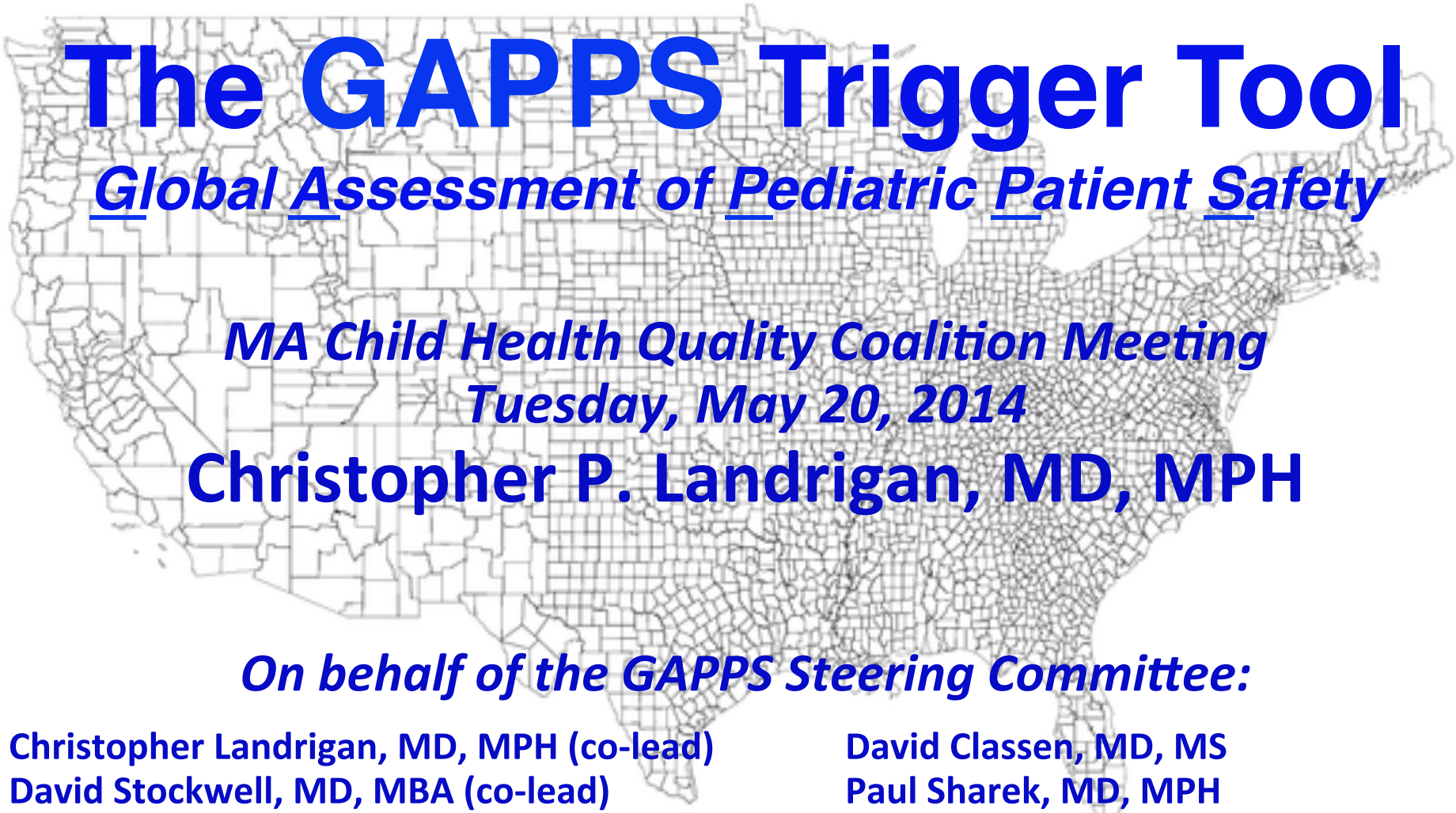


The GAPPS Trigger Tool

Global Assessment of Pediatric Patient Safety

MA Child Health Quality Coalition Meeting
Tuesday, May 20, 2014

Christopher P. Landrigan, MD, MPH

On behalf of the GAPPS Steering Committee:

Christopher Landrigan, MD, MPH (co-lead)
David Stockwell, MD, MBA (co-lead)
David Classen, MD, MS
Paul Sharek, MD, MPH
Raj Srivastava, MD, MPH
Mark Schuster, MD, PhD (CEPQM PI)

Boston Children's Hospital
HARVARD MEDICAL SCHOOL TEACHING HOSPITAL

Patient Safety

- "*To Err is Human*", IOM, 1999
  - 44,000 to 98,000 annual deaths from adverse events
  - 6th to 9th leading cause of death nationwide
  - Over 15 million injuries per year
- Large investment of federal and private funds
- Initiatives by Joint Commission, multiple private and federal organizations to improve safety

Is Healthcare Getting Safer?

Charles Vincent et al. BMJ November 2008

ANALYSIS

Is health care getting safer?

Despite numerous initiatives to improve patient safety, we have little idea whether they have worked. **Charles Vi**

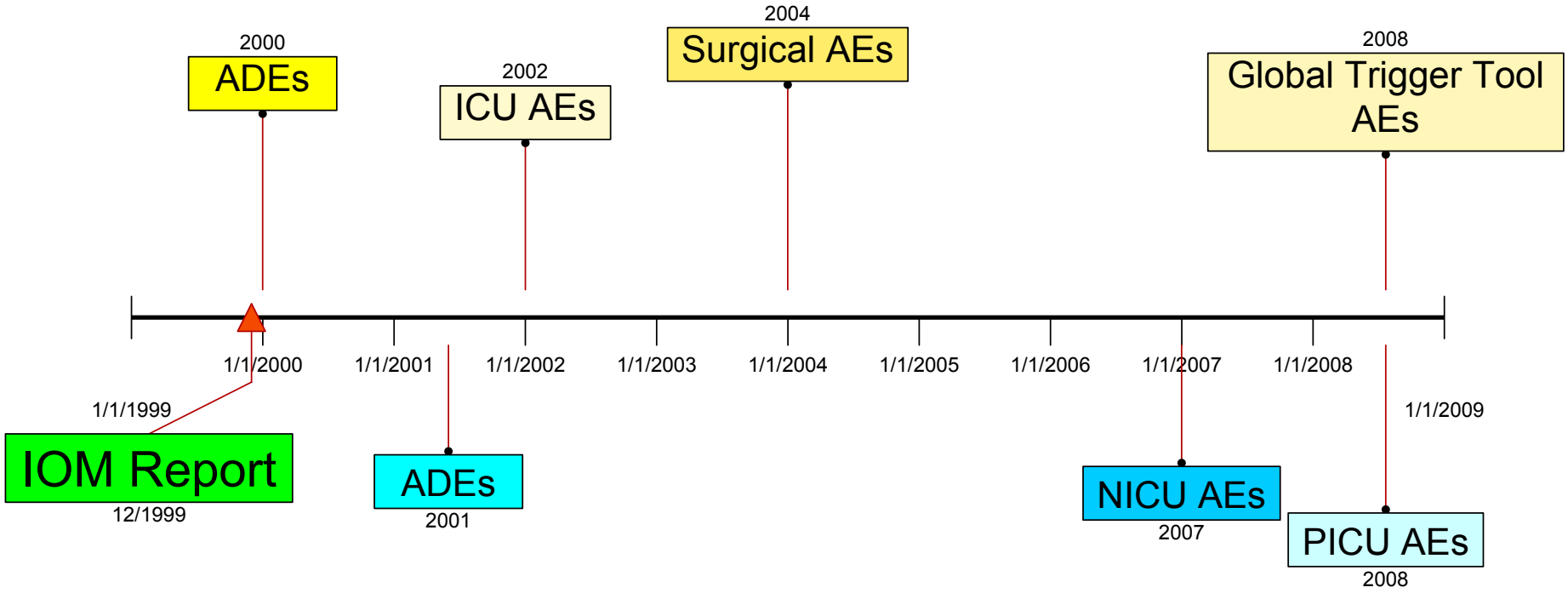
Patient safety has been high
and international agenda ir
almost a decade. In the U
reviews of case records have
10% of patients experience
while in hospital,[1 2] a figure
lar studies around the worl
efforts have been made to im
it is natural to ask whether t
been well directed. Are patier
answer to this simple questio
sive. Although some aspects
ficult to measure for technical
preventability for instance), t
is that measurement and eva
been high on the agenda. W
lack of reliable information o
ity of care is hindering impro
across the world.

