



Agency for Healthcare Research and Quality
Advancing Excellence in Health Care

Kaiser Permanente Center for Health Research
OCHIN, Inc

Automating Quality Measurement: HealthIT for Scalable, Comprehensive, and Routine Quality Assessment

Brian Hazlehurst, PhD
Senior Investigator
Kaiser Permanente Center for Health Research
Portland, Oregon

June 3, 2010



Agency for Healthcare Research and Quality
Advancing Excellence in Health Care

Background

Quality of care in the US healthcare system is unacceptably low (IOM, *JAMA* 1998)

“...Serious and widespread quality problems exist throughout American medicine. These problems....occur in small and large communities alike, in all parts of the country, and with approximately equal frequency in managed care and fee-for-service systems of care. Very large numbers of Americans are harmed as a result....”



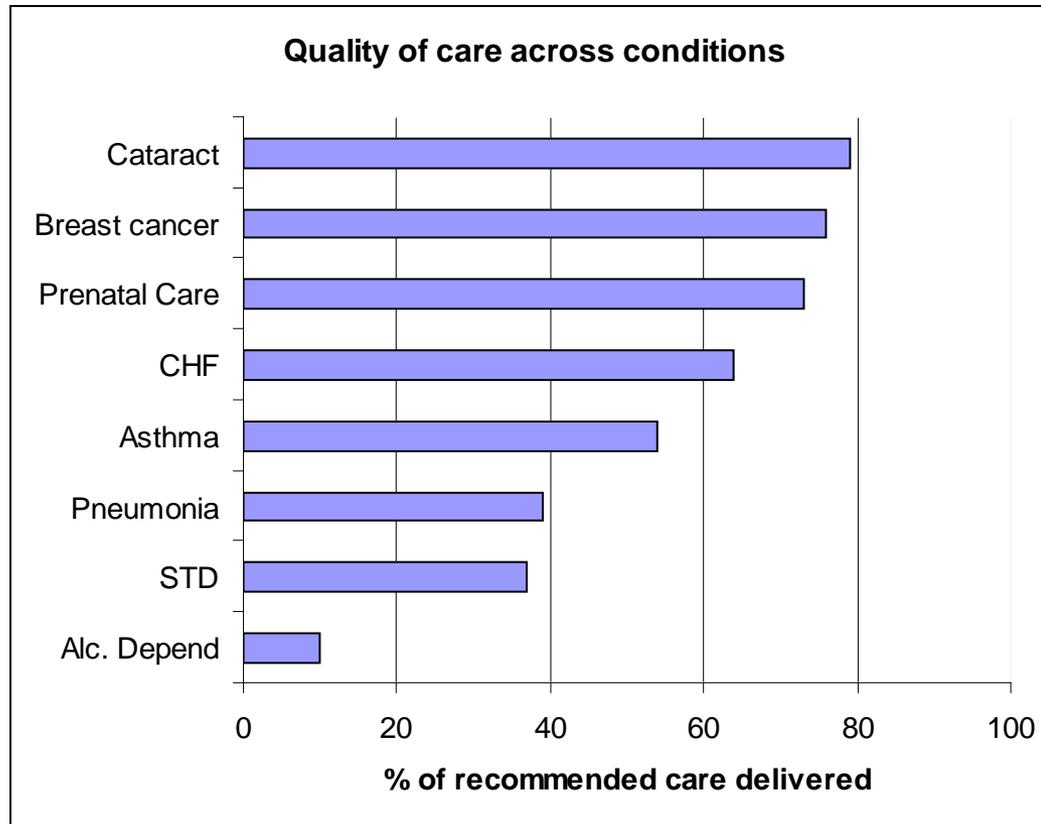
Agency for Healthcare Research and Quality
Advancing Excellence in Health Care

RAND assessment of quality (McGlynn et al, NEJM, June 2003)

- Developed and applied 439 quality measures to comprehensively “score” care quality from paper records.
 - Condition (30 conditions)
 - Type of care (Acute, Chronic, Prev)
 - Function of care (Dx, Tx, Screen, F/U)
- Manually reviewed medical records for ~7,000 participants recruited in 12 metropolitan regions of the US.



