



# **AHRQ Quality Indicators 101: Background and Introduction to the AHRQ QIs**

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*John Bott, Contractor, Agency for Healthcare Research and Quality*

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# AHRQ – Agency within DHHS

United States Department of  
**Health & Human Services**





# AHRQ mission

To improve the  
quality, safety,  
efficiency &  
effectiveness of  
health care for  
all Americans





# Overview

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1. Origins
2. Current modules
3. Advantages & challenges
4. Recent improvements
5. Uses of the AHRQ QIs
6. Tools: public reporting & quality improvement
7. National Quality Forum Endorsement
8. Additional activities
9. Questions



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# AHRQ QIs & the Healthcare Cost & Utilization Project (HCUP)

The AHRQ QIs utilize HCUP in measure development & maintenance

So what is HCUP?

- HCUP: Partnership among States, industry & AHRQ
- Uniform database for cross-State studies; includes clinical, demographic, and resource use information
- Represents all inpatient discharge data from 44 participating States — represents approximately 95% of all discharges

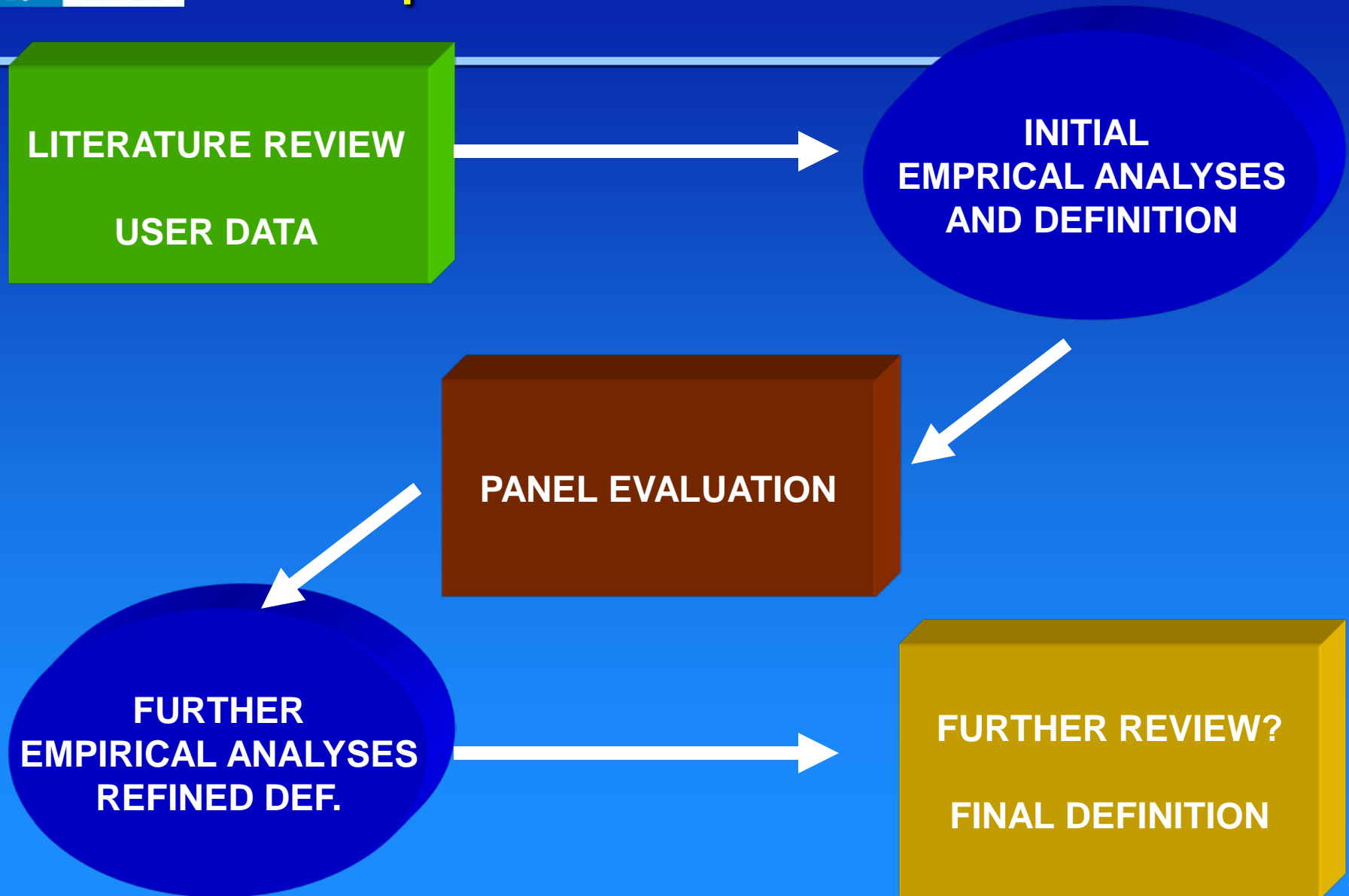


# AHRQ Quality Indicators (QIs)

- Developed through contract with UCSF-Stanford Evidence-based Practice Center & UC Davis
- Use existing hospital discharge data, based on readily available data elements
- Incorporate a range of severity adjustment methods, including APR-DRGs\* & co-morbidity groupings
- Current modules: Prevention, Inpatient, Patient Safety, Pediatric & Neonatal

\* 3M All Patient Refined - Diagnosis Related Groups

# Example of indicator evaluation







# Structure of AHRQ QIs

- Measure definitions based on a number of data elements, e.g.:
  - ICD-9-CM\* diagnosis & procedure codes
  - Medicare Diagnostic Related Groups (DRGs), Major Diagnostic Categories (MDC), sex, age, procedure dates, admission type, admission source, discharge disposition, discharge quarter, point of origin, present on admission
- Numerator: Number of cases with the outcome of interest (e.g., postoperative sepsis, avoidable asthma hospitalization asthma, death)
- Denominator: Population at risk (e.g., pneumonia patients, elective surgical patients, county population from census data)
- Observed rate: The numerator / denominator
- Volume counts for selected procedures