The principal approach to

Considerable efforts have been made to improve patient safety and it is natural to ask…are patients any safer? The answer to this simple question is curiously elusive…we believe that the lack of reliable information on safety and quality of care is hindering improvement in safety across the world.

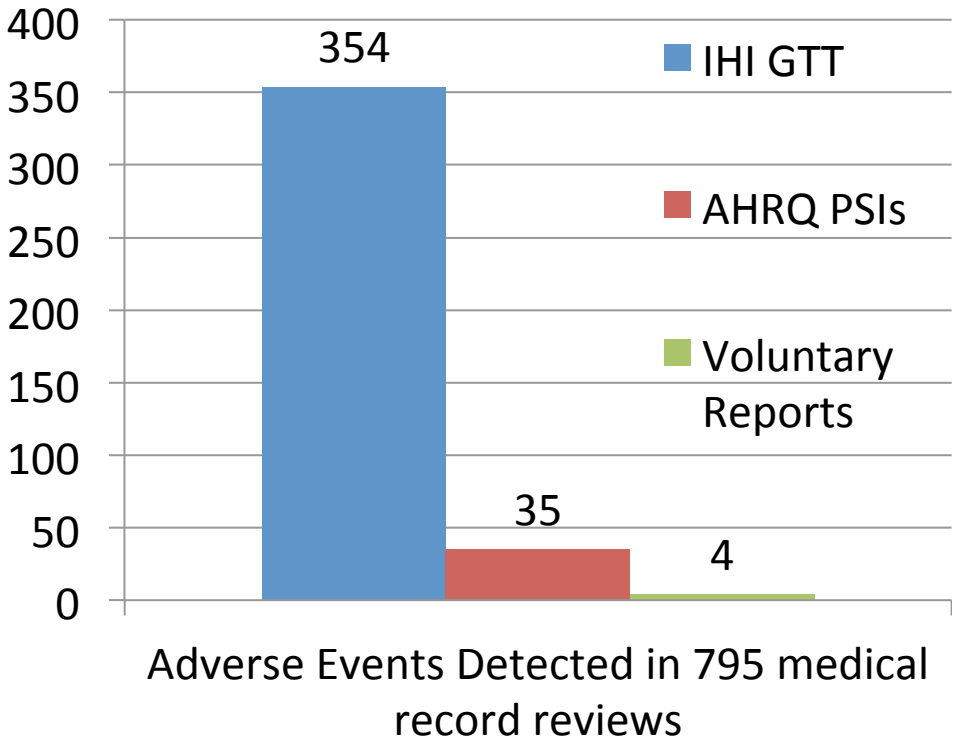
The Knowledge Gap

- Multiple snapshots in time…
- Multiple populations…
- Inconsistent methodologies



Approaches to Measuring AEs

- **Voluntary self reporting**
- **Billing data analysis (e.g. AHRQ PSIs)**
- **Unstructured chart review**
- **Trigger Tools**



Classen et al., Health Affairs 2011; 30: 581-9

Trigger Tool Method

1. Review Random Sample of Medical Records

- Nurse reviews medical record looking for triggers
  - e.g., use of Narcan, transfer to the ICU, positive blood culture after 48 hours)
- Flag Specific Events as suspected AEs
  - e.g., apparent morphine overdose
- Brief description recorded, along with circumstances of event

