1. TITLE PAGE

Pediatric Quality Improvement Methods, Research, and Evaluation Conference

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2. STRUCTURED ABSTRACT

Purpose
To promote dissemination and use of appropriate quality improvement (QI) research methods in child health and to facilitate the continued development of child health QI researchers nationally.

Scope
The program focused on key methodological and technical issues for QI and health services research, advancing AHRQ's core activities related to a priority population (children).
The conferences aimed to develop individuals' knowledge and understanding regarding QI research and its methods and to build a community of scholarship that results in important new knowledge and better healthcare and health outcomes for children.

Methods
Three 1-day conferences were held in association with the national Pediatric Academic Societies Meeting. Professional networks were utilized to publicize each meeting, and each was approved for CME by Mount Sinai School of Medicine. Speakers and participants focused on designing, implementing, and disseminating QI research in both plenary and workshop sessions. Topics included cluster randomized trials, stepped wedge designs, interrupted time series analysis, statistical process control, regression methods in QI research, implementation science, IRB, fundamentals of quality measure development, publishing and disseminating QI research results, bridging biostatistical methods and QI research, and obtaining funding for QI research. Keynote addresses were provided by Drs. Virginia Moyer, David Grossman, and Patrick Conway.

Results
The conferences were highly successful, with more than 400 Quality Improvement researchers in attendance over the 3 years. Evaluations were excellent with almost all encouraged that future conferences be held.

Key Words
Quality Improvement, Health Services Research, Research Methods, Child Health Quality, Quality of Care

3. PURPOSE

Conference Objectives: The specific learning objectives of each annual conference varied from year to year, but, in each conference, participants and faculty addressed barriers and facilitators to integrating state of the science in their work. The overall objectives for meeting attendees were to:

1. Develop their critical thinking skills to promote more rigorous QI research;
2. Improve their understanding of the relationship between study design, analytical methods, and both the validity and generalizability of pediatric QI research;
3. Enhance their understanding of one or more state-of-the-art pediatric QI research methods, including these methods' capabilities and limitations;
4. Maintain and enhance their network of pediatric QI research colleagues, and enhance their connections with individuals, resources, and organizations engaged in pediatric QI research;

4. SCOPE

Three 1-day, Pediatric Quality Improvement Methods, Research, and Evaluation Conferences were held:

1. Vancouver, BC, May 2, 2014. There were 133 Quality Improvement researchers in attendance, including 20 speakers. The meeting agenda is included as Appendix 1.
2. San Diego, CA, April 24, 2015. There were 137 Quality Improvement researchers in attendance, including 15 speakers. The meeting agenda is included as Appendix 2.
3. Baltimore, MD, April 29, 2016. There were 144 Quality Improvement researchers in attendance, including 17 speakers. The meeting agenda is included as Appendix 3.

FEATURED SPEAKERS

Maria Britto, MD, MPH: Professor of Pediatrics in the Division of Adolescent Medicine at Cincinnati Children's Hospital Medical Center

Terri L. Byczkowski, PhD: Assoc. Professor in the Division of Emergency Medicine at Cincinnati Children's Hospital Medical Center (CCHMC)

Nathaniel Carroll, PhD: Assistant Professor, MS in Health Administration Program at University of Alabama

David Chambers, PhD: Deputy Director for Implementation Science at National Cancer Institute

Steve Clauser, PhD, MPA: Program Director, Science at PCORI

Patrick Conway, MD, MSc: Deputy Administrator for Innovation & Quality, CMS Chief Medical Officer

Denise Dougherty, PhD: Adjunct Professor, Pediatrics- Case Western Reserve University and Rainbow Babies and Children's Hospital Center for Health Policy and Research

Jonathan Finkelstein, MD, MPH: Interim Chief Safety and Quality Officer at Boston Children's Hospital, Donald M. Berwick Chair in Pediatric Quality and Outcomes at Boston Children's Hospital, and Professor of Pediatrics and Population Medicine, Harvard Medical School

Michelle Garrison, PhD: Assoc. Research Professor in the Department of Pediatrics at the University of Washington

Donald Goldman, MD: Chief Medical and Scientific Officer, Institute for Healthcare Improvement (IHI)

David Grossman, MD, MPH: Professor, Health Services at University of Washington

David Hooper, MD, MS: Assistant Professor, UC Department of Pediatrics; Medical Director of Kidney Transplantation at Cincinnati Children's

Clarissa Hsu, PhD: Anthropologist and Senior Research Assoc. at Group Health Research Institute

James Hughes, PhD: Professor of Biostatistics at University of Washington

Dan Hyman, MD: Chief Quality Officer at Colorado Children's Hospital.