McGlynn et al: Findings

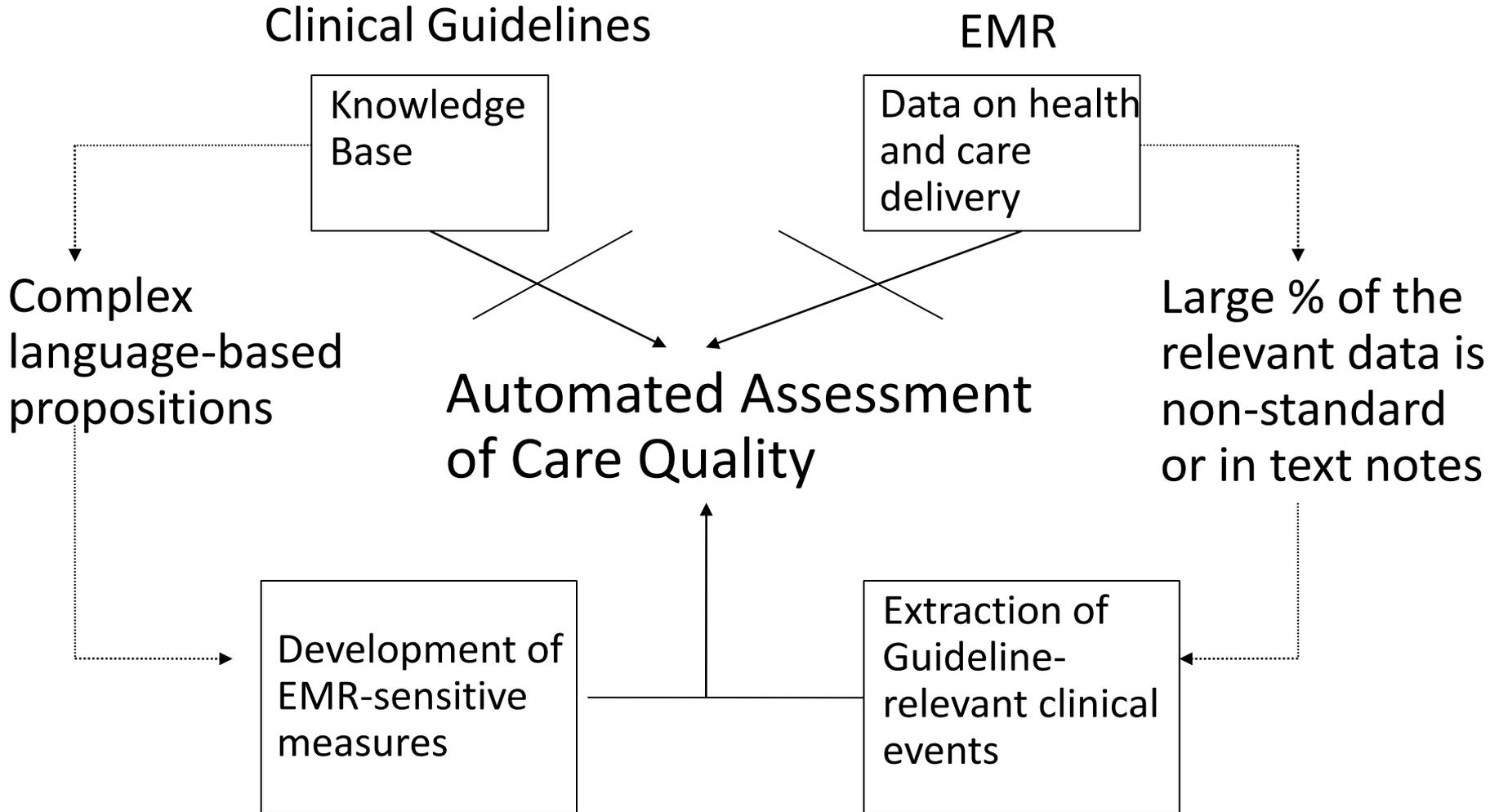




Agency for Healthcare Research and Quality
Advancing Excellence in Health Care

McGlynn et al: Conclusions

- On average, Americans receive about 55% of recommended medical care processes.
- A key component of any solution is the routine availability of information on care delivery performance at all levels.
 - Electronic healthcare data could make possible automated assessment of care quality, eliminating sampling, surveying, manual review of charts.





Agency for Healthcare Research and Quality
Advancing Excellence in Health Care

Where will these data come from?

- Jennifer Hicks (McGlynn student) dissertation