2. Events Reviewed and Classified by Physician Reviewers

- Make determination about whether AE occurred
- Rate severity
- Rate preventability

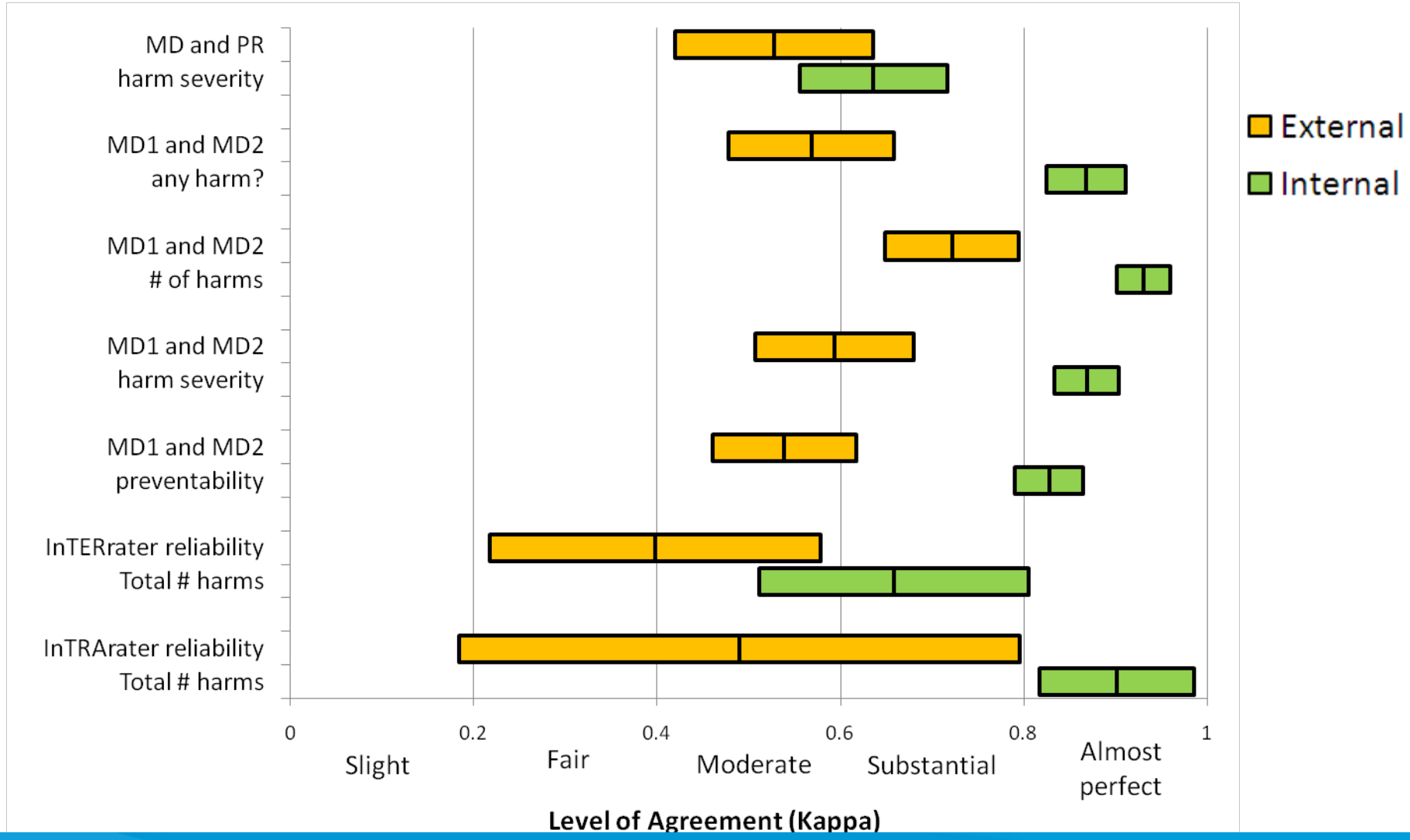
The North Carolina Patient Safety Study

Sharek PJ, Parry G, Goldmann D, Bones K, Hackbarth A, Resar R, Griffin FA, Rhoda D, Murphy C, Landrigan CP. *Health Serv Res* 2010