Heather Kaplan, MD: Assistant Professor, University of Cincinnati Department of Pediatrics and Attending Neonatologist, Neonatology and Pulmonary Biology, Cincinnati Children's Hospital Medical Center

Alex Kemper, MD, MPH, MS, Professor of Pediatrics at Duke University, Assoc. Chief for Research, Division of Children's Primary Care at Duke, and Assoc. Editor of *Pediatrics*.

Lawrence Kleinman, MD, MPH: Director, Center for Child Health and Policy, UH Rainbow Babies and Children's Hospital; Vice Chairman, Pediatrics for Child Health and Policy, UH Rainbow Babies and Children's Hospital; Visiting Professor, Pediatrics, CWRU School of Medicine

Rita Mangione-Smith, MD, MPH: Professor and Chief, Division of General Pediatrics and Hospital Medicine at the University of Washington

Kamila Mistry, PhD: AHRQ Senior Advisor, Children's Health and Quality Improvement

Virginia Moyer, MD, MPH: Vice President, Maintenance of Certification and Quality, The American Board of Pediatrics

Matthew Neidner, MD: Director of Quality and Safety at the Pediatric Intensive Care Unit (PICU) at CS Mott Children's Hospital, University of Michigan

Robert Penfold, PhD: Assoc. Investigator at the Group Health Research Institute (GHRI)

Michael Rinke, MD, PhD: Medical Director of Pediatric Quality at the Children's Hospital at Montefiore and an Asst. Professor of Pediatrics at Albert Einstein College of Medicine

Lori Rutman, MD, MPH: Asst. Professor of Pediatrics at the University of Washington

Judith S. Shaw, EdD, MPH, RN: Executive Director of the Vermont Child Health Improvement Program (VCHIP) and Professor of Pediatrics at the University of Vermont College of Medicine

Paul Shekelle, MD, MPH, PhD: Director of the Southern California Evidence-Based Practice Center site at the RAND Corporation, a consultant in health sciences at RAND, professor of medicine at the UCLA School of Medicine, and a staff physician at the VA Medical Center in West Los Angeles

James Stout, MD, MPH: Professor of Pediatrics, University of Washington

5. METHODS

The conferences were planned by a multidisciplinary group of quality improvement researchers from five universities across the country and representatives from the APA QI Special Interest Group, the APA Healthcare Delivery Committee, and staff from the APA.

The conferences focused on methodological and technical issues of major importance to those pursuing careers focused on QI implementation, research, and dissemination. The agenda of each conference included highly rated topics from previous years and new topics that reflected developments in the field.

The program was designed to create an interactive exchange, to develop consensus and meet the conference objectives that are listed above. The plenary presentations were lecture format with the opportunity for questions at the end of each presentation.

Also included were smaller workshop sessions designed to be interactive with limited numbers of participants. These groups worked with their facilitators to discuss issues of implementation and/or application of QI research techniques. The schedule allowed each participant to attend at least three small-group sessions.

6. RESULTS

We have implemented multiple approaches for evaluation for the conferences in 2014, 2015, and 2016. Each of the three conferences was very successful by measures of attendance and feedback of participants. We had 133 attendees, 122 attendees, and 127 attendees, (excluding faculty), in the 3 years, respectively. All had broad appeal, with substantial numbers of trainees, junior faculty, and more senior individuals attending. As with past conferences, there was also a broad diversity of level of experience with QI and QI science. We wished to understand the professional interests of participants of this conference and the effects it had on their practice and research. Table 1 presents preconference (baseline) ratings from 2014 and the difference in the mean (unpaired) ratings on a 1 to 5 scale (all increases) from pre-test to post-test times. The final column is the ratio of the difference to the standard deviation of the baseline ratings.

Table 1.

