

The Power of Audit and Feedback – What Does the Science Tell Us?



Roger F. Soll MD

President, Vermont Oxford Network
H. Wallace Professor of Neonatology
University of Vermont
Burlington, VT

Dr. Soll is the H. Wallace Professor of Neonatology at the University of Vermont College of Medicine, the President of Vermont Oxford Network, and Director of Network Clinical Trials. Dr. Soll is an authority in evidence-based medicine and randomized clinical trials. He is the coordinating editor of the Cochrane Neonatal Review Group of the Cochrane Collaboration and author or co-author of the Cochrane Reviews of surfactant therapy.

He is the author of numerous peer reviewed articles and book chapters on the subject of surfactant replacement therapy and evidence-based medicine. A native of New York City, Dr. Soll graduated from Cornell University with a degree in Genetics and History of Science in 1975. He received his MD degree from the University of Health Sciences/Chicago Medical School in 1978.

He returned to New York City to complete his residency training in Pediatrics at Bellevue Hospital/New York University Medical Center in 1981. After 2 years with the Public Health Service, Dr. Soll returned to academic training. He completed the post graduate fellowship in Neonatal Perinatal Medicine at the University of Vermont in 1983 and has remained in Vermont ever since.



Stephanie Anne Grayson MD
Associate Medical Director
Attending Neonatologist
Children's Hospital of Philadelphia
Pomona, NJ

Stephanie Anne Grayson MD, is a Neonatologist and associate medical director of AtlantiCare Regional Medical Center's 26-bed Level III NICU. She is a graduate of Temple University School of Medicine in Philadelphia, Pennsylvania, and completed her pediatric residency, chief pediatric resident year and fellowship in Neonatal-Perinatal Medicine at West Virginia University Children's Hospital in Morgantown, West Virginia.

Annual Quality Congress Breakout Session, Sunday, September 11, 2016

The Power of Audit and Feedback - What Does the Science Tell Us?

Objective: Participate in a workshop highlighting the evidence for data-driven improvement with the systematic use of audit and feedback.

Harnessing the Power of Audit and Feedback – What Does the Science Tell Us?

Roger F. Soll MD

Harnessing the Power of Audit and Feedback – What Does the Science Tell Us?

Roger F. Soll MD

H. Wallace Professor of Neonatology,
University of Vermont College of Medicine
President, Vermont Oxford Network
Coordinating Editor, Cochrane Neonatal



Disclosure

Roger F. Soll is President of
Vermont Oxford Network and the
Coordinating Editor of the
Cochrane Neonatal Review Group
Supported by a contract from the NICHD



Objectives

This workshop will highlight the evidence for data-driven improvement with the systematic use of audit and feedback and give participants the opportunity to discuss and design their own quality audit.



Steps in performing an Audit



1. Identify problem
2. Define standards/criteria
3. Collect data
4. Analyze
5. Implement change
6. Re-AUDIT



What type of audit do I plan on conducting?

System Audit: the who, what, where, when and how of the quality system used to produce its product.

- "an inch deep but a mile wide"

Process Audit: evaluation of the manner in which people, material, machines, etc., mesh together to produce a product.

- "an inch wide but a mile deep."

Product Audit: detailed inspection of a finished product performed prior to delivering the product to the customer

Compliance Audit: Examines the written procedures, work instructions, contractual obligations, etc., and attempts to match them to the actions taken by the auditee to produce the product.

- "say what you do—do what you say"



Journal of General Internal Medicine

Growing Literature, Stagnant Science? Systematic Review, Meta-Regression and Cumulative Analysis of Audit and Feedback Interventions in Health Care

Noah M. Ivers, Jeremy M. Grimshaw, Gro Jamtvedt, Signe Flottorp,
Mary Ann O'Brien, Simon D. French, Jane Young, and Jan Odgaard-Jensen.

J Gen Intern Med (2014) 29: 1534. doi:10.1007/s11606-014-2913-y



Harnessing the Power of Audit and Feedback – What Does the Science Tell Us?

Roger F. Soll MD

Audit and Feedback

Audit and feedback is widely used as a strategy to improve professional practice, either on its own or as a key component of multifaceted quality improvement (QI) interventions.

Providing data regarding clinical performance may overcome health professionals' limited abilities to accurately self-assess their performance.

