA, 19002
United States
Phone: 1 215 283 0860
Fax: 1 215 283 0859
Email: anna@moberg.com

Abstract

Background: Multimodal monitoring is the standard of care in neuroscience intensive care units (neuro-ICUs) and it has led to the creation of a data-rich environment. However, the data collected from each patient still varies from hospital to hospital and is rarely collected in a standardized format; a "plug-and-play" interoperable approach is not yet available for medical devices in neuro-ICUs and this has hindered the creation and adoption of valuable informatics tools such as clinical decision support.

Objective: This paper presents a review of the characteristics of the device interfaces that have been examined by Moberg Research, Inc. for the development of their platform for neurocritical care data integration.

Methods: Neurocritical care device interfaces were reviewed by answering a series of questions designed to describe the adherence to specifications, the acceptance of standards, the overall quality of the protocols and to uncover potential pitfalls.

Results: A total of 26 devices interfaces were examined in this process; 2 were discarded because of their analog nature. Device manufacturers did not provide protocol specification documents for 2 of the 24 device interfaces. In the case of device interfaces for which protocol specifications were provided, an unexpected degree of deviation was encountered. 18% of the protocol implementations exhibited a behavior substantially different from what expected based on the specifications. A large number (32%) exhibited undocumented behaviors. Out of the 24 examined protocol implementations, 3 did not provide a protocol version field in the output and only one was based on an existing communication and nomenclature standard. No form of identification for the device source and/or data types was included in the protocol for 29% of the investigated devices. One device did not specify the units either in the protocol specification or in the transmitted data. While some device protocols provided checksums or at least parity bits, 54% of the devices did not provide either.

Conclusions: The results of this review revealed a lack of adherence to published/provided specifications, creating significant barriers to the development of connected, interoperable systems. Almost no data standardization was implemented in the analyzed protocols, which imposes a high degree of technological overhead for those institutions that want to implement a connected neuro-ICU. Additionally, the lack of transmission error detection schemes or source identification could lead to data misinterpretation and, consequently, to delayed or incorrect treatment of patients. In order to reduce the currently identified barriers to connectivity, it is our recommendation that medical device manufacturers provide a well-designed and documented communication protocol for their devices. We also anticipate that our research will lead to the development of "best practices" that manufacturers could follow in the absence of widely adopted standards applicable to neurocritical care.

(iProc 2015;1(1):e12) doi:10.2196/iproc.4697

KEYWORDS

Connectivity; Medical devices; Acute medical conditions; Critical care

(This is a conference paper presented at the Connected Health Symposium, Boston, 2015, which was not edited and is only lightly peer-reviewed).

XSL•FO
RenderX

Multimedia Appendix 1

Extended abstract.

[PDF File (Adobe PDF File), 561KB - iproc_v1i1e12_app1.pdf]

References

Edited by G Eysenbach, T Hale; submitted 14.05.15; peer-reviewed by M Schmidt, T Khan; comments to author 24.06.15; revised version received 07.07.15; accepted 20.07.15; published 27.10.15.

Please cite as:
Rodriguez A, Ramsey M, Kohne M, Moberg D
Review of Medical Device Connectivity in Neurocritical Care
iProc 2015;1(1):e12
URL: http://www.iproc.org/2015/1/e12/
doi:10.2196/iproc.4697
PMID:

©Anna Rodriguez, Matt Ramsey, Michael Kohne, Dick Moberg. Originally published in JMIR Mhealth and Uhealth (http://www.iproc.org), 27.10.2015. This is an open-access article distributed under the terms of the Creative Commons Attribution License (http://creativecommons.org/licenses/by/2.0/), which permits unrestricted use, distribution, and reproduction in any medium, provided the original work, first published in JMIR mhealth and uhealth, is properly cited. The complete bibliographic information, a link to the original publication on http://mhealth.jmir.org/, as well as this copyright and license information must be included.