Item	Baseline	Pre - Post Difference	Increase in Percent of SD
I consider myself a QI researcher.	2.91	0.43	41%
I consider myself a consumer of QI research.	3.77	0.43	45%
I generally understand the methods of QI research.	3.28	0.57	72%
Currently, I have skills necessary to lead a QI research project.	2.70	0.68	76%
Currently, I have skills necessary to participate in a QI research project.	3.98	0.43	64%
I can identify the collaborators I would like to have available to help me to do QI Research.	3.62	0.43	45%
I generally understand the methods of Quality Improvement.	3.74	0.51	63%
I am comfortable reading the literature regarding QI projects.	3.91	0.39	55%
Currently, I have skills necessary to lead a QI research project.	3.00	0.84	97%
Currently, I have skills necessary to participate as a team member in a QI research project.	4.09	0.45	60%
I can identify the collaborators I would like to have available to help me to do a QI Project.	3.87	0.40	46%
I can identify the colleagues I would like to have available to help me to understand or interpret QI projects.	4.00	0.29	34%

Table 2 reports the evaluation data from all three conferences. At least 90% of all these items were scored a “4” or “5,” including items regarding recommending the conference to a colleague and supporting future conferences and affirming the intention of attendees to return in future years. On items asking about length of time for the conference and for interactions, the overwhelming majority were “About Right,” and there was not a skewing of the other responses (“Too Short” or “Too Long”) one way or the other. Mean evaluations for most of the breakout sessions exceeded 4, with only rare ratings less than 4 and none less than 3.0. The plenary morning keynote was highly rated in all years (above 4). The lunchtime abstract session and plenary presentation of “best abstracts” was rated lower in 2014, (posters [range 3.25-4.0] and closing plenary panel [range 3.5-4.2]), but, with changes, these ratings improved dramatically in 2015 and 2016. In 2015, the plenary lunch with posters was rated highly (range 4.3-4.92), as was the closing plenary panel (range 4.24-4.76). In 2016, the keynote was very highly rated (range 4.55-4.67), as was the plenary during which the most highly rated abstracts were

presented (range 4.17-4.61). In Table 2, we present the median score of participants to overall evaluation items. On the 5-point scale, “5” was “strongly agree,” and “4” was “agree”

Item	Median 2014	Median 2015	Median 2016
I will recommend this activity to colleagues	5	5	5
The overall activity met my expectations	5	5	5
The activity materials were useful	5	4	5
Teaching format was appropriate to achieve program objectives	5	5	5
The activity produced evidence-based information that will be useful to me in my job or practice	5	5	5
Future conferences on QI Research Methods should be held	5	5	5
I would like to attend a future conference on QI Research Methods	5	5	5
As a result of information received today, I plan to make changes that will benefit patient care	5	5	5

Open-ended comments. We provided opportunities for open-ended comments on topics, including participants’ views of the best parts of the conference, what they liked least, where they derived the greatest benefit, and what they would suggest we change. Respondents praised a variety of the sessions and were appreciative of the many networking opportunities that occurred during the course of the conference. There was a variety of specific suggestions for future topics and speakers. Some suggested that shorter breakout sessions and more sessions might be desirable. Also, in 2014, there was a sense by some that some sessions were too advanced for the participants, suggesting additional attention to tiered levels for sessions. There remained a strongly expressed need for faculty to develop skills to produce QI work that is scholarly and results in advancement in the methods and impact of the field as a whole. In subsequent years, the breakout sessions were very well received, offering opportunities for interaction and collaboration. A need was expressed for repeating breakout sessions in order for attendees to participate in additional sessions. This was implemented as a change in 2016. There was a variety of specific suggestions for future topics and speakers.

7. LIST OF PUBLICATIONS and PRODUCTS

In 2013, the APA Board voted to make this conference a Core Activity of the APA. The Chair of the APA Healthcare Delivery Committee will continue to report annually on the conference to the APA Board. The experience of holding this conference annually, and its success, was critical to the development and launch of a QI Scholars program, modeled upon other highly successful APA scholars programs, such as the New Century and Educational Scholars. This program has recruited its first cohort of 14 scholars to participate in a 3-year program beginning in the spring of 2017.

We utilize the APA QI SIG website for communication. In advance of the conference, it served a marketing function in addition to serving as a centralized source of information for participants. For example, the website from the 2013 conference can be accessed at http://www.academicpeds.org/specialInterestGroups/sig_QI_meetingMaterials2013.cfm.

Subsequent to the conference, a summary of the meeting was published in the electronic APA newsletter with a link provided on the website. The website contains links to peer-reviewed publications or white papers that came out of the conference as well as the conference bibliography. Consistent with copyright policies of the appropriate journals, we provide downloadable versions of the papers on the website. The website also serves as a resource center for those interested in the topic of QI research, highlighting those issues of importance for children’s health.