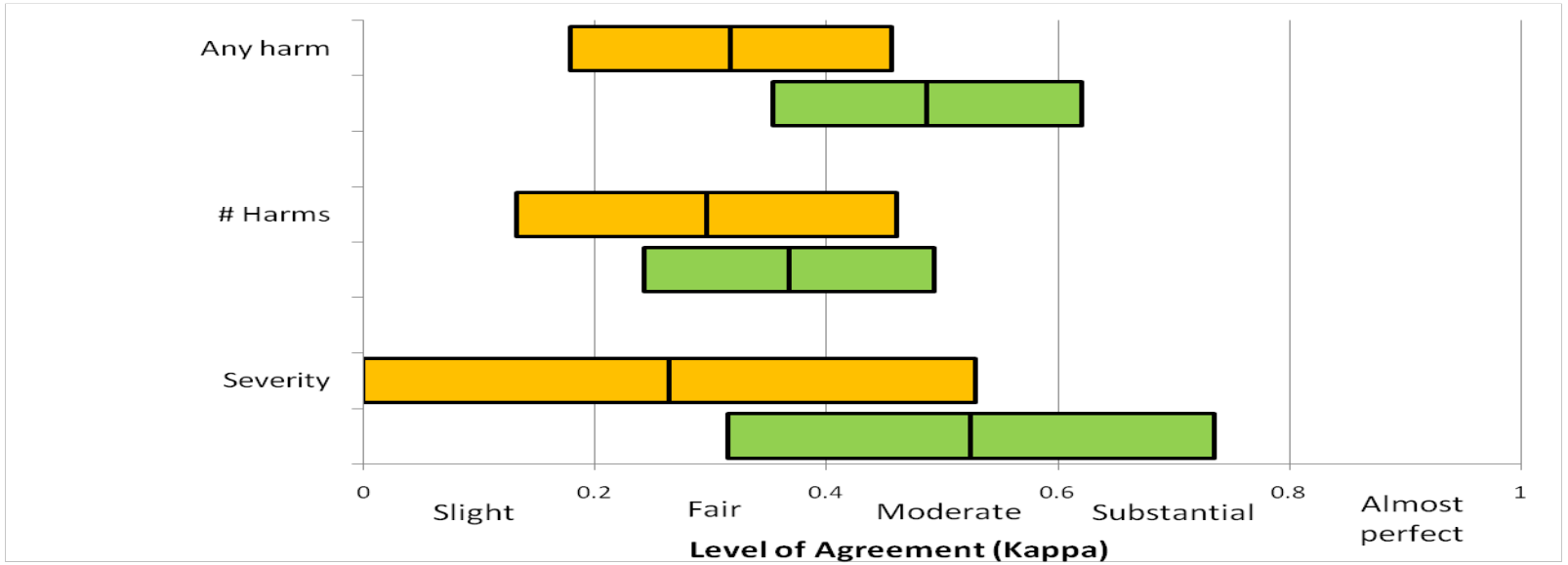
Landrigan CP, Parry G, Bones CB, Hackbarth AD, Goldmann DA, Sharek PJ. *New Engl J Med* 2010

- Longitudinal study of random sample of adult patients in 10 North Carolina adult hospitals
- ***Specific Aims***
  - To Assess inter-rater reliability, intra-rater reliability, sensitivity, specificity of IHI Global trigger tool
  - To Determine if there is a change in rates of harm due to medical care over time in North Carolina (2002-2007)

