MEDINFO 2013
C.U. Lehmann et al. (Eds.)

doi: 10.3233/978-1-61499-289-9-1138
***Book**: Studies in Health Technology and Informatics, Volume 192: MEDINFO 2013*

Effective Healthcare Process Redesign Through An Interdisciplinary Team Approach

Rita Snyder, PhD, RN[a]; Nathan Huynh, PhD[b]; Bo Cai, PhD[c]; José Vidal, PhD[d]; Kevin Bennett, PhD[e]

[a]College of Nursing; [b]Civil & Environmental Engineering, College of Engineering and Computing;
[c]Epidemiology and Biostatistics, Arnold School of Public Health;
[d]Computer Science, College of Engineering and Computing; [e]School of Medicine
University of South Carolina, Columbia, South Carolina, USA

Abstract and Objective

Healthcare process redesign is a complex and often high risk undertaking. Typically, there is a limited understanding of the baseline process and often inadequate tools by which to assess it. This can be confounded by narrow redesign team expertise that can result in unanticipated and/or unintended redesign consequences. Interdisciplinary research teams of healthcare, biostatistics, engineering and computer science experts provide broad support for a more effective and safer approach to healthcare process redesign. This paper describes an interdisciplinary research team focused on medication administration process (MAP) redesign and its achievements and challenges.

Keywords:

Healthcare process redesign; Interdisciplinary research; Interdisciplinary research teams.

Introduction

Effective healthcare process redesign requires 4 components: 1) access to real-world healthcare processes; 2) clinical subject matter experts to validate baseline processes; 3) healthcare stakeholder engagement for redesign intervention feasibility assessment; and 4) interdisciplinary redesign teams. The Institute of Medicine (IOM) encouraged healthcare and engineering experts to form partnerships for more effective redesign of high-risk healthcare processes [1]. Following the IOM recommendation, an interdisciplinary research team was initiated in 2010 within the Healthcare Process Redesign Center at the University of South Carolina, College of Nursing, Columbia, South Carolina, USA. The team is lead by a registered nurse/health informaticist and includes a health services researcher, a biostatistician, a civil engineer, a computer scientist, and 3 PhD students in healthcare, engineering, and computer science. Healthcare experts apply domain knowledge to interpretation of clinical processes and contextual factors. Biostatistical expertise guides complex analyses of multi-source and multi-level healthcare data. Engineering and computer science experts apply sophisticated computer simulation techniques to healthcare process redesign.

Methods

The initial focus of the healthcare process redesign research team is the high-risk medication administration process (MAP). Two pilot studies are completed and a third pilot study is underway. These studies supported effective interdisciplinary team building while also establishing a solid research program foundation in healthcare process redesign.

Pilot Study #1 (Instrumentation) was undertaken to develop and evaluate a handheld device application for MAP observation recording [2]. Pilot Study #2 (Methodology) used observation data from Pilot Study #1 to design and test computer simulation modeling techniques in a laboratory setting [3]. Pilot Study #3 (Field) is underway to field test: 1) the MAP observation application, 2) contextual and MAP observation data collection methods, and 3) computer simulation modeling techniques and methods for use in a large scale field-based MAP redesign study. Pilot studies assisted the team to gain insights about MAP redesign as well as disciplinary perspectives and skills. For example, software development is common in engineering but foreign to most healthcare researchers. In contrast, psychometric evaluation of software measurement adequacy is foreign to most engineers. Combined interdisciplinary expertise produced a psychometrically sound MAP observation measure for field use. Another innovation included application of an Edit Distance approach to multi-observer agreement assessment for uneven MAP task sequences. Derived from information theory, this technique was familiar to the team's computer scientist but not others and addressed a methodological problem uncommon in healthcare research.

Conclusions

In conclusion, the collective knowledge, skills and insights of this interdisciplinary team supports comprehensive advancement of the healthcare process redesign research program than would not have occurred with a more narrowly focused team. Key advantages include: 1) more rapid scientific advancement, 2) enhanced cross-disciplinary insights, 3) increased competitiveness for external funding, and 4) a greater potential for impacting intractable healthcare process problems. Recommendations include: 1) disseminate early and often to solidify and advance team building, 2) keep perspectives open, 3) question scientific assumptions, and 4) never assume that talking equals communication.

References

[1] Reid, P.P., Compton, W.D., Grossman, J.H., & Fanjiang, G. (Eds.). (2005). *Building a better delivery system: A new engineering/health care partnership*. Washington, DC: The National Academies Press.

[2] Snyder, R., et al. Evaluation of medication administration process: Tools and techniques. *Journal of Healthcare Engineering*, 2011, 2(4): 527-538.

[3] Huynh, N., et al. Application of computer simulation modeling to medication administration process redesign. *Journal of Healthcare Engineering*, 2012, 3(4): 649-662.