It is posited that when well-designed feedback demonstrates suboptimal performance for important and actionable targets, recipients are more likely to respond with efforts to improve quality of care.

Ivers et al. J Gen Intern Med (2014) 29: 1534.



Audit and Feedback

Audit and feedback (A&F) involves providing a recipient with a summary of their performance over a specified period of time and is a common strategy to promote the implementation of evidence-based practices.

Audit and feedback is used widely in healthcare by a range of stakeholders, including research funders and health system payers, delivery organizations, professional groups and researchers, to monitor and change health professionals' behavior, both to increase accountability and to improve quality of care.

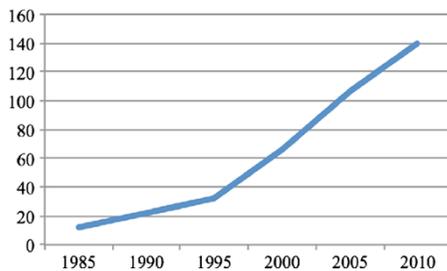
Audit and feedback is an improvement over self-assessment or self-monitoring as it can provide objective data regarding discrepancies between current practice and target performance, as well as comparisons of performance to other health professionals.

The recognition of suboptimal performance can act as a cue for action, encouraging those who are both motivated and capable to take action to reduce the discrepancy.

Ivers et al. J Gen Intern Med (2014) 29: 1534.



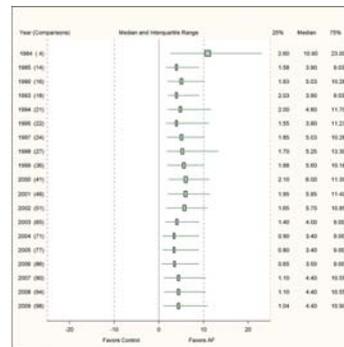
Cumulative number of randomized trials featuring audit and feedback as a core component of a quality improvement intervention.



Ivers et al. J Gen Intern Med (2014) 29: 1534.



Cumulative analysis—effect size of audit and feedback interventions over time



Ivers et al. J Gen Intern Med (2014) 29: 1534



Audit and Feedback

The effectiveness of Audit and Feedback (A&F) has been evaluated in the third update of a Cochrane review, which included 140 randomized trials of A&F conducted across many clinical conditions and settings around the world.

The review found that A&F leads to a median 4.3% absolute improvement (interquartile range 0.5% to 16%) in provider compliance with desired practice.

One-quarter of A&F interventions had a relatively large, positive effect on quality of care, while another quarter had a negative or null effect.

Ivers et al. J Gen Intern Med (2014) 29: 1534



Examples of Audits in Pediatric or Neonatal Medicine



Harnessing the Power of Audit and Feedback – What Does the Science Tell Us?

Roger F. Soll MD



Centers for Disease Control and Prevention
CDC 2675 Saving Lives. Protecting People™

Get Smart: Know When Antibiotics Work

Audit and feedback is a system of quality improvement that promotes individualized adherence to evidence-based practices. The most effective methods involving audit and feedback are programs that compare individual clinician prescribing rates to co-workers' or expected prescribing rates based on clinical practice guidelines. In combination with clinician education, audit and feedback has been shown to be an effective method to improve antibiotic prescribing for common infections among outpatients

<http://www.cdc.gov/getsmart/community/improving-prescribing/interventions/audit-feedback.html>



The Journal of the American Medical Association

Effect of an outpatient antimicrobial stewardship intervention on broad-spectrum antibiotic prescribing by primary care pediatricians: A randomized trial.

Gerber JS, Prasad PA, Fiks AG, Localio AR, Grundmeier RW, Bell LM, Wasserman RC, Keren R, Zaoutis TE.

JAMA. 2013;309(22): 2345-52.



Objective: Evaluate the effect of an antimicrobial stewardship intervention on antibiotic prescribing for pediatric outpatients.

Setting: 18 pediatric primary care practices in a healthcare network in Pennsylvania and New Jersey.

Intervention: Audit and feedback combined with clinician education. One-hour clinician education described study goals, current guidelines, and related practice-specific prescribing data followed by one year of personalized audit and feedback.

Impact:

- 12.5% reduction in broad-spectrum antibiotic prescribing.
- 11.5% improvement in pneumonia prescribing.
- 20.1% improvement in sinusitis prescribing.