Analysis of the electronic data needed to construct the RAND QA measures
- Using **electronic claims data** alone, only 34% of the measures can be obtained
Codes for billable services (includes diagnosis codes; procedure/lab performed, basic demographic information).



Agency for Healthcare Research and Quality
Advancing Excellence in Health Care

What's missing?

- Clinically detailed information
 - Severity of a condition
 - Timing or results of procedure or lab
 - History
 - Counseling/education
 - Signs/symptoms
 - Physical examination

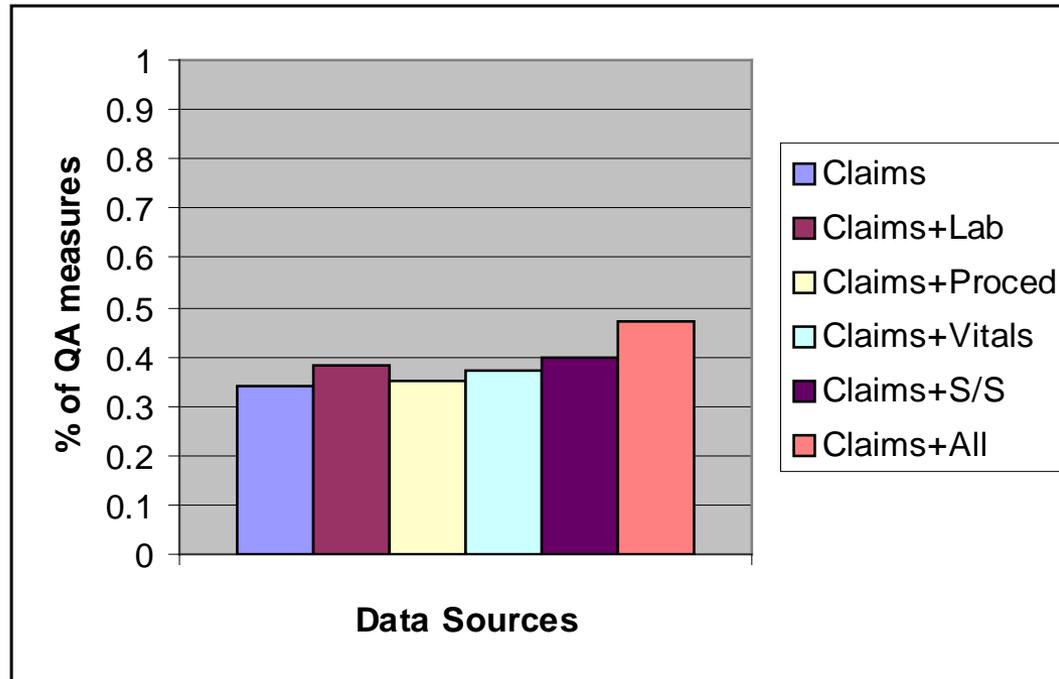


Agency for Healthcare Research and Quality
Advancing Excellence in Health Care

What does additional standard coded clinical data provide?