- Counts of admissions at an area level for certain types of admissions

\* International Classification of Diseases, Ninth Revision, Clinical Modification



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# AHRQ Quality Indicators

## Inpatient QIs

*Mortality,  
Utilization,  
Volume*

## Prevention QIs

*(Area Level)  
Avoidable  
Hospitalizations /  
Other Avoidable  
Conditions*

## Pediatric QIs

**Neonatal  
QIs**

## Patient Safety QIs

*Complications,  
Unexpected Death*



# Inpatient Quality Indicators (IQIs)

## ■ Volume Indicators

- Esophageal resection
- Pancreatic resection
- Abdominal Aortic Aneurysm (AAA) repair
- Coronary Artery Bypass Graft (CABG)
- Percutaneous transluminal coronary angioplasty (PTCA)
- Carotid endarterectomy

## ■ Utilization Indicators

- Cesarean delivery rate
- Primary cesarean delivery rate
- VBAC rate
- VBAC rate, uncomplicated
- Laparoscopic cholecystectomy rate
- Incidental appendectomy in the elderly rate
- Bilateral cardiac catheterization rate
- CABG (area level rate)
- PTCA (area level rate)
- Hysterectomy (area level rate)
- Laminectomy or spinal fusion (area level rate)



# Inpatient Quality Indicators (cont.)

## ■ Mortality Indicators for Inpatient Conditions

- Acute myocardial infarction (AMI)
- AMI, without transfer cases
- Congestive heart failure
- Gastrointestinal hemorrhage
- Hip fracture
- Pneumonia
- Acute stroke

## ■ Mortality Indicators for Inpatient Procedures

- AAA repair
- CABG
- Craniotomy
- Esophageal resection
- Hip replacement
- Pancreatic resection
- Carotid endarterectomy
- PTCA



# Patient Safety Indicators (PSIs)

- Death in low mortality DRGs
- Pressure ulcer
- Death among surgical inpatients with treatable serious complications
- Foreign body left during procedure \*
- Iatrogenic pneumothorax \*
- Central venous catheter-related bloodstream infection \*
- Postoperative hemorrhage or hematoma \*
- Postoperative hip fracture
- Postoperative physiological and metabolic derangement
- Postoperative PE or DVT

*\* Indicator also provided as an area-level indicator*



# Patient Safety Indicators (cont.)

- Postoperative respiratory failure
- Postoperative sepsis
- Postoperative wound dehiscence \*
- Transfusion reaction \*
- Accidental puncture or laceration \*
- Birth trauma – injury to neonate
- OB trauma – vaginal delivery with instrument (3<sup>rd</sup> or 4<sup>th</sup> degree laceration)
- OB trauma – vaginal delivery without instrument (3<sup>rd</sup> or 4<sup>th</sup> degree laceration)

