From Sentences to Sense-Making, From Utterances to Clinical Understanding, From Narratives to Structured Data: A tutorial on Qualitative Data Coding Concepts, Methods and Tools

**Endorsed by:** the AMIA Clinical Information Systems WG; Evaluation WG; the Ethical, Legal and Social Issues WG; People and Organizational Issues WG; Student WG; and the IMIA Organizational and Social Issues WG

**Presenters:** (listed alphabetically)
- Martha B. Adams, MD, MA, FACP, Division of General Internal Medicine, Department of Medicine; Division of Clinical Informatics, Department of Community and Family Medicine; Duke Center for Health Informatics, Duke University Medical Center, Durham, NC, USA
- Bonnie Kaplan, PhD, FACMI, Yale Center for Medical Informatics at Yale University School of Medicine; Yale Interdisciplinary Center for Bioethics; The Information Society Project at Yale Law School, Yale University, New Haven, CT, USA
- Ross Koppel, PhD, FACMI, Sociology Department; Center for Clinical Epidemiology and Biostatistics, Medical School; LDI, Wharton School: all at the University of Pennsylvania, Philadelphia, PA, USA.
- Craig Kuzziemsky, PhD, Telfer School of Management, University of Ottawa, Ottawa, ON, Canada
- Kourosh Ravvaz, MD, MPH, Biomedical and Health Informatics Program, University of Wisconsin, Milwaukee, WI, USA

**Abstract**
We rely on text, images, and other non-numeric information for professional and personal communication to provide care, conduct handoffs, and communicate in other ways and for other purposes. This qualitative data in patient records, handoffs, listserv exchanges, etc. are valuable for research and patient care. Rigorous and time-tested qualitative methods for analyzing progress and nursing notes, interviews, narratives, observations, images, and videos are especially useful in medicine and informatics. Building on many previous successful AMIA sessions on qualitative methods, we use postings to the American Medical Informatics Association’s (AMIA) Implementation and Optimization Forum to illustrate the power of qualitative methods, and insights that can be developed by using these approaches. We demonstrate how these same techniques can be used for all kinds of non-numeric data, such as clinical narratives, images, even maps. We illustrate coding and analysis for grounded theory, a way of preserving context and flavor of the original textual material while rigorously deriving significant and relevant themes from that data. Participants who bring their laptops will engage in hands-on exercises to learn key concepts of qualitative research and data analysis.

**Session leaders** from the endorsing AMIA Clinical Information Systems Working Group (WG), Evaluation WG, Ethical, Legal and Social Issues WG, People and Organizational Issues WG, Student WG, and IMIA Organizational and Social Issues WG, bring diverse skills from medicine, informatics, medical education, ethnography, history, statistics, sociology, workflow analysis, and business process management. Presenters all are members of the AMIA Implementation and Optimization Forum Steering Committee. Drs. Kaplan, Koppel, and Kuziemsky are highly regarded evaluation researchers who incorporate qualitative methods into their internationally known studies and teach these methods in popular tutorials, workshops, and university courses. Drs. Adams and Ravvaz provide key clinical perspectives and pointers for quantitative researchers wanting to become familiar with qualitative approaches and tools.

**Topics to Be Covered**
We demonstrate coding using simple MS-WORD manual methods and then introduce ATLAS.ti, a powerful software package that produces useful textual and graphic schema of the data. Throughout, participants will discuss, design, and carry out data analysis. Presenters draw from years of experience with qualitative methods from different disciplinary perspectives. Topics include:
- Examples of prevalence and usefulness of qualitative data in clinical care and research
- Utility of qualitative data, including advantages and challenges
- Qualitative data analysis methods for medical informatics, especially data coding and grounded theory
- Using ATLAS.ti or other software for qualitative data analysis including coding and an overview of other ATLAS.ti capabilities, e.g. Google maps, network analysis, content analysis, graphical displays
- Analyzing AMIA listserv postings and other qualitative data, such as progress notes and patient narratives
• Developing theory from data using grounded theory
• Transitioning from quantitative to qualitative approaches
• Ethical considerations, such as informed participants’ consent
• Rigor and advice for publishing qualitative research