Results- *Within Team* Comparisons



Agreement between External/Internal and Experienced Reviewers



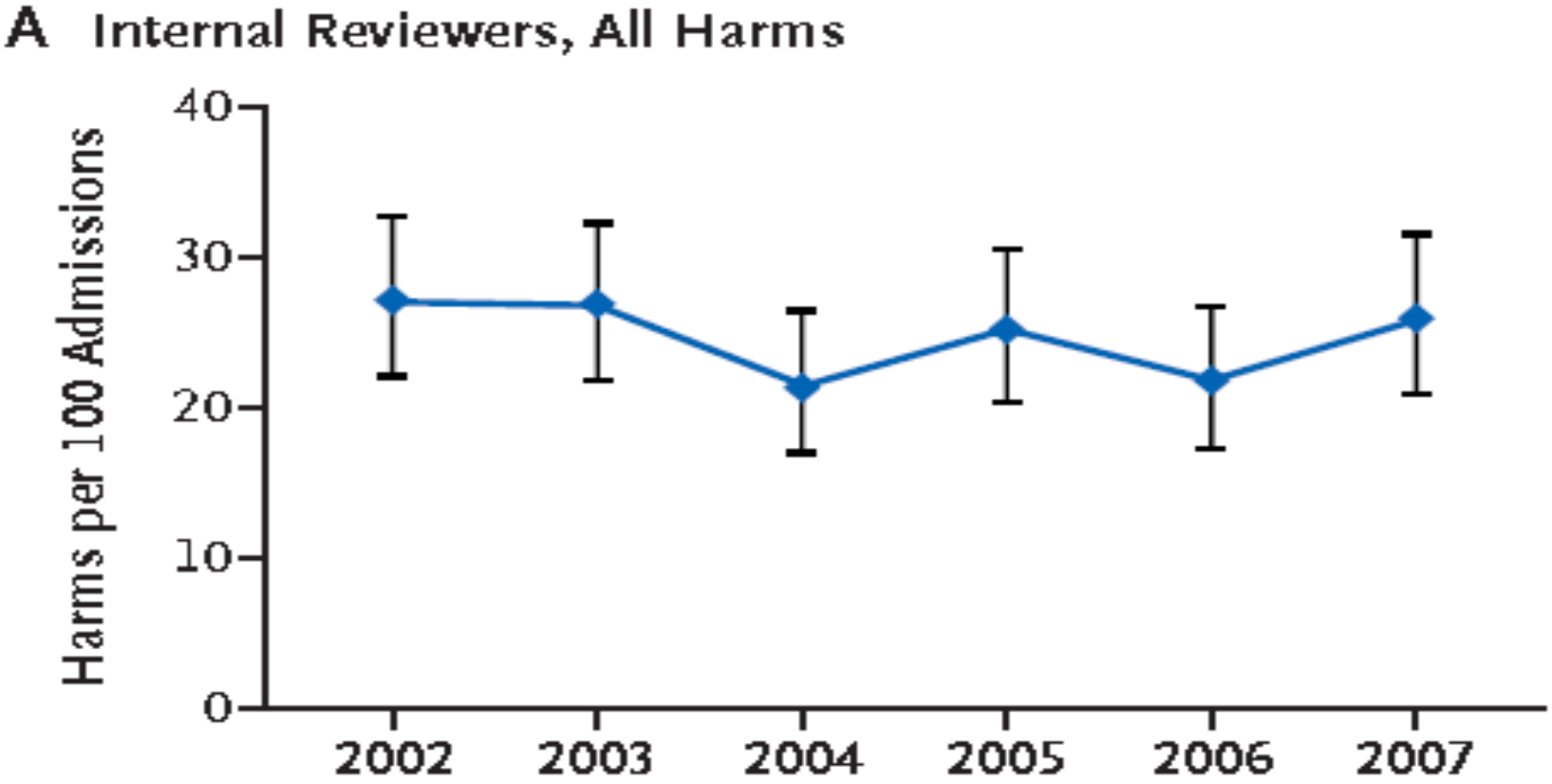
Internal team agreed with Experienced Reviewers = 81%

External team agree with Experienced Reviewers = 75%

Kappa: Internal team/ Experienced Reviewers = 0.49

Kappa: External team/ Experienced Reviewers = 0.32

Trends in Adverse Events Over Time



Landrigan et al. NEJM 2010; 363: 2124-34

GAPPS: A Pediatric Trigger Tool

Pediatric Quality Measures Program (PQMP)