XSL•FO
RenderX

Abstract

Assistive Dressing System: A Capabilities Study for Personalized Support of Dressing Activities for People Living with Dementia

Winslow Burleson[1*], PhD; Cecil Lozano[2], Ph.D; Vijay Ravishankar[2], Ph.D; Jeremy Rowe[1], EdD; Edward Mahoney[3], MS; Diane Mahoney[3*], PhD, RN, GNP-BC, FAAN

[1]NYU College of Nursing, New York University, New York City, NY, United States

[2]Motivational Environments Research Group, School of Computing, Informatics, and Decision Systems Engineering, Arizona State University, Tempe, AZ, United States

[3]MGH Institute, School of Nursing, MGH, Boston, MA, United States

[*]these authors contributed equally

Corresponding Author:
Winslow Burleson, PhD
NYU College of Nursing
New York University
433 1st Ave
New York City, NY, 10010
United States
Phone: 1 2129985376
Fax: 1 2129985376
Email: wb50@nyu.edu

Abstract

People living with advanced stages of dementia (PWD) or other cognitive disorders do not have the luxury of remembering how to perform basic day-to-day activities, making them increasingly dependent on the assistance of caregivers. Dressing is one of the most common activities provided by caregivers. It is also one of the most stressful for both parties due to its complexity and privacy challenges posed during the process. In this paper, we present the first of its kind system (DRESS) that aims to provide much needed independence and privacy to individuals with PWDs, and afford additional freedom to their caregivers. The DRESS system is designed to deliver continuous, automated, personally tailored feedback to support PWD's during the process of dressing. The core of DRESS consists of a computer vision based detection system that continuously monitors the dressing state of the user, identifies and prompts correct and incorrect dressing states, and provides corresponding cues to help complete the dressing process adequately with minimal, or ideally no, caregiver intervention. The DRESS system detects clothing location and orientation and status with respect to the dressing process by identifying and tracking fiducial markers (visual icons) attached to clothes. In preparation for in-home trials with PWDs, we evaluated the system's ability to detect dressing events by asking 11 healthy participants to simulate common correct and incorrect dressing scenarios, such as donning shirt and pants inside out, back in front, and partial dressing, in a laboratory setting. We found that although the fiducial tracking system missed a few expected detections, it was generally capable of detecting dressing phases for both pants and shirt. Our study suggests that the use of a fiducial tracking system in the context of detecting dressing processes has the potential to automatically recognize, and generate prompts and feedback to assist PWDs or related cognitive disorders to correctly dress themselves with little or, ideally no assistance from their caregivers.

(iProc 2015;1(1):e13) doi:10.2196/iproc.4700

KEYWORDS

User-centered design; Assistive technologies for persons with disabilities; Human Factors, Performance; Dementia; Context Aware Computing; Ubiquitous Computing; Sensing Systems; Image recognition.

(This is a conference paper presented at the Connected Health Symposium, Boston, 2015, which was not edited and is only lightly peer-reviewed).

XSL•FO
RenderX

Multimedia Appendix 1

Images one through four.

[PDF File (Adobe PDF File), 611KB - iproc_v1i1e13_app1.pdf]

Multimedia Appendix 2

Extended abstract.

[PDF File (Adobe PDF File), 488KB - iproc_v1i1e13_app2.pdf]

References

Edited by T Hale, G Eysenbach; submitted 14.05.15; peer-reviewed by B Hattink, T Kwok, E Konstantinidis; accepted 20.07.15; published 27.10.15.

Please cite as:
Burleson W, Lozano C, Ravishankar V, Rowe J, Mahoney E, Mahoney D
Assistive Dressing System: A Capabilities Study for Personalized Support of Dressing Activities for People Living with Dementia
iProc 2015;1(1):e13
URL: http://www.iproc.org/2015/1/e13/
doi:10.2196/iproc.4700
PMID:

©Winslow Burleson, Cecil Lozano, Vijay Ravishankar, Jeremy Rowe, Edward Mahoney, Diane Mahoney. Originally published in JMIR Mhealth and Uhealth (http://www.iproc.org), 27.10.2015. This is an open-access article distributed under the terms of the Creative Commons Attribution License (http://creativecommons.org/licenses/by/2.0/), which permits unrestricted use, distribution, and reproduction in any medium, provided the original work, first published in JMIR mhealth and uhealth, is properly cited. The complete bibliographic information, a link to the original publication on http://mhealth.jmir.org/, as well as this copyright and license information must be included.