Length: half-day

Educational Objectives: By the end of the tutorial, participants will be able to:
• Understand many uses of qualitative data
• Describe key concepts in qualitative data analysis
• Recognize clinically and theoretically useful materials generated from data such as natural language in EHRs, PHRs, listserv postings, maps, and images
• Use qualitative data analysis software to code data from, e.g., listservs, patient narratives, handoffs, etc.
• Integrate coding and grounded theory approaches into data analysis for research and practice

Who Should Attend: clinicians, IT personnel and designers, medical educators, HCI designers, researchers, scientists, and others involved in research or clinical care.

Level: Basic

Prerequisites: None

Presenter Experience and Contributions
Presenters make up the AMIA Implementation and Optimization Forum Research Steering Committee and are members of the Forum’s Steering Committee. Drs. Kaplan, Koppel, and Kuziemsky are highly-regarded evaluation researchers who incorporate qualitative methods into their internationally well-known studies. Drs. Adams and Ravvaz, also steering committee leaders, provide key clinical perspectives and pointers for quantitative researchers wanting to become familiar with qualitative approaches and tools.

Martha B. Adams, MD, MA, FACP, a member of the Duke Center for Health Informatics, has been a clinician-educator writing and teaching about information retrieval, a leader of applied informatics including research about adoption of handheld technology, telegenetics, information security, and social media. She led development of an enterprise-wide research data security plan for Duke and co-founded an antimicrobial stewardship framework deployed at Duke University Hospital and 30 hospitals in the Netherlands; Dr. Adams is recently advisor to projects of continuous learning quality improvement at Duke and another in personalized medicine involving genomics and cardiovascular disease. Dr. Adams is a member of the AMIA Board of Directors and Chair of the Working Group Steering Committee.

Dr. Adams will moderate the session, provide a clinical practice perspective to the subject matter, and discuss how to transition from a RCT perspective to qualitative approaches. The past two years as coordinator of the Implementation Listserv Steering Committee she brings experience with this qualitative analysis team. She will describe the listserv and the ethical considerations in analyzing postings.

Bonnie Kaplan, PhD, FACMI, of the Yale Center for Medical Informatics, is also a Yale Interdisciplinary Bioethics Center Scholar and a Faculty Fellow of the Yale Law School’s Information Society Project. Internationally known for her many evaluation studies using qualitative methods, she authored chapters on qualitative methods in the key evaluation textbooks and published seminal methodological papers and qualitative evaluation studies. Her research concerns informatics ethical and legal issues, user perspectives and experiences with HIT, and ethnographic sociotechnical evaluation. Her work on HIT failure and on ethical issues in telehealth were among the most read papers the year they were published. She presented popular evaluation and qualitative methods tutorials at AMIA, Medinfo, and other conferences, and served as faculty for the AMIA People and Organizational Issues Doctoral Consortium and the NSF Consortium for the Science of Socio-technical Systems (CSST) Summer Research Institute. Dr. Kaplan served twice as chair of AMIA’s People and Organizational Issues Working Group and of the Ethical, Legal, and Social Issues Working Group; and was chair of the IMIA Organizational and Social Issues Working Group. She is a fellow of the American College of Medical Informatics.
and a recipient of the AMIA President’s Award, and is currently a Hastings Center Scholar.

Dr. Kaplan authored chapters on qualitative methods in key medical informatics evaluation textbooks, published seminal methodological papers as well as evaluation studies and foundational papers on ethnography, mixed methods and methodological pluralism. She has presented popular tutorials and sessions on qualitative methods at the AMIA Symposium, Medinfo, and other conferences for more than 30 years. She draws on 40 years of qualitative research and teaching experience to explain the nature of qualitative data and data analysis and present an introduction to coding using manual methods and word-processing software.