8. Summary

In summary, under the auspices of the Academic Pediatric Association, we have successfully implemented three annual conferences at which we have brought together a vibrant group of committed individuals who seek to focus their work on quality improvement research for children. These conferences have been exceedingly successful by any objective measure and by the continual positive feedback we receive from participants at all levels. They have helped to build a cadre of investigators who will directly improve the care of children in their individual institutions and spread knowledge about how to implement such changes across institutions.

APPENDIX 1

Fourth Annual Advancing Quality Improvement Science for Children's Health Care Research
Agenda, May 3rd, 2014,
Vancouver, British Columbia, Canada

TIME	TOPIC	SPEAKER
8:00-8:30 am	Continental Breakfast/Networking	
8:30-8:40 am	Brief Welcome and Conference Overview: Goals and Objectives	Jon Finkelstein, MD, MPH
8:45-9:30 am	Keynote – The Future of Quality Improvement Research	Virginia Moyer, MD, MPH
9:30-9:45 am	Move to Breakout Sessions	
9:45-11:45 am	**Breakout Sessions**	**SESSION LEADER(S)**
Track 1	1) Interrupted Time Series	Robert Penfold, PhD
	2) The Anatomy of a Quality Measure: Key Issues to Consider when Developing Quality Metrics for QI Evaluation Research	Rita Mangione-Smith, MD, MPH
	3) The Fundamentals of Quality-Improvement: How to do QI	Matthew Niedner, MD
	4) Quality Improvement Works-in-Progress	Alex Kemper, MD, MPH, MS
	5) Introduction to Statistical Process Control	Maria Britto, MD, MPH
Track 2	6) Bridging Classical Biostatistical Methods and QI Research	Terri Byczkowski, PhD, MBA Jon Finkelstein, MD, MPH
	7) Cluster Randomized Controlled Trials	Michelle Garrison, PhD
	8) Stepped Wedge Designs	James Hughes, PhD
	9) Survey of Quality-Improvement Intervention Research Methods	Donald Goldmann, MD
12:00-1:15 pm	**Poster Session and Networking Lunch**	
	Lunch	
	Discussion of Posters with Authors and Attendees	David Link, MD Judy Shaw, EdD, MPH, RN
1:30-3:30 pm	**Breakout Sessions**	**SESSION LEADER**
Track 1	1) To IRB or Not to IRB: That is the Question	Jon Finkelstein, MD, MPH Daniel Hyman, MD
	2) Estimating the Value of QI: Organizational Perspectives on the Cost per Unit of Improved Quality	David Grossman, MD, MPH
	3) Qualitative Methods for Quality Improvement Research	Clarissa Hsu, PhD
	4) The Fundamentals of Quality-Improvement: How to do QI	Matthew Niedner, MD
Track 2	4) Statistical Process Control in QI Research	Maria Britto, MD, MPH Terri Byczkowski, PhD, MBA
	5) Regression Risk Analysis	Lawrence Kleinman, MD, MPH Edward Norton, PhD
	6) Advanced Application of Interrupted Time Series Analysis	Robert Penfold, PhD
	7) Context in Quality-Improvement Research	Heather Kaplan, MD, Denise Dougherty, PhD
3:30-3:45 pm	**Coffee Break and Networking**	
3:45-4:30 pm	**Closing Plenary**	**PANEL MEMBERS**
	Quality Improvement versus Quality Improvement Research: Academic Work on the Borderline	**Moderato**r: Lawrence Kleinman, MD, MPH **Panel:** Donald Goldman, MD Alex Kemper, MD, MPH, MS Rita Mangione-Smith, MD, MPH James Stout, MD, MPH

APPENDIX 2

Fifth Annual Advancing Quality Improvement Science for Children's Health Care Research
Agenda, April 24, 2015,
San Diego, California