XSL•FO
RenderX

Abstract

Patient Rating Sites for Daily Supervision by Healthcare Inspectorates: Implementation into Practice

Tom H van de Belt[1], PhD; Sophia M Kleefstra[2,3], MSc, PhD (c); Rudolf B Kool[4], MD PhD

[1]Radboud REshape Innovation Center, Radboud university medical center, Nijmegen, Netherlands

[2]Department of Risk detection and Innovation, Dutch Healthcare Inspectorate, Utrecht, Netherlands

[3]Academic Medical Center, department of Medical Psychology, University of Amsterdam, Amsterdam, Netherlands

[4]IQ Healthcare, Radboud Institute for Health Sciences, Radboud university medical center, Nijmegen, Netherlands

Corresponding Author:
Tom H van de Belt, PhD
Radboud REshape Innovation Center
Radboud university medical center
REshape 911, 1st Fl.
Reinier Postlaan 4
Nijmegen, 6525 GC
Netherlands
Phone: 31 24770080
Fax: 31 24770080
Email: tom.vandebelt@radboudumc.nl

Abstract

Background: Social media and especially patient rating sites (PRS's) have shown to be an interesting new source of information about quality of care from the patient's perspective. Several studies indicate a relationship between information on social media and quality of health care including patients' experiences, mortality ratio's, readmission rates and infection rates. Therefore, information on PRS's could have added value in supervision the quality for care by official supervising bodies such as a healthcare inspectorate.

Objective: To implement a system in which relevant information about the quality of care is efficiently identified and extracted from PRS's and presented to inspectors by adding it to the risk judgment system for day-to-day supervision.

Methods: The study consisted of three parts: (1) Exploration based on expert opinion by supervision experts of the Dutch Healthcare Inspectorate (DHI) of the added value for individual reviews with a poor rating (< 7 on a scale from 1-10) by making use of pre-developed scales. (2) Investigation of the opportunities for preselecting information by DHI researchers by scoring reviews in duos in order to test interrater agreement. (3) Designing a process description with all relevant stakeholders to create a realistic implementation path.

Results: For 72 of 116 cases in supervision of long-term elderly care on four major risk themes (medication safety, hygiene, expertise and restriction of freedom) information was considered to be relevant. Preselecting information from PRS's showed acceptable agreement for four out of five researchers. Based on these results we designed a process description of adopting PRS data into the risk database of the DHI for long-term elderly care by using a File Transfer Protocol, extracting data from the PRS. Starting from June 1st 2015 the DHI inspectors will receive information about long-term elderly care organisations of the major Dutch PRS, next to other quality and safety indicators.

Conclusions: The results show that PRS's could be used to include the patient's perspective in day-to-day supervision. Important conditions are sufficient number of reviews and enthusiastic inspectors. These findings indicate that PRS's may enable supervisory bodies to include the patients' perspective in an efficient way. Future research should explore the opportunities of other healthcare sectors and other social media such as Twitter en Facebook.

(iProc 2015;1(1):e14) doi:10.2196/iproc.4701

KEYWORDS

supervision; patient rating sites; risk database; implementation

XSL•FO
RenderX

(This is a conference paper presented at the Connected Health Symposium, Boston, 2015, which was not edited and is only lightly peer-reviewed).

Multimedia Appendix 1

Extended abstract.

[PDF File (Adobe PDF File), 545KB - iproc_v1i1e14_app1.pdf]

References

Edited by G Eysenbach, T Hale; submitted 14.05.15; peer-reviewed by M Emmert, G Gao, H Potts; comments to author 18.06.15; revised version received 14.07.15; accepted 20.07.15; published 27.10.15.