No change in group A *Streptococcus* pharyngitis prescribing or for viral infections, which were both relatively appropriate at baseline. Gerber et al. JAMA. 2013;309(22): 2345-52.



Real time patient safety audits: improving safety every day.

Ursprung R, Gray JE, Edwards WH, Horbar JD, Nickerson J, Plsek P, Shiono PH, Suresh GK, Goldmann DA.

Qual Saf Health Care. 2005 Aug;14(4):284-9.



Real time patient safety audits: improving safety every day.

Background: Timely error detection including feedback to clinical staff is a prerequisite for focused improvement in patient safety. Real time auditing, the efficacy of which has been repeatedly demonstrated in industry, has not been used previously to evaluate patient safety. Methods successful at improving quality and safety in industry may provide avenues for improvement in patient safety.

Objective: Pilot study to determine the feasibility and utility of real time safety auditing during routine clinical work in an intensive care unit (ICU).

Methods: A 36 item patient safety checklist was developed via a modified Delphi technique. The checklist focused on errors associated with delays in care, equipment failure, diagnostic studies, information transfer and non-compliance with hospital policy. Safety audits were performed using the checklist during and after morning work rounds thrice weekly during the 5 week study period from January to March 2003.

Ursprung et al. Qual Saf Health Care. 2005 Aug;14(4):284-9.



Real time patient safety audits: improving safety every day.

Random process audits, an industrial methods that could potentially be applied directly by front line clinical staff in real time; methods that would permit monitoring of a broad range of errors without draining time and energy from the busy staff.

Intuitive and simple method used routinely in banking, the pharmaceutical industry, and high risk industries such as steel manufacturing, has many of these characteristics.

In contrast to system and product quality audits which are typically done for purposes of formal evaluation, process audits are mainly used to engage employees directly in continuous improvement efforts.

Rather than attempting to monitor all potential errors all the time, random process auditing systematically chooses a subset of error prone points to monitor at any given moment, thereby permitting meaningful coverage of complex systems over time.

Ursprung et al. Qual Saf Health Care. 2005 Aug;14(4):284-9.



Harnessing the Power of Audit and Feedback – What Does the Science Tell Us?

Roger F. Soll MD

Real time patient safety audits: improving safety every day.

Ground rules for process audits:

- results are not to be used to compare one area with another;
- audits should be part of the routine of work;
- they should be constructive, not destructive;
- they should use findings to drive improvement;
- they should never use findings in punitive ways; and
- findings should be openly shared and reviewed with all staff and management.

Ursprung et al. Qual Saf Health Care. 2005 Aug;14(4):284-9.



Real time patient safety audits: improving safety every day.

Results: A total of 338 errors were detected; 27 (75%) of the 36 items on the checklist detected >1 error.

Diverse error types were found including unlabeled medication at the bedside (n = 31), ID band missing or in an inappropriate location (n = 70), inappropriate pulse oximeter alarm setting (n = 22), and delay in communication/information transfer that led to a delay in appropriate care (n = 4).

Conclusions: Real time safety audits performed during routine work can detect a broad range of errors. Significant safety problems were detected promptly, leading to rapid changes in policy and practice.

Staff acceptance was facilitated by fostering a blame free "culture of patient safety" involving clinical personnel in detection of remediable gaps in performance, and limiting the burden of data collection.

Ursprung et al. Qual Saf Health Care. 2005 Aug;14(4):284-9.



Policy Changes and Educational Initiatives resulting from information obtained via Safety Audit

- Development of a pulse oximeter saturation guideline.
- Education of the clinical staff as to optimal oxygen saturation targets for various clinical conditions.
- Change in the patient identification system used in the NICU.
- Education of the nursing staff as to the hospital policy concerning identification bands.
- Nursing leadership participation in a follow up safety audit study: revision of safety audit questions, creation of new safety audit questions; staff emails concerning findings of the study.
- An intermediate care unit in the hospital learned of the audits and started their own unit based safety audit system

Ursprung et al. Qual Saf Health Care. 2005 Aug;14(4):284-9.



VON Days:
Audit your NICU in
just a few hours!