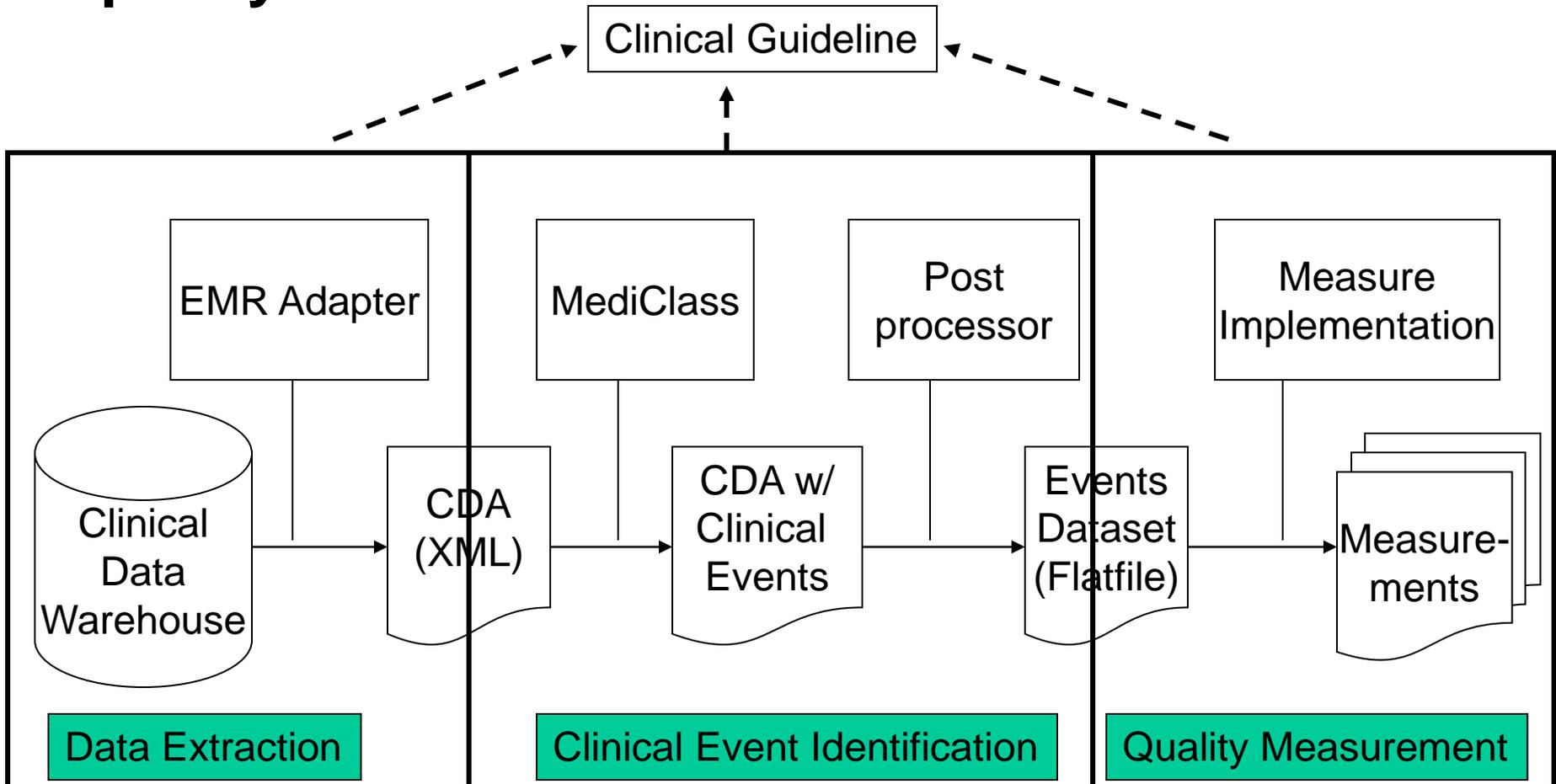
- Four additional types of standardized coded information were considered by Hicks as possible “add-on” to claims data.
 - Lab results
 - Procedure results
 - Vital signs
 - Signs/symptoms
- Estimated additional coverage of the 439 RAND quality measures

Additional coverage provided by standardized coded data



- Coverage goes from about 34% to about 47% of measures
- The remainder is found in either the templated- or free-text clinical notes of the EMR!