Please cite as:
van de Belt TH, Kleefstra SM, Kool RB
Patient Rating Sites for Daily Supervision by Healthcare Inspectorates: Implementation into Practice
iProc 2015;1(1):e14
URL: http://www.iproc.org/2015/1/e14/
doi:10.2196/iproc.4701
PMID:

©Tom H van de Belt, Sophia M Kleefstra, Rudolf B Kool. Originally published in JMIR Mhealth and Uhealth (http://www.iproc.org), 27.10.2015. This is an open-access article distributed under the terms of the Creative Commons Attribution License (http://creativecommons.org/licenses/by/2.0/), which permits unrestricted use, distribution, and reproduction in any medium, provided the original work, first published in JMIR mhealth and uhealth, is properly cited. The complete bibliographic information, a link to the original publication on http://mhealth.jmir.org/, as well as this copyright and license information must be included.

XSL•FO
RenderX

Abstract

Design of A Smartphone Application for Automated Wound Measurements for Home Care

Joshua Budman[1,2], MS Eng; Kevin Keenahan[1,2], MS Eng; Soumyadipta Acharya[1], MD, PhD; Gabriel A Brat[2,3], MD, MPH

[1]Department of BIomedical Engineering, Johns Hopkins University, Baltimore, MD, United States

[2]Tissue Analytics, Inc., Baltimore, MD, United States

[3]Brigham and Women's Hospital, Division of Trauma, Burn, and Surgical Critical Care, Boston, MA, United States

Corresponding Author:
Gabriel A Brat, MD, MPH
Brigham and Women's Hospital
Division of Trauma, Burn, and Surgical Critical Care
75 Francis Street
Boston, MA, 02115
United States
Phone: 1 617 732 8042
Fax: 1 617 5669549
Email: gbrat@partners.org

Abstract

Background: There are 8.5 million Americans who suffer from a chronic wound. Due to the lack of an objective system to measure and characterize wounds, the current standard of care relies highly on provider guesswork. This leads to misinformed care decisions, ultimately leading to prolonged healing times and high healthcare expenditures.

Objective: This study describes the design and validation of a smartphone image-based system for accurately measuring and characterizing chronic wounds in an automated and objective fashion.

Methods: Photos (n=81) were collected by the study team from patients (n=25) at the Johns Hopkins Bayview Wound Clinic in an IRB-approved study. Photos were taken using a variety of smartphones such that our training data set would include nuances of different smartphone cameras. We combined supervised image classification and computer vision to detect wound edges and segment the tissues within the wound. 15 individuals (“raters”) with various levels of training were then instructed to trace wound regions in a diverse subset of the wound images arbitrarily selected by the study team (n=10). The ensemble wound edge and tissue segmentation algorithms were compared against an 80% inter-rater gold standard.

Results: The automated method resulted in a sensitivity = 98.31 ± 2.18 and specificity = 92.06 ± 7.86). In contrast, the ruler-based measurement resulted in sensitivity = 1 ± 0, Specificity = 0.57 ± 0.30. A normalized area measurement for the automated method resulted in a normalized area of 1.14 ± 0.17. In comparison, the standard of care method resulted in a normalized area of 1.86 ± 0.30 relative to gold standard. With respect to tissue segmentation, the overall average tissue classification accuracy on k-fold cross validation using the sparse neural network method is 93.6% ± 3.3%.

Conclusions: The result illustrates the large overestimation of wound size that occurred when the wounds were measured using the ruler measurement. It also corroborates the literature-reported value of measurement inaccuracy by standard methods. Our study shows the feasibility of an easily deployed smartphone system to classify wounds in an automated manner with high accuracy. Such a system could be used to objectify measurements by nurses in the home care environment, thus improving the accuracy of wound care and, potentially, the outcomes of patients.

(iProc 2015;1(1):e16) doi:10.2196/iproc.4703

KEYWORDS

Mobile Applications; Wound Care; Machine Learning

XSL•FO
RenderX

(This is a conference paper presented at the Connected Health Symposium, Boston, 2015, which was not edited and is only lightly peer-reviewed).