- **AHRQ/CMS initiative funded by CHIPRA**
  - To increase the portfolio of evidence-based, consensus-approved pediatric quality measures available to public and private purchasers, providers, and consumers
- **7 Centers of Excellence (CoEs) across U.S.**
- **Boston Children's Hospital Center of Excellence for Pediatric Quality Measurement (CEPQM)**
  - Led by Mark Schuster, MD, PhD

PQMP Measure Development Process

Step 1: AHRQ/CMS assigns measures to CoEs

Step 2: CoEs develop and test measures

Step 3: CoEs deliver final measures with support materials to AHRQ/CMS

Step 4: AHRQ/CMS expert panel reviews measures

Step 5: AHRQ/CMS makes measures available for state Medicaid/CHIP reporting and for general use

Boston Children's CEPQM

- **Responsible for five pediatric quality measures, including a global patient safety tool**
  - Goal: To measure harm in hospitals due to medical care
    - Phase 1: Develop a draft tool to measure inpatient harm
    - Phase 2: Test the reliability of the tool in a sample of hospitals nationwide

Background: Prior Work

- Initial version of Pediatric Trigger Tool developed by team convened by the Children's Hospital Association
  - Leaders: David Stockwell, Paul Sharek, David Classen, Hema Bisarya
- Initial tool developed by CHA team melded adult and prior pediatric tools, selecting from over 100 published triggers / triggers in use at initial sites
- Expert panel process done by CHA through which 51 triggers identified for inclusion in Pilot Trigger Tool
- Pilot study at 6 institutions conducted using initial Trigger Tool (100 chart reviews each)
  - *Analyses currently underway*

Development of GAPPS Tool

- GAPPS Team Assembled
  - ***Steering Committee:*** Chris Landrigan (co-lead), David Stockwell (co-lead), Hema Bisarya, Sangeeta Rana, Raj Srivastava, David Classen, Paul Sharek, Mark Schuster (CEPQM PI)
- Expert Stakeholder Panel Assembled
  - 9 Member Panel representing AAFP, AAP, ANA, APA, CAPS, IHI, Joint Commission, NPSF, and SAHM
  - RAND/UCLA appropriateness method used (validity and feasibility of each candidate trigger rated) to consider candidate triggers (n=108) and develop Final Trigger List (54 triggers ultimately approved)
- Initiated national testing of GAPPS Trigger Tool through PRIS network

National Study

- Aims:
  1. To test the performance characteristics of the GAPPS tool across a sample of hospitals nationwide
  2. To evaluate trends over time in rates of pediatric AEs
- Review of 3840 charts from 16 hospitals by hospital based reviewers
- Hospital sampling:
  - 16 hospitals
  - Teaching and Non-Teaching
  - All 4 major US geographic areas represented
- Medical Record Sampling and Review:
  - 10 records per quarter, randomly selected, over 24 quarters (2007-2012)= total 240/hospital
  - Subjects presented in random order (i.e. not chronological order)
  - Reviewers limited to 30 min per chart

Trigger / AE Detection Methodology

- Primary reviewer (usually RN) reviews charts for triggers
- Positive trigger prompts review for suspected harms
- All suspected harms presented to 2 MD reviewers
- MD reviewers independently determine if harm occurred or not; rate severity; rate preventability
  - Pre-discussion Kappa calculated

Testing Tool Performance

- Primary Review at hospitals Inter-rater reliability: 10% subset of 24 charts per site reviewed by 2nd primary reviewer at site
- All suspected events reviewed by two independent physicians
- External Audit: 24 charts per hospital reviewed by expert trigger reviewers

Analysis: Trends Over Time

- Base model
  - Poisson Regression (used to measure rate-based outcomes)
  - Quarter included as variable to allow for trending over time
  - Accounted for hospital-level clustering
- Adjusted model
  - Will control for sex, age, race, ethnicity, insurance group, CCC