Evaluating Health Information and Communications Technologies: Why, How, Challenges

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Abstract

Despite large worldwide investments in health information and communications technologies (ICT), the evidence base remains scant as to its impact on the cost, quality, safety and efficiency of health care services. The need to focus on implementation and workflow optimization has meant that there are typically few resources available for robust evaluation.

Measuring the impact of health ICT implementations however has a number of benefits both to individual projects and to their stakeholders. Evaluations may be used to inform funders and stakeholders, convince late adopters of the value of a system, provide stories that resonate with other health systems, and justify both continuous improvements and future enhancements in systems.

While there are many resources available around the theory of evaluation, there is a dearth of practical, real-world tools to help organizations construct plans around evaluation. The instructors in this course have taken the theory of evaluation in health informatics and developed a practical approach to choosing measurements for an evaluation, developing an evaluation plan, and implementing that plan. The course will cover why implementers (e.g., health systems, ministries of health) should be investing in evaluation of their health ICT projects; discuss how to choose measures; review techniques for study design and analysis; discuss common challenges; and review techniques for disseminating findings from evaluations.

Keywords:
Medical Informatics; Evaluation Studies; Technology Evaluation; Mixed Methods; Data Collection; Information Dissemination.

Tutorial Description

Aim and Scientific Content: This tutorial will present a practical approach to planning and executing an evaluation of health information and communications technologies (ICT). Participants will learn about the spectrum of evaluation methods available to them, techniques for developing evaluation plans, available tools for planning and conducting evaluations, and common challenges when evaluating health ICT. The session will conclude with a review of methods for disseminating findings from health ICT evaluations to develop the evidence base. Emphasis will be placed on guiding attendees through the use of freely available, open-source tools that can be used after attendees return to their home nation. The session will further provide attendees with an opportunity to interact with experienced health ICT evaluators who have worked on measuring the impact of health ICT across a wide spectrum of inpatient and ambulatory settings, as well as public and population health settings.

Tutorial Structure and Arguments: The tutorial will be largely didactic teaching around a range of evaluation topics with the opportunity for the attendees to share their experiences and ask advice on their own projects. Tutorial material will be drawn from real-world implementation and evaluation projects. Textbook material will be used to supplement and fill in gaps. The tutorial will cover the following topics:

I. Motivations Behind Health Informatics Evaluations: Why is Evaluation Important? A sub-optimal evidence base exists for the impact of health information systems, devices, and applications, on the cost, quality, safety and efficiencies of healthcare. This session will review the need to enhance the existing evidence base, and the benefits to local organizations when they undertake evaluation of their projects.

II. Getting Started with Evaluation Planning. An effective evaluation begins with engaging stakeholders, establishing goals, and carefully choosing measures. In this session, the instructors will review why it is important to involve a wide array of stakeholders in evaluation planning, and will present...
a methodology for making decisions around what to measure. An emphasis will be made on importance and feasibility of measures that are chosen.

III. Evaluation Design and Analysis. Choosing the correct design for an evaluation can impact its success. In this segment, the instructors will introduce the concept of a logic model for connecting the dots between the information system, its impact on health care services, and the selected measures from the prior step. This segment will then review common evaluation designs and methods, as well as considerations around cost impact and feasibility. A brief review of analysis techniques will also be provided, emphasizing techniques that can be performed within budget for many health ICT projects. Examples from both clinical and public health will be discussed by the instructors.

IV. Evaluation Tools. There are a number of tools available to groups developing evaluation plans and conducting evaluations. In this session the instructors will present resources available including interactive tools, books, and websites. Emphasis will be placed on sharing tools and content that is largely available for free on the Internet to support evaluation efforts in every nation or organization in attendance. Tools will include but are not limited to the following: guidelines from the International Medical Informatics Association; strategy documents from the World Health Organization; and guides produced by US federal health agencies.

V. Case Studies. The instructors will present case studies highlighting the challenges of evaluation in the real world and providing examples of leveraging vendor tools to capture benefits in the midst of go-lives. This session will provide the opportunity for attendees to hear of real-world examples of evaluation.