Multimedia Appendix 1

Extended abstract.

[PDF File (Adobe PDF File), 593KB - iproc_v1i1e16_app1.pdf]

References

Edited by G Eysenbach, T Hale; submitted 16.05.15; peer-reviewed by M Kandola, E Chung; comments to author 23.07.15; accepted 23.07.15; published 27.10.15.

Please cite as:
Budman J, Keenahan K, Acharya S, Brat GA
Design of A Smartphone Application for Automated Wound Measurements for Home Care
iProc 2015;1(1):e16
URL: http://www.iproc.org/2015/1/e16/
doi:10.2196/iproc.4703
PMID:

©Joshua Budman, Kevin Keenahan, Soumyadipta Acharya, Gabriel A. Brat. Originally published in JMIR Mhealth and Uhealth (http://www.iproc.org), 27.10.2015. This is an open-access article distributed under the terms of the Creative Commons Attribution License (http://creativecommons.org/licenses/by/2.0/), which permits unrestricted use, distribution, and reproduction in any medium, provided the original work, first published in JMIR mhealth and uhealth, is properly cited. The complete bibliographic information, a link to the original publication on http://mhealth.jmir.org/, as well as this copyright and license information must be included.

XSL•FO
RenderX

Abstract

Chronic Aphasia Treatment Outcomes after Teletherapy & Online Exercises - A Comprehensive A-FROM Analysis

Lisa Haynes[1], MS, CCC-SLP; Richard Steele[1], PhD; Denise McCall[2], MA, CCC-SLP; Allison Baird[3], MA, CCC-SLP

[1]Lingraphica, Princeton, NJ, United States

[2]Snyder Center for Aphasia Life Enhancement @ The League, Baltimore, MD, United States

[3]Speech Works, Inc., Winnipeg, MB, Canada

Corresponding Author:
Lisa Haynes, MS, CCC-SLP
Lingraphica
103 Carnegie Center
Suite 104
Princeton, NJ, 08540
United States
Phone: 1 609 275 5546
Fax: 1 609 275 1311
Email: lhaynes@lingraphica.com

Abstract

Background: Following a stroke or traumatic brain injury, many acquire a communication disorder called aphasia. For some, aphasia is acute and resolves after therapy, for others it's a chronic condition. Research has shown that adults with chronic aphasia can get better with on-going treatment and practice. Armed with this knowledge, Lingraphica partnered with the Snyder Center for Aphasia Life Enhancement (SCALE) at The League in Baltimore, Md. to conduct a 12-week Framework for Outcome Measurements in Aphasia (A-FROM) study with nine chronic aphasic SCALE members. These members received teletherapy services that combined group therapy with one-on-one therapy sessions; and worked at home using online language exercises when they wished.

Objective: The four areas requiring attention to improve life for persons with aphasia (PWA) include the following categories: -Language and related impairments -Communication and language environment -Personal identity, attitudes, and feelings -Participating in life situations

Methods: To diminish impairment: Participants were setup and encouraged to use online TalkPath Therapy exercises to reduce speaking, listening, reading, and writing impairments. To modify communication environments: Participants used remote communication technologies to communicate with others at a geographic distance. To widen opportunities for participation: Participants used the remote communication technology to receive individual therapy session at home. To enhance attitudes and feelings: Participants received individualized training, and support in uses of advanced therapeutic and communication technologies.

Results: Language and related impairments were assessed using the Western Aphasia Battery - Aphasia Quotient (AQ), the metric of overall severity, improved in the mean for the participants by 3.5†, with a trend toward statistical significance (†*P*=.057). Additionally, the National Outcomes Measurement System (NOMS), diminished by modest, though statistically significant amounts in the four rated items, e.g., mean improvement in Speaking= +0.6* (**P*=.006). Participation in life situations were assessed using the Communicative Effectiveness Index overall mean (CETI Overall). The CETI showed a robust improvement of +17.8* (**P*=.011). Personal identity, attitudes, feelings were tested using the Communication Confidence Rating Scale for Aphasia (CCRSA-RIC). It showed an improvement of +10.1* (**P*=.0004). Additionally, the users' satisfaction levels were high at the end of the study. On a Likert Scale of 1 (least satisfied) to 5 (most satisfied), by far most items received scores in the 4-5 range. Participation in life situations also showed improvement. Spouses reported their loved ones were more engaged, and reports from the online exercises show that independent work increased.