*\* The indicators are also provided as area-level indicators*



# Pediatric Quality Indicators (PDIs)

## ■ Inpatient Indicators

- Accidental puncture or laceration
- Pressure ulcer
- Foreign body left in after procedure
- Iatrogenic pneumothorax
- Pediatric heart surgery mortality
- Pediatric heart surgery volume
- Postoperative hemorrhage or hematoma
- Postoperative respiratory failure
- Postoperative sepsis
- Postoperative wound dehiscence
- Transfusion reaction
- Central venous catheter-related bloodstream infection





# Pediatric Quality Indicators (Cont.)

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## ■ Area-Level Indicators

- Asthma admission rate
- Diabetes short-term complication admission rate
- Gastroenteritis admission rate
- Perforated appendix admission rate
- Urinary tract infection admission rate



# Neonatal Quality Indicators (NQIs)

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- Inpatient Indicators
  - Iatrogenic pneumothorax in neonates
  - Neonatal mortality
  - Central line bloodstream infection in neonates



# Prevention Quality Indicators (PQIs)

- Bacterial pneumonia
- Dehydration
- Urinary tract infection
- Perforated appendix
- Low birth weight
- Angina without procedure
- Congestive heart failure
- Hypertension
- Adult asthma
- COPD
- Diabetes complications - short term
- Diabetes complications - long term
- Uncontrolled diabetes
- Lower extremity amputation among patients with diabetes



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# Advantages

## ■ Public Access

- All development documentation & details on each indicator available on Web site
- Software available to download at no cost
  - Documentation & software at: [www.qualityindicators.ahrq.gov](http://www.qualityindicators.ahrq.gov)
- Standardized indicator definitions
- Can be used with any administrative data, e.g. HCUP, MEDPAR\*, State data sets, payer data, hospital internal data
- Hospitals can replicate results

\* Medicare Provider Analysis & Review (Medicare administrative inpatient data)



# Advantages (cont.)

## ■ Scope

- Over 90 individual measures
- Each measure can be stratified by other variables including patient race, age, sex, provider, geographic region
- Include priority populations & areas, e.g.:
  - Child health, women's health (pregnancy & child-birth), diabetes, hypertension, ischemic heart disease, stroke, asthma, patient safety, preventive care
- Focus on acute care, but crosses over to community & outpatient care delivery settings



# Advantages (cont.)

- Harmonization of measures
- Indicator maintenance and updates
- Tools & technical assistance
- National benchmarks:
  - National Healthcare Quality Report
  - National Healthcare Disparities Report
  - HCUPnet



# Current limitations & challenges

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- Outcomes data less actionable than processes
- Limited clinical detail
- Risk adjustment challenges
- Accuracy hinges on accuracy of documentation & coding
- Data potentially subject to gaming
- Time lag of the data





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# Recent improvements

- Composite measures
  - Developed composite measures for the IQIs, PSIs, PQIs & PDIs
- Risk adjustment based on administrative data
  - Additional risk adjustment methods for AHRQ QIs
- Updated literature reviews
  - Completed IQIs, PDIs & PSIs
- Reporting template
  - Tested & refined
- National Quality Forum review & endorsement of a number of the QIs
- Use of present on admission & point of origin data



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# General uses of the AHRQ QIs

- Hospital quality improvement efforts
  - Individual hospitals & health care systems, such as:
    - Banner Health (a multi-hospital system in AZ)
    - Norton Healthcare (a multi-hospital system in KY)
    - Baycare Health System (a multi-hospital system in FL)
    - Ministry Health Care (a multi-hospital system in WI)
  - Hospital association member based reports, such as:
    - University Healthsystem Consortium
    - Dallas - Fort Worth Hospital Council
    - Premier (note: Premier participating in CMS pay for performance demonstration, which includes AHRQ QIs)