American Academy
of Pediatrics
DEDICATED TO THE HEALTH OF ALL CHILDREN™

Improving Care for Neonatal Abstinence Syndrome

Stephen W. Patrick, Robert E. Schumacher, Jeffrey D. Horbar, Madge E. Buus-Frank, Erika M. Edwards, Kate A. Morrow, Karla R. Ferrelli, Alan P. Picarillo, Munish Gupta, Roger F. Soll.

Pediatrics. May 2016, 37 (5) e20153835; DOI: 10.1542/peds.2015-3835



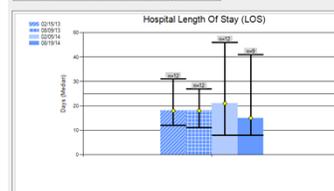
VON Days Quality Audits / NAS

Immediate "Feedback" to Individual Center

Summary 02/15/13 08/09/13 02/05/14 08/19/14

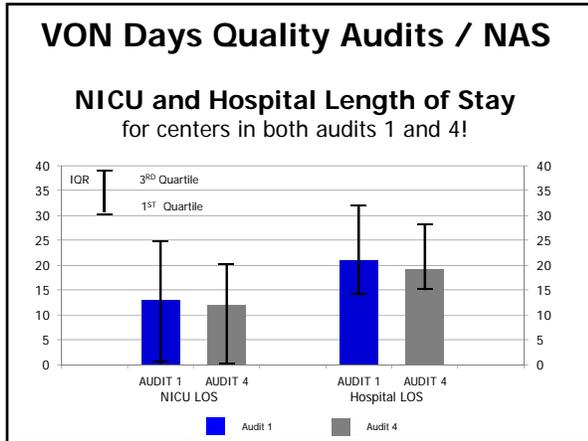
Serial Results

Audit Date	Audit Name	Infants Audited
02/15/13	Neonatal Abstinence Syndrome Quality Audit	12
08/09/13	Neonatal Abstinence Syndrome Quality Audit	12
02/05/14	Neonatal Abstinence Syndrome Quality Audit	12
08/19/14	Neonatal Abstinence Syndrome Quality Audit	9



Harnessing the Power of Audit and Feedback – What Does the Science Tell Us?

Roger F. Soll MD

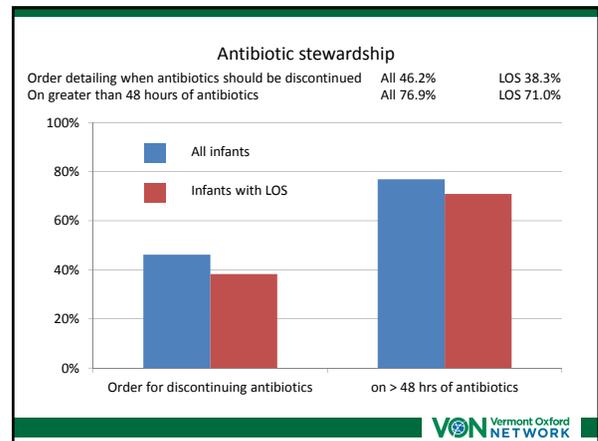
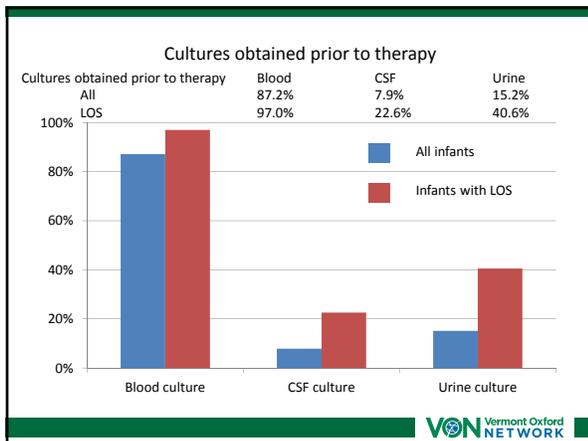
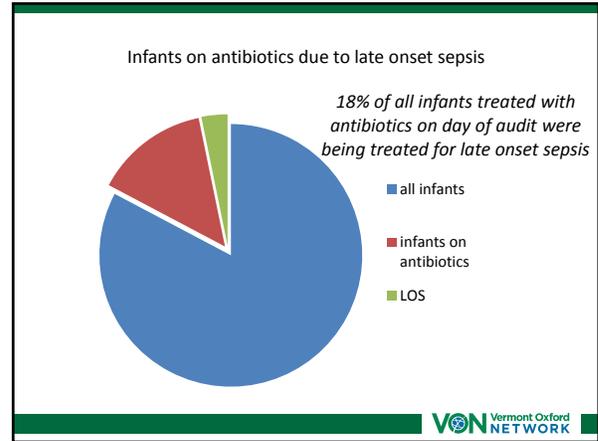
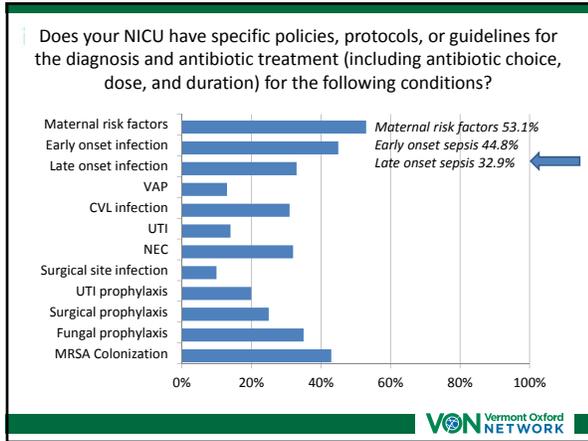