Time	Topic	Speaker
7:30-8:00 am	Continental Breakfast/Meet the Professors	
	Welcome & Conference Overview	
8:00-8:30 am	Keynote – Making a Case for QI Research	David Grossman, MD, MPH
8:45-10:15 am	Break Out Session 1:	
	Interrupted Time Series Analysis	Robert Penfold, PhD
	Anatomy of Quality Measure	Rita Mangione-Smith, MD, MPH
	The Fundamentals of Quality Improvement: How to do QI	Matthew Niedner, MD
	Bridging Classical Statistics and QI Research	Jon Finkelstein, MD, MPH Terri Byczkowski, PhD, MBA
	Introduction to Statistical Process Control	Maria Britto, MD, MPH
	Introduction to Qualitative Methods in QI Research	Clarissa Hsu, PhD
10:30 am-12:00 pm	Break Out Session 2:	
	Interrupted Time Series Analysis	Robert Penfold, PhD
	Quality Research Works in Progress	Alex Kemper, MD, MPH, MS Jon Finkelstein, MD, MPH Rita Mangione-Smith, MD, MPH Lawrence Kleinman, MD, MPH
	The Fundamentals of Quality Improvement: How to do QI	Matthew Niedner, MD
	Survey of QI Research Methods	Donald Goldmann, MD
	Introduction to Statistical Process Control	Maria Britto, MD, MPH
	Introduction to Qualitative Methods in QI Research	Clarissa Hsu, PhD
12:15-1:15 pm	Networking Lunch and Discussion of Posters with Authors and Attendees	
1:30-3:00 pm	Break Out Session 3:	
	Anatomy of Quality Measure	Rita Mangione-Smith, MD, MPH
	What is Implementation Science?	Paul Shekelle, MD, MPH, PhD
	How to obtain Risk Ratios and Risk Differences from Logistic Regression: An introduction to regression risk analysis for SAS and STATA	Lawrence Kleinman, MD, MPH Nathan W. Carroll, PhD
3:15-4:30 pm	Best Abstracts	Moderated by David Grossman, MD, MPH Judy Shaw, EdD, MPH, RN

APPENDIX 3

6th Annual Conference
Advancing Quality Improvement Science For Children's Healthcare Research
Agenda, April 29, 2016
Baltimore, MD

Time	Topic	Speaker
7:00 – 8:30 am	Registration	
8:30 – 9:15 am	Continental Breakfast/Meet the Professors (optional)	
9:15 – 9:30 am	Welcome & Conference Overview	Jonathan Finkelstein, MD, MPH
9:30 – 10:15 am	Keynote: Pediatric Health System Transformation and Innovation	Patrick H. Conway, MD, MSc
10:30 am – Noon	**Break Out Session 1:**	
	Interrupted Time Series Analysis	Robert Penfold, PhD
	Anatomy of a Quality Measure	Rita Mangione-Smith, MD, MPH
	The Fundamentals of Quality-Improvement: How to do QI – Part I	Matthew Niedner, MD
	Bridging Classical Statistics and QI Research	Terri Byczkowski, PhD, MBA Jon Finkelstein, MD, MPH
	Introduction to Statistical Process Control (SPC)	Maria Britto, MD, MPH
	Introduction to Qualitative Methods in QI Research	Clarissa Hsu, PhD
12:00 – 1:00 pm	Lunch and Poster Session	
1:10 – 2:40 pm	**Break Out Session 2:**	
	Interrupted Time Series Analysis	Robert Penfold, PhD
	Works in Progress–Session 1	Jon Finkelstein, MD, MPH Alex Kemper, MD, MPH, MS Lawrence Kleinman, MD, MPH, FAAP
	The Fundamentals of Quality-Improvement: How to Do QI – Part II	Matthew Niedner, MD
	Survey of QI Research Methods	Donald Goldmann, MD
	Advanced Statistical Process Control (SPC)	Maria Britto, MD, MPH Terri Byczkowski, PhD, MBA
	Introduction to Qualitative Methods in QI Research	Clarissa Hsu, PhD
2:50 – 4:20 pm	**Break Out Session 3:**	
	Anatomy of a Quality Measure	Rita Mangione-Smith, MD, MPH
	To IRB or not to IRB, That is the Question	Jonathan Finkelstein, MD, MPH
	Developing a Portfolio in Safety Research: Methods and Considerations	Michael Rinke, MD, PhD
	Funding Opportunities for Pediatric QI Research	David Chambers, PhD, NIH; Steve Clauser, PhD, MPA, PCORI; Kamila Mistry, PhD, AHRQ
	How to Obtain Risk Ratios and Risk Differences from Logistics Regression	Lawrence Kleinman, MD, MPH, FAAP Nathaniel Carroll, PhD
	Works in Progress–Session 2	Donald Goldmann, MD Alex Kemper, MD, MPH, MS Lori Rutman, MD, MPH
4:30 – 5:15 pm	**Best Abstracts**	