# General uses of the AHRQ QIs

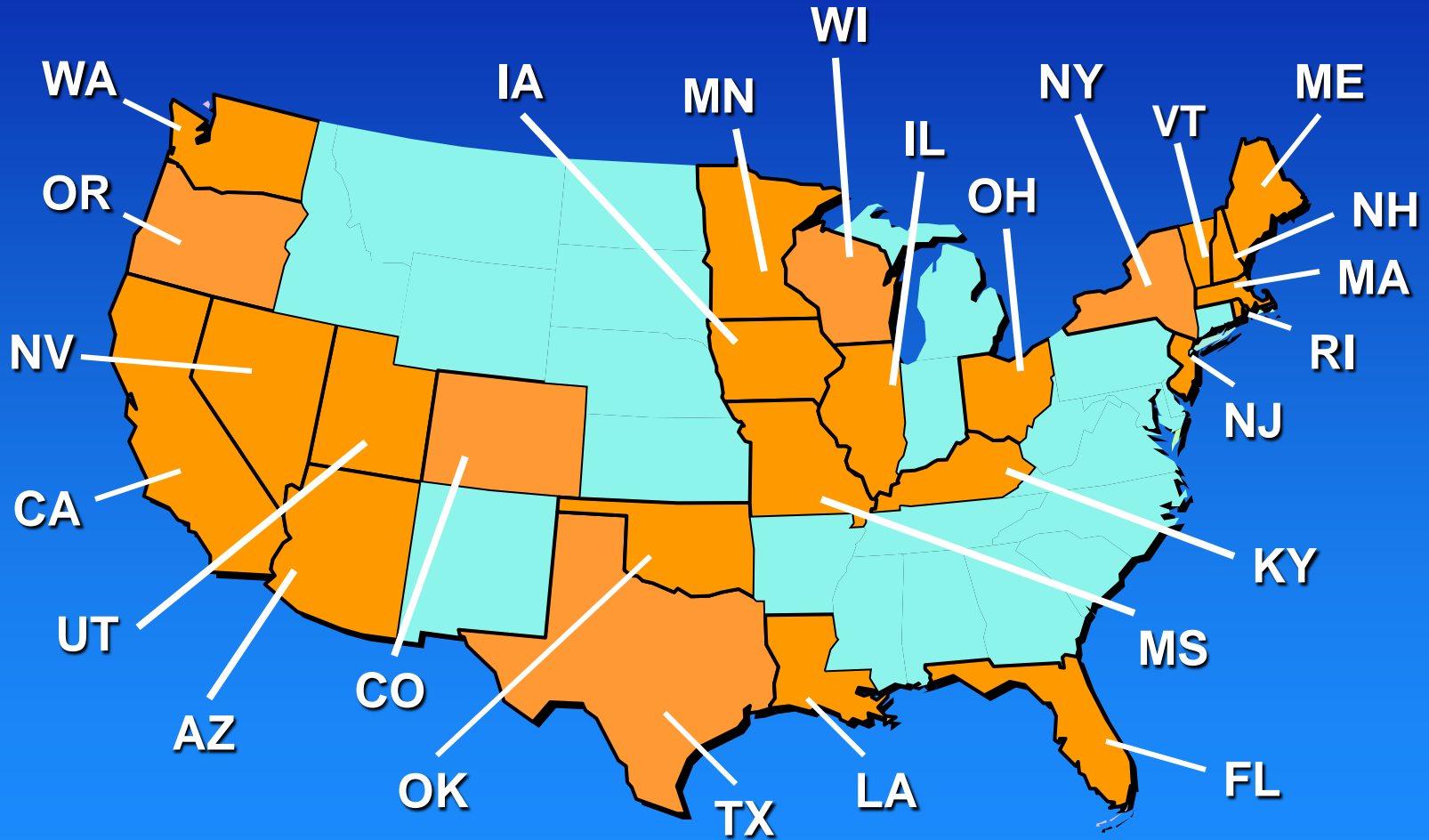
- Aggregate reporting: National, state, regional
  - National Healthcare Quality / Disparities Reports
  - Commonwealth Fund's Health Performance Initiative
  
- Research
  - Tracking quality of care for populations over time & across areas
  - Tracking disparities in care over time and across areas
  - Comparing quality between different types of hospitals or hospital systems (e.g., size, volume, teaching status, ownership, accreditation, critical access status)
  - Evaluating impact of interventions to reduce costs or improve quality (e.g., resident work hours reform, electronic health information systems, hospital mergers & consolidations)



# General uses of the AHRQ QIs

- Value based purchasing / pay for performance (P4P)
  - CMS - Premier Demo
  - Anthem of Virginia
  - The Alliance (Wisconsin)
  
- Hospital level public reporting
  - Currently: Statewide public reporting (*upcoming slide*)
  - Upcoming: CMS Hospital Compare, including Veterans Affairs medical centers (*upcoming slide*)
  
- Hospital profiling: Public reporting & P4P
  - Blue Cross / Blue Shield of Illinois

# Two-thirds of the US has access to a public report in their state that use the AHRQ QIs



AHRQ QIs appear in public reports in 25 states



# Centers for Medicare & Medicaid Services (CMS) Hospital Compare

Hospital Compare is a public report of 4,500+ hospitals produced by CMS

AHRQ QIs (below) to be added per a recent Inpatient Prospective Payment System (IPPS) rule