**Ross Koppel, PhD, FACMI**, is a leading scholar of healthcare IT, and of the interactions of people, computers and workplaces, having published seminal works in the field. Professor Koppel is on the faculty of the Sociology Department, University of Pennsylvania and on the faculty of the Medical School at UPenn, where he is the Principal Investigator of the Study of Hospital Culture and Medication Error. Koppel is also a Senior Fellow of the Leonard Davis Institute at Penn’s Wharton School. In addition, Koppel is a co-investigator of Penn’s National Science Foundation Project on Safe Cyber Communication and Smart Alerts in Hospitals. At Harvard University, Dr. Koppel is PI on the FDA-funded study of prescribing errors in relation to displays of patient information. Also at Harvard, he is the Internal Evaluator of Harvard Medical School’s project to create a new HIT architecture. Ross Koppel has won every award in applied sociology offered by the Amer. Sociological Assoc., the Sociological Practice Assoc, and the American Society for Applied and Clinical Sociology. Professor Koppel’s work often focuses on the context of work settings, available information, and the technology. His newest book, *First Do Less Harm: Confronting the Inconvenient Problems of Patient Safety* (Cornell University Press) was published in May. Recently he coauthored the AHRQ Guide to reducing unintended consequences of HIT, www.ucguide.org.

Dr. Koppel’s work often combines ethnographic research, extensive statistical analysis, surveys, and usability studies. He will provide examples that show the power of qualitative approaches for medical informatics research and clinical practice.

**Craig Kuziemsky, PhD** is an Associate Professor and director of the Master of Science in Health Systems Program in the Telfer School of Management at the University of Ottawa. Craig’s research focuses on developing new approaches for modeling collaborative healthcare delivery so we can better design and evaluate HIT to support collaboration. His research is tackling this problem at two levels. The first level is the micro level where he is modeling healthcare delivery from the perspective of the micro level relationships between providers and teams. The second level is looking at collaboration from a meso or organizational level that makes a key distinction between data and process interoperability. Dr. Kuziemsky is the current chair of the IMIA Organizational and Social Issues working group and an associate editor for the Journal of Interprofessional Care.

Dr. Kuziemsky’s research primarily uses qualitative methods including ethnographic approaches and participatory design. He has published a book chapter on a combined grounded theory-participatory design approach for sociotechnical HIT design. Dr. Kuziemsky has participated in a panel on qualitative approaches for evaluating health information systems (ITCH 2009) and also co-presented a workshop on using grounded theory in health informatics (MIE 2011). He will demonstrate ATLAS.ti for coding and developing grounded theory from qualitative data.

**Kourosh Ravvaz, MD, MPH** from University of Wisconsin at Milwaukee is a biomedical and health informatician who has used his experience as a physician and public health expert to study the translation of new healthcare technology, biomedical scientific discoveries, and informatics methods to improved health outcomes. As a member of the Laboratory for Public Health Informatics and Genomics, he has been working on different projects addressing the research questions associated with the biomedical and health knowledge translation continuum from discovery to dissemination, implementation, and adoption of effective interventions. In addition, as a member of the AMIA Implementation and Optimization Forum's Steering Committee, he leads the Forum’s education and reference team. Dr. Ravvaz’s focus on the Committee has been on the educational value and contents of the forum’s postings (on knowledge, lessons, and experiences others learned during implementation of EHRs) to keep medical informatics trainees abreast of the latest developments and real-world implementation challenges within the ever-changing electronic health record systems (EHRs) landscape and also to make them more prepared for dealing with the implementation and utilization of health information systems.

Dr. Ravvaz, who presented a panel along with the other members of the Forum’s steering committee during AMIA 2013 on the Forum's discussions, will demonstrate how to use ATLAS.ti for analyzing graphical and pictorial data, such as from Google maps, and how to generate data displays. He will also discuss transitioning, as a physician and medical informatician, from a quantitative to qualitative perspective.