A system for automated, comprehensive, quality measurement





Agency for Healthcare Research and Quality
Advancing Excellence in Health Care

MediClass – A MEDICAL record CLASSifier

1. Takes in encounter record (CDA) and marks up each data section with identified clinical concepts.
2. Identifies concepts within text notes (using NLP algorithms) and coded elements of each encounter record.
3. Uses rules defining logical combinations of concepts to infer additional clinical events (classifications) of interest.

Hazlehurst, Frost, Sittig, Stevens. MediClass: A system for detecting and classifying encounter-based clinical events in any electronic medical record. *JAMIA*. 2005 Sep-Oct;12(5):517-29.



Agency for Healthcare Research and Quality
Advancing Excellence in Health Care

MediClass History

- We have been working on MediClass since 2003 and have applied it on numerous studies to:
 - Assess the 5A's of smoking cessation in primary care
 - Detect vaccine adverse events
 - Characterize asthma prevalence and severity
 - Identify family and personal history of breast and ovarian cancer
 - Classify severity of diabetic retinopathy and macular edema
 - Measure outpatient asthma care quality
 - Measure obesity care quality in primary care



Example: Assessing delivery of the 5 A's

5A Step	Operational definition	Example in free-text notes of EMR
Ask	Identify tobacco status at every visit	"patient smokes 1ppd"
Advise	Advise all tobacco users to quit	"it is important for you to quit smoking now"
Assess	Determine patient's willingness to make a quit attempt	"pt not interested in quitting smoking"
Assist	Aid the patient in quitting	"started pt on zyban"
Arrange	Schedule follow-up contact, in person or via telephone	"follow-up in 2 wks for quit progress"



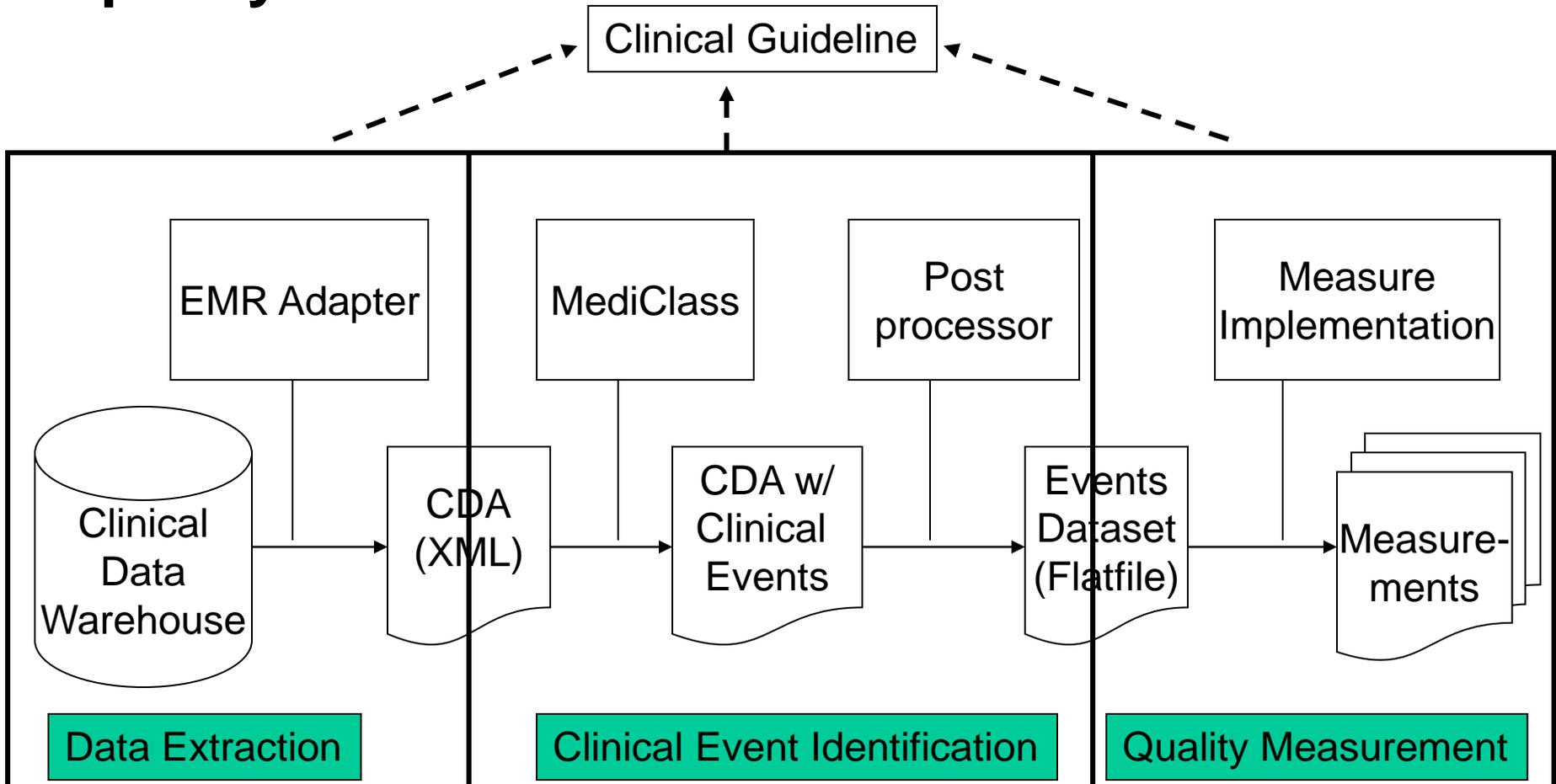
How well does MC do classifying the 5 A's in the EMR's of 4 different health plans?