iNICQ 2016 Choosing Antibiotics Wisely

VON Day Quality Audit: Choosing Antibiotics Wisely

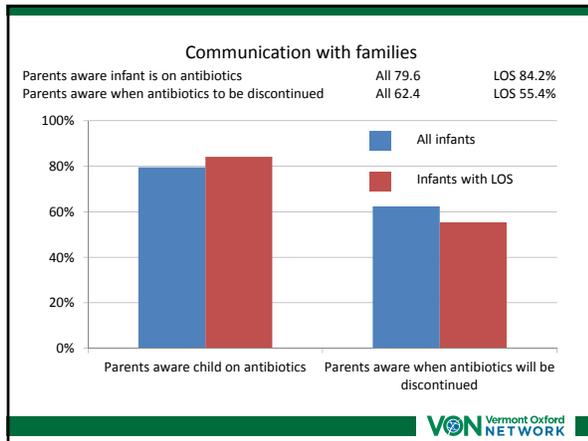
148 Centers (143 NICUs and 5 Mother/ Baby Units) reviewed 4164 patients and completed a detailed audit of antibiotic use in 726 infants!

Vermont Oxford NETWORK



Harnessing the Power of Audit and Feedback – What Does the Science Tell Us?

Roger F. Soll MD



Annals of Internal Medicine
ESTABLISHED IN 1977 BY THE AMERICAN COLLEGE OF PHYSICIANS

Practice Feedback Interventions: 15 Suggestions for Optimizing Effectiveness

Jamie C. Brehaut, PhD, Heather L Colquhoun, PhD, Kevin W Eva, PhD, Kelly Carroll, MA, Anne Sales, PhD, Susan Michie, PhD, Noah Ivers, MD, PhD, Jeremy M. Grimshaw, MD, PhD.

Ann Intern Med. 2016;164(6):435-441. doi:10.7326/M15-2248

VON Vermont Oxford NETWORK

Practice Feedback Interventions: 15 Suggestions for Optimizing Effectiveness

Nature of the Action Sought
Nature of the Data Available for Feedback
Display of the Feedback
Delivering the Feedback Intervention

VON Vermont Oxford NETWORK

Nature of the Action Sought

1. Recommend actions consistent with established goals and priorities. Feedback that supports actions consistent with established goals and priorities is more likely to be effective.
2. Recommend actions that can improve and are under the control of the recipient. Feedback should recommend actions that have room for improvement, and over which the recipient has control.
3. Recommend specific actions. Feedback that recommends specific rather than general actions is more likely to be effective.
4. Provide feedback multiple times.

VON Vermont Oxford NETWORK

Nature of the Data Available for Feedback

5. Provide feedback as soon as possible, at a frequency informed by the number of new patient cases.
6. Provide individual rather than general data. Evidence from psychology shows that feedback data that are specific to the individual recipient are usually more effective than data that summarize a group.
7. Choose comparators to reinforce desired behavior change. While feedback without an explicit comparison is feasible, practice feedback most often is given in the context of some kind of comparator or benchmark.