Conclusions: The findings represent a proof of concept for teletherapy services that combine: remote one-on-one sessions; remote group therapy sessions; and online language exercise use, between remote therapy sessions. These findings document some of the important, widespread additional benefits the future can hold, and suggests some of the practical ways to deliver them to PWAs.

XSL•FO
RenderX

Trial Registration: N/A

(iProc 2015;1(1):e18) doi:10.2196/iproc.4771

KEYWORDS

Teletherapy; online language exercises; aphasia; life participation approach; speech-language pathologist

(This is a conference paper presented at the Connected Health Symposium, Boston, 2015, which was not edited and is only lightly peer-reviewed).

Multimedia Appendix 1

Extended abstract.

[PDF File (Adobe PDF File), 970KB - iproc_v1i1e18_app1.pdf]

References

Edited by T Hale, G Eysenbach; submitted 29.05.15; peer-reviewed by A Holland, D Putrino; comments to author 24.06.15; accepted 20.07.15; published 27.10.15.

Please cite as:
Haynes L, Steele R, McCall D, Baird A
Chronic Aphasia Treatment Outcomes after Teletherapy & Online Exercises - A Comprehensive A-FROM Analysis
iProc 2015;1(1):e18
URL: http://www.iproc.org/2015/1/e18/
doi:10.2196/iproc.4771
PMID:

©Lisa Haynes, Richard Steele, Denise McCall, Allison Baird. Originally published in JMIR Mhealth and Uhealth (http://www.iproc.org), 27.10.2015. This is an open-access article distributed under the terms of the Creative Commons Attribution License (http://creativecommons.org/licenses/by/2.0/), which permits unrestricted use, distribution, and reproduction in any medium, provided the original work, first published in JMIR mhealth and uhealth, is properly cited. The complete bibliographic information, a link to the original publication on http://mhealth.jmir.org/, as well as this copyright and license information must be included.

XSL•FO
RenderX

Abstract

Predictive Modeling of Emergency Hospital Transport Using Medical Alert Pattern Data: Retrospective Cohort Study

Jorn op den Buijs[1], Ph. D; Tine Smits[1]; Marten Pijl[1]; Mariana Simons[1], Ph. D; Linda Schertzer[2]

[1]Philips Research, Eindhoven, Netherlands

[2]Philips Home Monitoring, Framingham, MA, United States

Corresponding Author:
Jorn op den Buijs, Ph. D
Philips Research
HTC 34.5.038
High Tech Campus 34
Eindhoven, 5656AE
Netherlands
Phone: 31 631926890
Fax: 31 000000000
Email: jorn.op.den.buijs@philips.com

Abstract

Background: In the transition from a fee-for-service to a fee-for-value system, health care organizations (HCOs) are under pressure to keep patients healthy through preventive services and population health management. Predictive analytics based on the past health behavior of the patient population can be used to predict future risk of decline.

Objective: The objective of this study was to develop robust predictive models of impending emergency transports to the hospital based on enrollment and medical alert pattern data from subscribers of a Personal Emergency Response System (PERS) service. This enables targeting of clinical programs to members that need it the most.

Methods: De-identified medical alert pattern data of 551,127 subscribers to a PERS service were used. Multivariate logistic regression was performed on subscriber demographics, self-reported medical conditions, variables related to the care giver network and variables derived from up to one year of retrospective medical alert data. A 10-fold cross-validation scheme was used to predict transport to the hospital by emergency medical services in the next 30 days. Furthermore, the model performance was evaluated after retraining using up to 90 days of medical alert data, and using enrollment data only.