Created a gold standard using 4x125 records and 5 trained coders

MC agreed with the gold standard 91% of the time

5A step	Frequency in gold standard (n=500)	Sensitivity	Specificity
Ask	417 (83%)	0.97 (0.95-0.99)	0.95 (0.88-0.98)
Advise	161 (32%)	0.68 (0.60-0.75)	1.0 (0.99-1.0)
Assess	55 (11%)	0.64 (0.50-0.76)	0.96 (0.94-0.98)
Assist	71 (14%)	1.0 (0.94-1.0)	0.82 (0.78-0.85)
Arrange	1 (0.2%)	NA	NA

A system for automated, comprehensive, quality measurement





Agency for Healthcare Research and Quality
Advancing Excellence in Health Care

Quality Measurement Definitions

- Observation period = data window (3 yrs)
 - Qualification period is first portion (2 yrs)
- Each measurement represents the proportion of recommended care delivered to those eligible.
 - Denominator counts patients who qualify (within qualification period) to receive the care prescribed by the measure
 - Numerator counts patients in the denominator who actually receive the care (during some “measure interval” defined by the measure and relative to patients qualification for the measure).

Asthma Care Quality Measure Set (partial)

Quality Measure	Denominator criteria [Index Date]	Numerator criteria [Measure Interval]	Operationalization Comments
Patients with the diagnosis of persistent asthma should have a historical evaluation of asthma precipitants	Patients with persistent asthma [PA Qualification Date]	Patients with a subjective evaluation of precipitants or triggers [observation period]	Probably only found in the text progress notes
Patients with the diagnosis of persistent asthma should have spirometry performed annually	Patients with persistent asthma [PA Qualification Date]	Patients with orders for PFTs or documentation of office spirometry or PFT results [subsequent 12 mnths]	Numerator satisfied with documentation of referral to pulmonary specialist if no PFT known available
Patients with the diagnosis of persistent asthma should have available short acting beta2-agonist inhaler for symptomatic relief of exacerbations	Patients with persistent asthma [PA Qualification Date]	Prescription for a short acting beta-2 agonist to use PRN [subsequent 12 mnths]	Numerator satisfied if prior / existing active Rx; also combination Rx (i.e. Combivent) Exclusion if adverse reaction to b-agonists
All patients seen for an acute asthma exacerbation should have current medications reviewed	Patients with persistent asthma meeting criteria for outpatient exacerbation [Exac. Encounter]	Documentation that medications reviewed by provider [same visit]	Numerator satisfied if provider documents asthma specific medication history in notes or active mgmnt of current med list



