AHRQ Grant Final Progress Report

Title of Project: Diagnostic Error in Medicine Annual Conference

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Inclusive Dates of Project: 09/30/2012 – 09/29/2015

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Acknowledgement of Agency Support: The project described was supported by grant number 5 R13 HS021774-03, and its contents are solely the responsibility of the authors and do not necessarily represent the official views of the Agency for Healthcare Research and Quality.

Grant Number: 5 R13 HS021774-03

Diagnostic Error in Medicine Annual Conference
Structured Abstract

Purpose: To leverage AHRQ's conference support mechanism to advance the science of diagnostic error reduction and ensure the continuity of the DEM conference. One of the crucial functions of the conference is to identify key members of the diagnostic error research community who can assist in advancing research while inspiring and mentoring junior investigators to engage in the process.

Scope: The conference has created substantial impact in the areas of research, education, and clinical care. The conference brings together researchers, practitioners, educators, and noted experts to focus on issues that lie at the intersection of diagnostic error and fields such as clinical informatics, cognitive psychology, and human factors.

Methods: The conference is a 2.5-day meeting preceded by half-day pre-conference sessions and a patient summit (both open to meeting attendees and non-attendees). Daily keynote presentations by internationally recognized experts in the field are followed by plenary and concurrent sessions addressing diagnostic error issues, oral plenary abstracts, and poster exhibits.

Results: Over the past 3 years**,** the conference achieved several important goals: (1) increased the visibility and public awareness of the field of diagnostic error; (2) became the primary vehicle in developing a global strategic plan to coordinate research, education, collaboration, and action to improve diagnostic safety; (3) expanded the conference program offerings to include formal short courses that emphasize developments in the field and organize specific interest groups around emerging topics; and (4) laid the foundation for promotion of diagnostic error prevention--related competencies in clinical training/accreditation.

Key Words: diagnostic error, policy, patient engagement, human factors.

Purpose

The goal of this 3-year conference grant was to establish the DEM conference in national and international arenas as the premier meeting focused on reducing diagnostic error. The proposal was designed to help the DEM conference "gain traction" over the next 3 years and achieve several important goals: (1) to further bolster the visibility and public awareness of the field of diagnostic error; (2) to make the DEM conference the primary vehicle of developing a national strategic plan to coordinate research, education, collaboration, and action to improve diagnostic safety; (3) to expand the conference program offerings to include formal short courses that emphasize new developments in the field and organize specific interest groups around key emerging topics; and (4) to lay the foundation for promotion of diagnostic error prevention--related competencies in clinical training/accreditation.

Scope

Background and Context**:** In light of an Institute of Medicine (IOM) report highlighting the epidemic of medical error in the United States,(1) the medical profession, general public, and administrative and legislative branches of the national government are now focused on medical errors and improving the safety of medical care. It is not surprising that, with intense pressure for action, attention has centered on "low-hanging fruit," such as medication errors, wrong-site surgery, and hospital-acquired infections. Less often emphasized is the substantial problem of diagnostic errors, which are defined as instances in which diagnosis is unintentionally delayed (though sufficient information was available earlier), wrong (another diagnosis was made before the correct one), or missed (no diagnosis was ever made), as judged from the eventual appreciation of more definitive information.(2) Compared with procedural and medication errors, diagnostic errors are more difficult to recognize and understand and therefore harder to confidently identify and prevent. This may be due in part to the fact that diagnostic errors often occur in ambulatory settings, where errors are especially challenging to detect, track, and correct. (3;4)

The relative obscurity of diagnostic errors belies their impact. Diagnostic errors comprise a substantial and costly fraction of all medical errors. In the Harvard Medical Practice Study of Hospitals in New York State, diagnostic errors represented the second largest cause of adverse events.(5) Large-scale US studies report that diagnostic errors are a major cause for malpractice suits; in fact, diagnostic errors comprise the largest fraction of tort claims in the large healthcare organizations that track these data, including Veterans Health Administration (VHA), Kaiser Permanente, and insurance companies such as CRICO\RMF.(3;6-9) Autopsy studies consistently identify diagnostic discrepancies in 20%-30% of cases, and correct diagnoses would change patient management in an estimated 50% of these cases.(10)

Despite a growing number of organizations and conferences devoted to improving patient safety, the specific issue of diagnostic error receives relatively little attention. For instance, diagnostic error is not on the national meeting agendas of the National Quality Forum, the Institute for Healthcare Improvement, or the National Patient Safety Foundation. Of all the patient safety papers, few focus specifically on diagnostic error, despite its significance.(11) Despite the impact of diagnostic errors, there has never been a forum for a focused interdisciplinary study of diagnostic error prior to the AHRQ-funded DEM conference.