Results: Emergency hospital transport in the 30-day window was experienced by 2.4% of all subscribers. The area under the receiver operator characteristic curve (auROC) was 0.75 ± 0.01 in the validation cohorts. The model using up to 90 days of data resulted in auROC = 0.71 ± 0.01 and the model using enrollment data only resulted in auROC = 0.62 ± 0.01.

Conclusions: Our model for emergency hospital transport in subscribers of a medical alert service showed good discriminatory accuracy on retrospective validation data. While the model yields good discriminatory accuracy with up to 90 days of data, best performance is achieved using up to one year of medical alert data. The model using enrollment data only, without medical alert pattern data, does not perform as well. We are planning a prospective validation of the algorithm to determine the value of the predictive model in assisting HCOs with planning early interventions to avoid emergency department visits and hospitalizations.

(iProc 2015;1(1):e19) doi:10.2196/iproc.4772

KEYWORDS

care coordination; data analysis; emergency medical services; personal emergency response service; population health management; predictive modeling

(This is a conference paper presented at the Connected Health Symposium, Boston, 2015, which was not edited and is only lightly peer-reviewed).

XSL•FO
RenderX

Multimedia Appendix 1

Extended abstract.

[PDF File (Adobe PDF File), 739KB - iproc_v1i1e19_app1.pdf]

References

Edited by G Eysenbach; submitted 29.05.15; peer-reviewed by K Chen, R Gouripeddi; comments to author 25.06.15; accepted 20.07.15; published 27.10.15.

Please cite as:
op den Buijs J, Smits T, Pijl M, Simons M, Schertzer L
Predictive Modeling of Emergency Hospital Transport Using Medical Alert Pattern Data: Retrospective Cohort Study
iProc 2015;1(1):e19
URL: http://www.iproc.org/2015/1/e19/
doi:10.2196/iproc.4772
PMID:

©Jorn op den Buijs, Tine Smits, Marten Pijl, Mariana Simons, Linda Schertzer. Originally published in JMIR Mhealth and Uhealth (http://www.iproc.org), 27.10.2015. This is an open-access article distributed under the terms of the Creative Commons Attribution License (http://creativecommons.org/licenses/by/2.0/), which permits unrestricted use, distribution, and reproduction in any medium, provided the original work, first published in JMIR mhealth and uhealth, is properly cited. The complete bibliographic information, a link to the original publication on http://mhealth.jmir.org/, as well as this copyright and license information must be included.

XSL•FO
RenderX

Abstract

Wearables, Gamified Group Challenges and Behavioral Incentives: A Preliminary Study of an Engagement Program to Increase Physical Activity

Trevor van Mierlo[1,2], B.A. (Hons), MScCH, MBA, GEMBA, MScBMR; Douglas Hyatt[3], Ph.D; Andrew T. Ching[3], Ph.D; Rachel Fournier[1,2], BSc (Hons); Ron S. Dembo[4], Ph.D

[1]Evolution Health Systems Inc., Toronto, ON, Canada

[2]Research Associate, Henley Business School, University of Reading, Greenlands, Henley-on-Thames, United Kingdom

[3]Rotman School of Management, University of Toronto, Toronto, ON, Canada

[4]Zerofootprint Software Inc., Toronto, ON, Canada

Corresponding Author:
Trevor van Mierlo, B.A. (Hons), MScCH, MBA, GEMBA, MScBMR
Evolution Health Systems Inc.
1266 Queen Street West
Suite 8
Toronto, ON,
Canada
Phone: 1 416 644 8476
Fax: 1 416 644 8477
Email: tvanmierlo@evolutionhs.com

Abstract

Background: Healthcare literature supports the development of accessible interventions that integrate behavioral economics, wearable devices, principles of evidence-based behavior change, and community support. However, there are limited real-world examples of large-scale, population-based, member-driven reward platforms. Subsequently, a paucity of outcome data exists and health economic effects remain largely theoretical. To complicate matters, an emerging area of research is defining the role of Superusers, the small percentage of unusually engaged digital health participants who may influence other members.