## ■ Individual measures

- Death among surgical inpatients with serious treatable complications
- Iatrogenic pneumothorax
- Postoperative wound dehiscence
- Accidental puncture or laceration
- AAA repair mortality
- Hip fracture mortality

## ■ Composites

- Patient safety for selected indicators
- Mortality for selected conditions

*(See next slide for measures within each composite)*





# CMS Hospital Compare (cont.)

- Composite: Patient safety for selected indicators
  - Pressure ulcers
  - Iatrogenic pneumothorax
  - Central venous catheter-related bloodstream infections
  - Postoperative hip fracture
  - Postoperative pulmonary embolism or DVT
  - Postoperative sepsis
  - Postoperative wound dehiscence
  - Accidental puncture or laceration
  
- Composite: Mortality for selected conditions
  - AMI mortality
  - CHF mortality
  - Acute stroke mortality
  - GI hemorrhage mortality
  - Hip fracture mortality
  - Pneumonia mortality



# CMS Hospital Compare (cont.)

- Additional AHRQ QIs to be added per the FY11 IPPS rule:
  - Postoperative respiratory failure
  - Postoperative pulmonary embolism or DVT
  
- The above 2 PSI measures are scheduled to be added to Hospital Compare in FY12



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# AHRQ tools for public reporting the AHRQ QIs: Recent & current

- Reporting templates (or model reports)
  - Tool for reporting sponsors to use the best evidence on public reports
- Reporting guidance
  - Report on the appropriate uses of the AHRQ QIs based on the evidence to date
- Quality Indicators Learning Institute
  - Web conference series to disseminate technical information of various aspects of public reporting



# AHRQ tools for public reporting the AHRQ QIs (cont.)

## ■ MONAHRQ software

- Software to input hospital administrative claims data & produce a website to publicly report performance in the AHRQ QIs at the hospital & community level

- MONAHRQ Web site at: [www.monahrq.ahrq.gov](http://www.monahrq.ahrq.gov)

## ■ MONAHRQ Learning Network

- Provide information & technical assistance to users & potential users of MONAHRQ



# AHRQ tools for quality improvement using the AHRQ QIs: Upcoming

- Quality improvement toolkit under development for hospital use to make improvement related to the AHRQ IQIs & PSIs
- Some specifics of the toolkit:
  - Methods to evaluate the data for identifying opportunities for improvement
  - Strategies for implementing interventions (or evidence-based best practices)
  - Methods to measure progress
- Available late - 2011



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# National Quality Forum Endorsement: Overview

Currently, NQF endorsement in regard to:

## ■ 47 of the AHRQ QIs

- Inpatient Quality Indicators (IQIs): 12
- Patient Safety Indicators (PSIs): 10
- Prevention Quality Indicators (PQIs): 14
- Pediatric Quality Indicators (PDIs): 10
- Neonatal Quality Indicators (NQIs): 1

## ■ 3 AHRQ QI composites

- Mortality for selected conditions
- Patient safety for selected indicators
- Pediatric patient safety for selected indicators





# National Quality Forum Endorsement: IQIs

<b>IQI</b>	<b>Label</b>	<b>IQI</b>	<b>Label</b>
IQI 1	Esophageal Resection Volume	IQI 16	CHF Mortality
IQI 2	Pancreatic Resection Volume	IQI 17	Acute Stroke Mortality
IQI 4	Abdominal Aortic Aneurysm (AAA) Repair Volume	IQI 19	Hip Fracture Mortality
IQI 8	Esophageal Resection Mortality	IQI 20	Pneumonia Mortality
IQI 9	Pancreatic Resection Mortality	IQI 24	Incidental Appendectomy in the Elderly
IQI 11	AAA Repair Mortality	IQI 25	Bilateral Catheterization



# National Quality Forum Endorsement: PSIs

PSI	Label	PSI	Label
PSI 2	Death in Low Mortality DRGs	PSI 12	Postoperative PE or DVT
PSI 4	Death Among Surgical Inpatients With Treatable Serious Complications	PSI 14	Postoperative Wound Dehiscence
PSI 5	Foreign Body Left in During Procedure	PSI 15	Accidental Puncture or Laceration
PSI 6	Iatrogenic Pneumothorax	PSI 16	Transfusion Reaction
PSI 11	Postoperative Respiratory Failure	PSI 17	Birth Trauma – Injury to Neonate