VON Vermont Oxford NETWORK

Display of the Feedback

8. Closely link the visual display and summary message. Feedback should include a verbal summary message and can often be effectively supported by visual or graphical elements.
9. Provide feedback using multiple modalities.
10. Minimize extraneous cognitive load for recipients of feedback. (Cognitive load generally refers to effort required of short-term, working memory to process information; simpler, more easily processed information is said to entail less cognitive load).

VON Vermont Oxford NETWORK

Harnessing the Power of Audit and Feedback – What Does the Science Tell Us?

Roger F. Soll MD

Delivering the Feedback Intervention

11. Address barriers to use of feedback. Practice feedback interventions are likely to fail if they do not reach the intended target.
12. Provide short, actionable messages followed by optional detail.
13. Address credibility of the information (In order to enable practice change, feedback needs to be perceived as credible).
14. Prevent defensive reactions to feedback. Providing feedback often involves pointing out performance limitations that may elicit a defensive reaction in the recipient.
15. Construct feedback through social interaction. Effective feedback requires the recipient to actively work with the material, constructing and facilitating their own learning based on the data provided, often through social interaction.



Potentially 'best practices' when designing Audit and Feedback Interventions

Audit components	Data are valid Data is based on recent performance Data are about the individual/team's own behavior(s) Audit cycles are repeated, with new data presented over time
Feedback components	Presentation is multi-modal including either text and talking or text and graphical materials Delivery comes from a trusted source Feedback includes comparison data with relevant others
Nature of the behavior change required	Targeted behavior is likely to be amenable to feedback Recipients are capable and responsible for improvement
Targets, goals, and action plan	The target performance is provided Goals set for the target behavior are aligned with personal and organizational priorities Goals for target behavior are specific, measurable, achievable, relevant, time-bound A clear action plan is provided when discrepancies are evident

Implementation Science 2014



What shall we audit?

Transfusion practice?

Delivery room teamwork?

Antibiotic utilization?

Let's choose and discuss!



What shall we audit?

Audit components

Feedback components

Nature of the behavior change required

Targets, goals, and action plan



Integrating Medical Checklist 'Rounding Tools' into Care Practices in a Neonatal Intensive Care Network

Stephanie Grayson MD / Jeanette Koran BSN / Dipesh Bhakta / Bobby George BE / Jean Marie Carroll RN MSN / John Chuo MD,MS

Integrating Medical Checklist 'Rounding Tools' into Care Practices in a Neonatal Intensive Care Network

CHILDREN'S HOSPITAL OF PHILADELPHIA NEWBORN CARE NETWORK, PHILADELPHIA, PA, USA
STEPHANIE GRAYSON MD, JEANETTE KORAN BSN, DIPESH BHAKTA, BOBBY GEORGE BE, JEAN MARIE CARROLL RN MSN, JOHN CHUO MD,MS

Disclosures

We have nothing to disclose.

Learning Objective

Participate in a workshop highlighting the evidence for data-driven improvement with the systematic use of audit and feedback.

Project Aim/Background

Audit Tool¹ – Medical Checklist

- Improves care
- Serves as a reminder to clinicians

Incorporated across a neonatal network

- Empowers local providers
- Encourages high level sharing and comparison of results
- Improves measurable outcomes

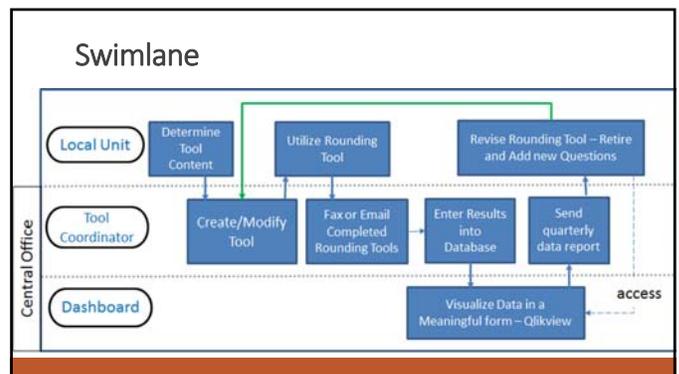
(1) Ursprung R, Gray JE, Edwards JD, Horbar JD, Nickerson J, Plsek P, Shiono PH, Suresh GK, Goldmann DA. Real time patient safety audits: improving safety everyday. Qual Saf Health Care 2005; 14:284.