VI. Common Challenges. It is not uncommon for evaluations to ‘fail’. The instructors will discuss common pitfalls of evaluation including over-scooped evaluation plans, inability to collect data, lack of support from leadership, as well as lack of funding and time. During this section, attendees will interact with instructors, enabling discussion of challenges the attendees have faced or techniques for working around challenges when encountered.

VII. Dissemination. Once an evaluation is completed, the results may be disseminated in a number of ways. This session will cover common strategies for dissemination, including visualization of data for presentation to stakeholders; how the data might be used to improve process, quality, or safety; and how to share results beyond immediate stakeholders through peer-reviewed articles or monographs useful to other health systems. The STARE-HI guidelines for reporting on health informatics evaluations will be briefly reviewed with information on how to access the full materials online after the tutorial.

Specific Educational Goals: At the end of the tutorial, participants will have the knowledge and tools needed to develop a realistic, feasible evaluation plan for their health ICT project; will understand the challenges they may encounter; and will have the tools to disseminate their findings. Attendees will more specifically be able to:

- Identify realistic evaluation measures for various health ICT projects;
- Distinguish practical metrics given a context;
- Design a feasible approach for measuring the impact of ICT on health care processes, quality, safety, or costs;
- Recognize challenges when planning or conducting a health ICT evaluation;
- Utilize available tools and resources for developing or conducting a health ICT evaluation; and
- Prepare a summary of a health ICT evaluation for dissemination to stakeholders or other health systems.

Expected Attendees: This tutorial is intended for individuals seeking guidance on how to evaluate clinical and public health ICT projects. Individuals may be in the earliest stages of planning an evaluation, or may have already begun to evaluate a project and are experiencing challenges. Attendees may include but are not limited to junior faculty/researchers, project managers, ICT directors, chief health informatics officers (CMIO/CHIO/CNIO), epidemiologists, public health informatics professionals, or clinical leaders looking to measure the impact of health ICT on process, patient, or population outcomes.

Basic knowledge of biomedical informatics is assumed, as topics of specific health ICT and applications, reasons to implement health ICT, implementation challenges and barriers, and adoption challenges and barriers will not be covered. Knowledge of basic statistics, such as mean, standard deviation, and paired T-test, is preferable but not required. Familiarity with health care and public health settings and workflows is also assumed as the instructors will use examples drawn from real-world settings.

Tutorial Speakers

- Caitlin M Cusack MD MPH CPHIMS FHIMSS is Principal at Insight Informatics in Manchester NH USA. She works as a consultant Physician Informaticist with the Office of Informatics and Analytics, Applied Information Management, Health Provider Services, Veteran’s Health Administration in Silver Spring MD, USA. She holds an MD from SUNY Upstate Health Science Center at Syracuse NY and an MPH from the Harvard School of Public Health. In addition she is board certified in Obstetrics and Gynecology as well as Clinical Informatics.

- Brian E. Dixon MPA PhD FHIMSS, is an Assistant Professor with the Indiana University Fairbanks School of Public Health, Department of Epidemiology, at Indiana University-Purdue University Indianapolis (IUPUI) in Indianapolis, IN, USA; a Research Scientist with the Regenstrief Institute Center for Biomedical Informatics; a Research Scientist with the IU Center for Health Services and Outcomes Research at the Regenstrief Institute in Indianapolis, IN, USA; and an Investigator in Residence with the Center of Health Information and Communication, Department of
Veterans Affairs, Health Services Research & Development Service, in Indianapolis, IN, USA. Dr. Dixon teaches graduate public health and health administration students at IUPUI and the Regenstrief Fellowship program in the areas of health information exchange, public health informatics, and clinical decision support. He further designs, conducts, and disseminates research on the implementation and impact of health ICT on patient and population outcomes in a wide range of clinical and public health settings.

• Eric G Poon MD MPH, is Chief Health Information Officer at Duke University Health System and a faculty member in the Department of Medicine at the Duke University School of Medicine in Durham NC USA. He is responsible for the visioning and strategic planning of clinical and analytic information systems that impact patient care, research and education. He also oversees the optimization of the electronic health record, and partners with physicians, patients and operational leaders to effectively leverage innovative ICT in support of Duke’s mission. In addition, Dr. Poon is board certified in Internal Medicine and practices adult primary care.