# National Quality Forum Endorsement: PDIs & NQIs

Indicator	Label	Indicator	Label
PDI 1	Accidental Puncture or Laceration	PDI 7	Pediatric Heart Surgery Volume
PDI 2	Decubitus Ulcer	PDI 11	Postoperative Wound Dehiscence
PDI 3	Foreign Body	PDI 13	Transfusion Reaction
PDI 5	Iatrogenic Pneumothorax	PDI 14	Asthma Admission Rate (area rate)
PDI 6	Pediatric Heart Surgery Mortality	PDI 16	Gastroenteritis Admission Rate (area rate)
NQI 3	Blood Stream Infection in Neonates		



# National Quality Forum Endorsement: PQIs

PQI	Label	PQI	Label
PQI 1	Diabetes, Short-Term Complications	PQI 10	Dehydration
PQI 2	Perforated Appendicitis	PQI 11	Bacterial Pneumonia
PQI 3	Diabetes, Long-Term Complications	PQI 12	Urinary Tract Infections
PQI 5	Chronic Obstructive Pulmonary Disease	PQI 13	Angina without Procedure
PQI 7	Hypertension	PQI 14	Uncontrolled Diabetes
PQI 8	Congestive Heart Failure	PQI 15	Adult Asthma
PQI 9	Low birth weight	PQI 16	Lower Extremity Amputations among Patients with Diabetes



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# Highlights of additional activities

- AHRQ funded HCUP Partner projects to add more clinical data to statewide administrative databases (e.g. present on admission, lab values)
- AHRQ proposed coding changes & clarifications to ICD-9 to enhance accuracy & use of some indicators
  - Retinopathy of prematurity
  - Necrotizing enterocolitis
  - Disruption of postoperative wound
  - Deep vein thrombosis
  - Transfusion reaction
- Working with other measure developers to align specifications of similar measures
  - The Joint Commission
  - Centers for Medicare & Medicaid Services
  - National Perinatal Information Center
  - Researchers

# Organisation for Economic Cooperation and Development (OECD)

- The OECD Health Care Quality Indicators Project includes a patient safety component
- The project conducted a pilot with seven countries to translate a number of PSIs to the WHO's version of ICD 10
- A paper on the pilot was recently published in the International Journal of Quality Health Care
  - volume 21, number 4, pages 272 – 278
- The pilot has recently expanded
  - Currently 18 countries are participating



# Validation pilot

## ■ Pilot Objectives:

- Gather evidence on the scientific acceptability of the PSIs
  - Medical record reviews, data analysis, clinical panels, evidence reviews
- Consolidate the evidence base
- Improve guidance on the interpretation and use of the data
- Evaluate potential refinements to the specifications



# Validation pilot, phases 1 to 4

- Phase 1 (Concluded)
  - Focus on estimating false positive rate for 5 PSIs (# 6, 7, 12, 13, 15)
  - 6 articles published or soon to be published
- Phase 2 & 3 (Currently in data analysis)
  - Focus on estimating false positive rate for 2 other PSIs (# 9, 10)
  - Will also estimate false negative rate (sensitivity) for these 2 PSIs and up to 6 more PSIs (# 5, 6, 7, 11, 14, 15)
- Phase 4 (Ongoing)
  - Collaboration with University HealthSystem Consortium on 3 PSIs (# 3, 11, 12)
    - 2 articles published (PSI 11, 12) and 1 in preparation (PSI 3)
  - Collaboration with Veterans Health Administration on 10 PSIs (# 3, 5, 6, 8, 9, 11-15)
    - 3 articles published or soon to be published (PSI 6, 11-13, 15)
  - Collaboration with National Perinatal Information Center on PSI 17

# Current Measurement Work

## Measure & Beta Measurement pipeline

- Readmission measures
  - Health care associated infections
  - Emergency Preparedness measures
  - Care coordination measure development
  - Emergency dept. PSI measure development
  - Emergency dept. PQI measure development
- Medicaid Home & Community Based Services population measures

## Exploration of Measure Enhancement pipeline

- Integration of lab values
- Further integration of present on admission



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# For more information...

- Web site: <http://qualityindicators.ahrq.gov>
  - QI documentation and software are available
  - Sign up for AHRQ QI listserv
  
- Support E-mail: [support@qualityindicators.ahrq.gov](mailto:support@qualityindicators.ahrq.gov)
  
- Support Phone: (888) 512-6090 (voicemail)
  
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