Agency for Healthcare Research and Quality
Advancing Excellence in Health Care

A definition of “persistent asthma”

- Patient meets any of the following within any 12 month window during qualification period
 - 4 “fills” ordered of asthma-specific meds
 - 2 “fills” ordered of asthma-specific meds and 4 outpatient visits coded with asthma Dx
 - Asthma-related ED visit or hospitalization
 - Provider notation that patient has persistent asthma
 - Provider use of “home grown” persistent asthma Dx code



Agency for Healthcare Research and Quality
Advancing Excellence in Health Care

Asthma Care Quality (ACQ) findings

- 22 Outpatient asthma measures identified
 - 18 (80%) have prototype implementations
 - 2 rely on complex assessment of “control”
 - 2 rely on knowing patients baseline PFT values

- 6 of the 18 (33%) require processing clinician’s text notes, another 6 are enhanced by it
 - In addition, roughly 6% of persistent asthma qualifications were found to rely on text processing



Agency for Healthcare Research and Quality
Advancing Excellence in Health Care

More ACQ findings

➤ KPNW

- Multiple observation windows in 2001 – 2008 period
- Roughly 45,000 study patients per window; 13,000 with persistent asthma

➤ OCHIN

- 8 orgs with the EMR installed in 2006-2008 period
- Single observation window (all data available)
- Roughly 5,000 study patients; 1,000 with persistent asthma



Currently underway (ACQ)

- Preliminary measurements
 - Patients with the diagnosis of persistent asthma should have available Rx for beta2-agonist inhaler for symptomatic relief of exacerbations -- 86%
 - All patients seen for acute asthma exacerbation should have history taken or reviewed for prior episodes of respiratory failure requiring intubation -- 1.2%
- Validation of measures
 - Comparisons to manual chart review (~450 patients at each site)
- Outcomes studies
 - Death, Hospitalizations for asthma, Asthma exacerbations, Asthma-related utilization (visits, meds)



Agency for Healthcare Research and Quality
Advancing Excellence in Health Care

Obesity Care Quality study

- NHLBI has developed a 10 step clinical guideline for obesity care in adults
 - Includes steps such as:
 - assess cardiovascular risk factors,
 - measure BMI,
 - counsel overweight and obese patient on weight loss and exercise.
 - From this guideline we have:
 - produced a draft measure set,
 - conducted a consensus process involving clinicians from the represented organizations to refine the draft,
 - begun to operationalize the measure set



Agency for Healthcare Research and Quality
Advancing Excellence in Health Care

Next Steps

- Complete our ACQ study (scheduled for this fall).
- We need to streamline application development, and enable broader dissemination of the system.
 - New grant applications to produce tools that would accelerate this.
- We need to demonstrate that we can assess/measure quality intervention efforts
 - Identifying new funding and partners to conduct quality improvement trials using this infrastructure.



Agency for Healthcare Research and Quality
Advancing Excellence in Health Care

Contact Info:

Brian Hazlehurst, PhD

Kaiser Permanente Center For Health Research

Brian.Hazlehurst@kpchr.org

Collaborators:

MaryAnn McBurnie, PhD

Richard Mularski, MD

Victor Stevens, PhD

Jon Puro, MPA-HA

Susan Chauvie, RN, MPA-HA

Funding:

Agency for Healthcare Research and Quality (AHRQ)