Diagnostic errors reflect both system-level failings and cognitive failings.(2) Among the most common cognitive origins of diagnostic errors are failures to gather and synthesize the available information. We recently completed a systematic literature review to identify interventions that have been tested to reduce or prevent diagnostic errors after publication of the IOM report, To Err is Human.(12) Of 139 articles reviewed, 40 reported tested interventions to address cognitive aspects of diagnostic error.

Only six articles reported interventions to address systems-related aspects. There were no systematic evaluations of patient-related interventions.
Many interventions suggested in the literature have never been evaluated. For example, Croskerry has proposed that cognitive training methods might decrease the rate of diagnostic errors,(13) yet interventions to improve clinicians' diagnostic skills have not reached the stage of clinical trials. Furthermore, much remains to be learned about the real workings of clinical decision making and what can be done to improve its reliability. It is clear that more research is essential to measure the epidemiology and burden of diagnostic error, assess root causes, and develop strategies to prevent misdiagnosis or mitigate the resulting harms.(14)
One of the crucial functions of the DEM conference is to help identify key members of the diagnostic error research community who can assist in advancing the research agenda while inspiring and mentoring junior investigators to engage in the research process. In addition, the DEM conference functions to bring together other stakeholders (e.g., educators, laboratorians, payers, policymakers, clinical leaders) to engage in the error reduction process.

Background and Context Reference List

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Settings:

The 2013, 2014, 2015 DEM Conferences were held in Chicago, Illinois, Atlanta, Georgia, and Washington, DC, respectively. The ultimate goal of the conferences was to improve patient safety by reducing the likelihood of diagnostic error in medicine. The overall objectives included:

- Recognizing the frequency, impact, and public health significance of medical misdiagnosis.
- Developing a community of advocates from across the healthcare delivery spectrum.
- Identifying the causes of diagnostic error in medicine and strategies to reduce them.
- Sharing research methods and results relevant to clinical reasoning, diagnostic error, and misdiagnosis-related harm.
- Describing the epidemiology and impact of error in medical diagnosis.
- Analyzing the factors contributing to error and provide prevention strategies.
- Identifying ways to measure diagnostic error.
- Participating in the development of research, education, technology, and practice strategies to reduce diagnostic error.

Participants:

Each year, in order to meet the conference goals, a 10-member multidisciplinary planning committee composed of educators, providers, malpractice liability insurers, and government and diagnostic error researchers was established. Committee members included:

- Paul L. Epner, M.Ed, MBA, Executive Vice President, Society to Improve Diagnosis in Medicine
- Mark L. Graber, MD, President, Society to Improve Diagnosis in Medicine
- David L. Meyers, MD, FACEP, Sinai Hospital of Baltimore
- Art Papier, MD, University of Rochester School of Medicine
- P. Divya Parikh, MPH, Physician Insurers Association of America
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- Geeta Singhal, MD, MEd, Baylor College of Medicine
- Robert A. Swerlick, MD, FAAD, Emory University School of Medicine
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- Donna Woods, EdM, PhD, Northwestern University Feinberg School of Medicine
- Nikola Baumann, PhD, DABCC, Mayo Clinic

Methods

The conference was the mechanism by which the grant objectives were met.

Conference Overview – 2013: The conference had programming that was approved for 31 AMA PRA Category 1 Credits™.
Keynote Speakers: Christine K. Cassel, MD, Brent C. James, MD, MStat, and Robert M. Wachter, MD

Pre-Conference Sessions

- Research Summit (invitation only)
- Educator's Workshop: Practical Approaches to Teaching Clinical Reasoning Skills
- Short Course: Cognitive Psychology of Diagnostic Error
- Short Course: Introduction to Diagnostic Errors

Day 1 Sessions

- Keynote Presentation: Bringing Diagnosis into the Quality and Safety Equations
- What's in a Name? — Controversies and Consensus in Describing Diagnostic Errors
- Shifting Sands: Diagnosis, Diagnostic Error, and Changes Brought by DSM-5
- Diagnostic Challenges in Surgical Care
- The NIH Undiagnosed Diseases Program: Using Exome Sequencing and Other Genetic Tests for Diagnosis
- Putting the Patient First: On the Way to Safer Diagnosis Through Patient Involvement at Three Tables – Exam Room, Board Room, and Policy
- Information Technology Systems to Support Clinical Diagnosis and Reduce Diagnostic Error
- Diagnostic Error and Clinical Reasoning Case Presentation