3 Implementation Pillars for Effective QI

	Engage frontline	Communicate effectively	Manage Actionable Data
People	For each of the 3 Pillars, what is the SYSTEM that will execute?		
Process			
Tools			

Swimlane



Integrating Medical Checklist 'Rounding Tools' into Care Practices in a Neonatal Intensive Care Network

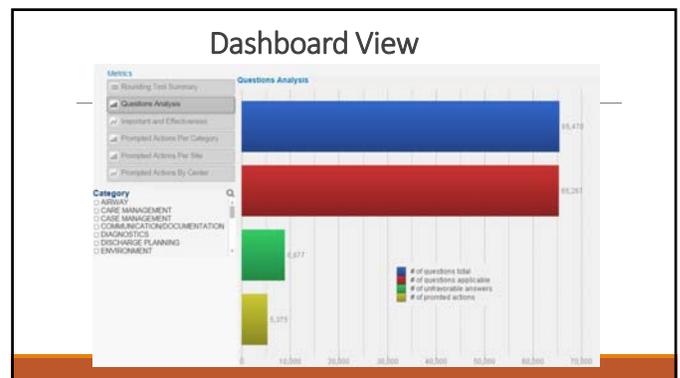
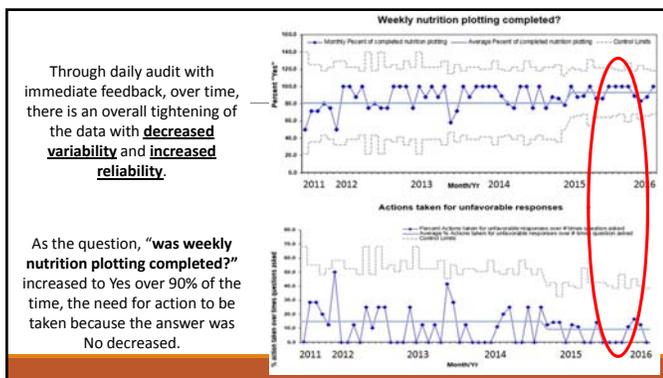
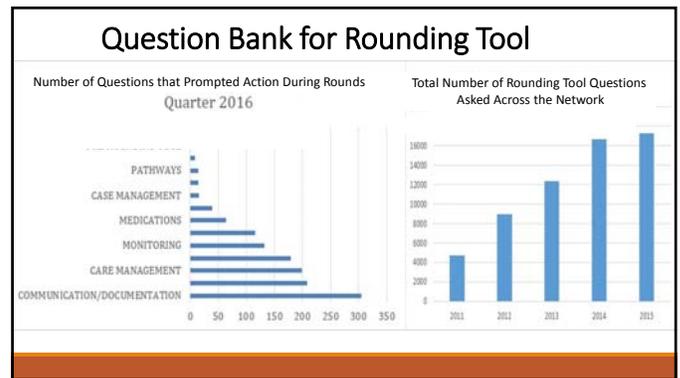
Stephanie Grayson MD / Jeanette Koran BSN / Dipesh Bhakta /
Bobby George BE / Jean Marie Carroll RN MSN / John Chuo MD,MS

SAMPLE QUESTION

Has the team reconciled this patient's medication list today?

Yes No Action taken?

Category	Question	Adverse hit rate factor (questions with answers that was unfavorable to patient)	Reaction % factor (questions that led team to commit an action)	Yes	No	Prompt Action (No)
MEDICATIONS	Has the team reconciled this patient's medication list today?	9.6%	75%	41	4	3



Many Thanks to Leaders and Champion Stakeholders at Network Centers

- ❖ Phyllis Dennery
- ❖ Jeffrey Gerdes
- ❖ Jacquelyn R Evans
- ❖ Carrie Hufnal
- ❖ Elizabeth Y Fong-Deleon
- ❖ Jennifer Tioseco
- ❖ Amy Zucker
- ❖ Cynthia Kellogg
- ❖ Gita Jani
- ❖ Anna Sosnovsky
- ❖ Michael Posencheg
- ❖ Jennifer Cohen