Objective: The objective of this preliminary study is to analyze descriptive data from GOODcoins, a self-guided, free-to-consumer engagement and rewards platform incentivizing walking, running and cycling. Registered members accessed the GOODcoins platform through PCs, tablets or mobile devices, and had the opportunity to sync wearables to track activity. Following registration, members were encouraged to join gamified group challenges and compare their progress with that of others. As members met challenge targets, they were rewarded with GOODcoins, which could be redeemed for planet- or people-friendly products.

Methods: Outcome data was obtained from the GOODcoins custom SQL database. The reporting period was December 1, 2014 to May 1, 2015. Descriptive self-report data was analyzed using MySQL and MS Excel.

Results: The study period includes data from 1298 users who were connected to an exercise tracking device. 52.6% (n=683) were female. 33.7% (n=438) were between the ages of 20-29, and 24.8% (n=322) were between the ages of 30-39. 77.5% (n=1006) of connected and active members met daily-recommended physical activity guidelines of 30 minutes, with a total daily average activity of 107 minutes (95% CI 90, 124). 96.1% (n=1248) of connected and active users engaged in walking as their primary activity. Of members who exchanged GOODcoins, the mean balance was 4,000 (95% CI 3850, 4150) at time of redemption. 50.4% (n=61) were exchanged for fitness or outdoor products, while 4.1% (n=5) were for food-related items. Participants were most likely to complete challenges when rewards were between 201-300 GOODcoins.

Conclusions: This analysis is observational, and its purpose is to form a baseline for future research. Results indicate that challenges and incentives may be effective for connected and active members, and may play a role in achieving daily-recommended activity guidelines. Registrants were typically younger, walking was the primary activity, and rewards were mainly exchanged for fitness or outdoor products. Remaining to be determined is whether members were already physically active at time of registration and are representative of healthy adherers, or were previously inactive and were incentivized to change their behavior. As challenges are gamified, there is an opportunity to investigate the role of Superusers and their impact on behavioral norms. Study limitations and future research agendas are discussed.

XSL•FO
RenderX

(iProc 2015;1(1):e1) doi:10.2196/iproc.4773

KEYWORDS

diabetes mellitus; health communication; health information management; health information technology; medical informatics; patient care management

[This is a conference paper presented at the Connected Health Symposium Boston, 2015, which was not edited and is only lightly peer-reviewed]

Multimedia Appendix 1

Extended Abstract.

[PDF File (Adobe PDF File), 472KB - iproc_v1i1e1_app1.pdf]

References

Edited by T Hale, G Eysenbach; submitted 29.05.15; peer-reviewed by S McIntosh, B Carron-Arthur, T Von Bargen, P Petridis, E Huurne; accepted 20.07.15; published 27.10.15.

Please cite as:
van Mierlo T, Hyatt D, T. Ching A, Fournier R, S. Dembo R
Wearables, Gamified Group Challenges and Behavioral Incentives: A Preliminary Study of an Engagement Program to Increase Physical Activity
iProc 2015;1(1):e1
URL: http://www.iproc.org/2015/1/e1/
doi:10.2196/iproc.4773
PMID:

©Trevor van Mierlo, Douglas Hyatt, Andrew T. Ching, Rachel Fournier, Ron S. Dembo. Originally published in JMIR Mhealth and Uhealth (http://www.iproc.org), 27.10.2015. This is an open-access article distributed under the terms of the Creative Commons Attribution License (http://creativecommons.org/licenses/by/2.0/), which permits unrestricted use, distribution, and reproduction in any medium, provided the original work, first published in JMIR mhealth and uhealth, is properly cited. The complete bibliographic information, a link to the original publication on http://mhealth.jmir.org/, as well as this copyright and license information must be included.

XSL•FO
RenderX

Publisher:
JMIR Publications
130 Queens Quay East.
Toronto, ON, M5A 3Y5
Phone: (+1) 416-583-2040
Email: support@jmir.org

XSL•FO
RenderX