Day 2 Sessions

- Posters with presenters
- Keynote Presentation: Meeting the Measurement Challenge of Diagnostic Error
- What Was I Thinking...Or Not: Measuring Diagnostic Error for Improvement
- Panel: Solving Practical Problems of Diagnostic Error Measurement
- Medical Improv: Creative Expansion of Communication Skills
- Educator's Session: Teaching Clinical Reasoning in Undergraduate and Graduate Medical Education – How Should We Do It? Should We Do It?
- Quality Improvement Session: "Your Results are Back" – Identifying Gaps and Improving the Follow-up and Communication of Diagnostic Test Results
- Oral Abstracts

Day 3 Sessions

- Keynote Presentation: Diagnostic Error in the Patient Safety Universe: Is the Square Peg Getting Rounder?
- How Evolving Testing Technologies Will Impact Diagnostic Accuracy in Radiology and Pathology
- Top Diagnostic Error Stories of 2013
- Conference Retrospective
- Closing Remarks: Define, Measure, Improve

Conference Overview – 2014: The conference had programming that was approved for 25.25 AMA PRA Category 1 Credits™.

Keynote Speakers:

- Lucian Leape, MD, Harvard School of Public Health
- Robert A. Berenson, MD, FACP, Urban Institute
- Otis Webb Brawley, MD, FACP, Emory University

Pre-Conference Sessions

- Patient Summit
- Research Summit (invitation only)
- Short Courses:
    - Training Others to Teach about the Science of Diagnostic Error
    - Clinical Decision Support – Bedside Tools for Better Diagnosis
    - An Introduction to Diagnostic Errors
    - Patient Summit: How to Reduce Chances of Misdiagnosis
    - Reducing Diagnostic Error Through Improvement of Laboratory Test Utilization

Day 1 Sessions

- Keynote Presentation: It's a Culture Problem
- Underdiagnosis vs. Overdiagnosis: Which Should We Be More Worried About?
- Measuring Diagnostic Error in Real-World Clinical Practice: Insights from Multidisciplinary Research
- Error, Overconfidence and Inadequate Feedback: Prospects for Systems Improvements
- "Deep" Root Cause Analysis: Patient and Professional Dialog on Diagnostic Errors
- The Impact of High Value Care on Diagnostic Error: The Educator Perspective
- Diagnostic Error and Clinical Reasoning Case Presentation

Day 2 Sessions

- Keynote Presentation: Placing Diagnosis Errors on the Policy Agenda
- Behavioral Economics – Is Biology Really Destiny? Evolution, Survival Skills and Diagnostic Reasoning
- Oral Abstracts
- Implementing Diagnostic Decision Support Systems: Barriers and Strategies to Overcome Them
- Understanding and Misunderstanding Diagnostic Testing: A Source of Diagnostic Error
- Diagnostic Errors: Causes of Heartburn Among Health Care Risk Managers, Malpractice Insurers and Public Policymakers

Day 3 Sessions

- Keynote Presentation: Cancer Diagnosis in the 21st Century
- Top Diagnostic Error Stories of 2014
- Closing in Action – Tapping into the Wisdom in the Room to Envision Diagnostic Error Reduction
- Conference Retrospective

Conference Overview – 2015: The conference and short courses were approved for up to 20.75 AMA PRA Category 1 Credits™.

Keynote Speakers

- Tejal K. Gandhi, MD, MPH, CPPS, National Patient Safety Foundation

- Richard Kronick, PhD, U.S. Agency for Healthcare Research and Quality
- Francis J. Crosson, MD, MedPAC

Pre-Conference Sessions
- Research Summit (invitation only)
- Patient Summit: Participation and Prevention
- Short Courses:
    - An Introduction to Diagnostic Errors
    - Using Cases to Improve Diagnostic Performance: A Workshop for Educators
    - Tools You Can Use: Practical Approaches to Diagnostic Errors
    - Cognitive Psychology of Diagnostic Error

Day 1 Sessions
- Keynote Presentation: The Changing Landscape of Diagnostic Safety
- Getting the Foundation Right: The Definition and Measurement of Diagnostic Errors
- Oral Plenary Abstracts
- Posters presentations

Day 2 Sessions
- Keynote Presentation: Improving Diagnostic Performance: A Funding Agency's Perspective
- Improving Practice One Opportunity at a Time
- The Evaluation of Medical Tests – from Information to Consequences
- Improving Diagnostic Safety: Options for Moving Forward
- Technologies Enhancing Diagnostic Accuracy
- Principles of Conservative Diagnosis
- How Can Risk Management Contribute to Improving Safety in Diagnosis?
- Diagnosis-related MPL Claims Issues – What Keeps Liability Insurers Up at Night? And What Do They Do to Get to Sleep?
- Oral Abstract Presentations

Day 3 Sessions
- Keynote Presentation: Potential Policy Approaches to Improving the Accuracy of Diagnosis in Medicine
- Diagnostic Errors – Where Do We Go From Here? – Policy, Payer and Practice Implications
- For Better or Worse: Context Influences Diagnostic Accuracy
- Diagnostic Error and Clinical Reasoning Case Presentation
- Diagnosis and Dialogue: Patient Access to Patient Data
- Top Diagnostic Error Stories of 2015

Results

Over the past 3 years, the conference achieved several important goals: (1) increased the visibility and public awareness of the field of diagnostic error; (2) become the primary vehicle in developing a national strategic plan to coordinate research, education, collaboration, and action to improve diagnostic safety; (3) expanded the conference program offerings to include formal short courses that emphasize developments in the field and organize specific interest groups around emerging topics; and (4) laid the foundation for promotion of diagnostic error-prevention related competencies in clinical training/accreditation.

Attendance for the 2013 conference set a record and the pre-conference workshops were very successful:

- There were 104 attendees at the three pre-conference workshops, 26 of whom only attended the workshop.
- The main conference had 212 attendees, from 10 different countries.
- There were 40 abstracts submitted for peer review and approved. Six abstracts were selected for oral presentation in a plenary session and the remaining 34 were displayed as posters.
- There was an invitation-only research summit prior to the start of the conference with approximately 20-25 attendees.

Summary of participant's evaluation ratings/comments – 2013

The participant evaluations were collected by the conference management company via a 36-item online survey, which was distributed nearly a month after the conference. This resulted in only 28 responses from over 200 attendees. We discussed the need to provide the evaluation form to the attendees before they leave the conference as well as the realization that the survey was much too long. Based on the survey responses that we received and feedback from attendees, we agreed that the schedule was too compressed and built slightly longer breaks into the schedule for the 2014 conference.

Overall, 96% of the respondents said that the program content met the advertised learning objectives, and 93% said that they obtained new information (knowledge) as a result of attending; 85% felt that the conference met or exceeded their expectations, and 89% rated the overall educational quality of the conference as good (21%) or excellent (68%). Based on these responses and other feedback from the attendees, we felt that the quality of the sessions was excellent and that our greatest challenges for the 2014 conference would be logistical. The planning committee worked to fine tune the sessions based on the comments received and develop a conference schedule that reflected the needs of the attendees as related to timing of the sessions and longer breaks. We worked with the conference management company to ensure that evaluations are collected before the conference ends and that the evaluations do not place too heavy a burden on the respondents.

We received positive feedback about the use of panels with some controversy attached, such as the definitions panel. As a result, we used a similar approach the next year with two panels, one on “over versus under” diagnosis and one with patients, physicians, and risk managers on open communication in the diagnostic process including access to clinical notes.

We received several suggestions for topics or speakers and considered them when planning the 2014 sessions.

In 2014, attendance essentially matched the previous year’s record-setting level (234 vs 238 in 2013). This is despite moving to a location with fewer hospitals, medical schools, and medical society corporate homes.

- We offered five pre-conference workshops, including a new offering of a "patient summit." In total, we had 112 attendees.
- Overall, 229 of the 234 attendees were there for the main conference (19 attended for just 1 day), with five registrants who only attended pre-conference workshops.
- There were 84 abstracts submitted for peer review and approved. This was twice as many as were submitted for the 2013 conference. There were six abstracts selected for oral presentation, two as clinical cases, and 70 were displayed as posters (six abstracts were withdrawn by the authors).
- We continued with the invitation-only research summit prior to the start of the conference. Approximately 20-25 people attended

Summary of participant's evaluation ratings/comments – 2014

Due to the low response rate in 2013, the 2014 participant evaluations were collected onsite by the conference management company using a paper form. There was a form for each day of the conference, with evaluations on session and a general form covering the overall conference. The form was provided by the conference accreditors, Stony Brook University. Each session was evaluated using six items and open text fields for comments. The general conference evaluation had 17 items and open text fields. The shift to daily paper evaluations resulted in a much improved response rate, with 232 evaluations from across the 3-day conference, 88 general conference evaluations, and 54 evaluations from the pre-conference workshop.

Responses were collected on a 5-point scale from "strongly agree" to "strongly disagree." With 5.0 being the maximum, the averages of general evaluation items ranged from 4.11 to 4.74, which was generally felt to be very positive and was supported by the open text responses.

Five items had averages equal to or above 4.7. They were:

1. This conference was valuable as a way to meet potential collaborators or colleagues with interests similar to mine.	4.74
2. There was no inappropriate commercial bias toward any product or vendor.	4.73
3. The speakers/instructors exhibited competence in the program content.	4.72
4. The content was objective and balanced.	4.71
5. I would be interested in attending another similar meeting on this topic in the future.	4.70

Only three items were below 4.4. They were:

1. The length of the program was appropriate.	4.39
2. The speakers and instructors presented the subject matter in a well-organized and engaging manner.	4.37
3. The audiovisual equipment was effective.	4.11

We believe that the lowest-rated problem was related to the lack of a monitor for the speaker, which was resolved during the morning break on the first day, and presentation audio volume, which was too low. We made significant improvement by lunchtime of the first day but continued to have problems until day 3. For the 2015 conference, we ensured that there was a "confidence monitor" for speakers and there was a higher standard for volume.

Although there was still a relatively low rating on the length of the sessions and the meeting, there were also many more positive comments this year. We enforced longer breaks than the previous year. We did not make any major changes in the program density in 2015.

Finally, as a result of the ratings on "engaging speakers," we continued to challenge ourselves when we selected speakers. We requested that each planning committee member meet with their invited speakers in advance of the meeting to ensure proper context for the presentation is set.

Based on these responses and other feedback from the attendees, we felt that the quality of the sessions was excellent and that our greatest challenges for the coming conference would be logistical. We continued to employ planning assumptions that have proven effectiveness, but we also introduced some new innovations as we have done each year.

In 2015, attendance at the conference and pre-conference sessions grew substantially over the previous year's record-setting level (313 vs 234 in 2014).

- We offered five pre-conference workshops, including a very successful "patient summit." In total, we had 101 short course attendees and 57 patient summit attendees (29 attended pre-conference sessions only).
- Overall, 258 of the 284 DEM attendees were there for the full conference (26 attended for just 1 day).
- There were 80 abstracts submitted for peer review and approved. This was approximately as many as were submitted for the 2014 conference (80 accepted versus 84 accepted in 2014). There were four abstracts selected for oral plenary presentation, six selected for oral concurrent session presentation, one selected for case presentation, and 69 approved for display as posters.
- We continued with the invitation-only research summit prior to the start of the conference. Approximately 27 people attended

Summary of participant's evaluation ratings/comments – 2015

In 2015, participant daily evaluations were collected onsite by the conference management company using a paper form, and the general conference evaluation was conducted online through a survey sent approximately 1 week after the conclusion of the conference. There was a separate form for each day of the conference with evaluations covering each session. The form was provided by the conference accreditors, Stony Brook University. Each session was evaluated using six items and open text fields for comments. The general conference evaluation had seventeen items and open text fields. The shift to daily paper evaluations resulted in a good response rate, with 267 evaluations from across the 3-day conference, 77 "general conference" evaluations, and 71 evaluations from the pre-conference workshop.

Responses were collected on a 5-point scale from "strongly agree" to "strongly disagree." With 1.0 being the maximum, the averages of general evaluation items ranged from 1.33 to 2.18, which was generally felt to be very positive and was supported by the open text responses.

Six items had averages below 1.5, considered very favorable ratings. They were:

1. The speakers/instructors exhibited competence in the program content.	1.33
2. This conference was valuable as a way to meet potential collaborators or colleagues with interests similar to mine.	1.34
3. The program provided me with relevant and educational information that I will apply to my work.	1.46
4. The content was objective and balanced.	1.46
5. Quality of sessions: Networking Opportunities	1.47
6. Would you recommend attending the DEM Conference to your colleagues?	1.49

Only three items were above 1.9. They were:

1. Quality of Sessions: Posters	1.95
2. Quality of Sessions: Breakout Groups	2.10
3. Likelihood of attending in 2016 (was announced to be in Los Angeles in November)	2.17

We believe that the lowest rated problem was related to the move of DEM 2016 to the west coast, which is a more difficult location for this east coast audience. The informal comments about posters and breakouts continue to deal with the volume of content and content choices and not generally with the quality of the material presented.

Based on these responses and other feedback from the attendees, we feel that the quality of the sessions was excellent and that our greatest challenges for the coming conference will be logistical. We will continue to employ planning assumptions that have proven effectiveness, but we will also introduce some new innovations, as we have done each year. One example of a possible innovation in 2016 is the creation of an Educator's Summit to pair with the Research Summit and Patient Summit.

Publications and Products

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