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Health Information Technology

Costs and Benefits

What does the current literature address?

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August 17, 2010

2010 National Conference on Health Statistics
August 16-18
Washington, DC

Background

Health Information Technology has the potential to yield quality improvements and cost savings. In addition,
it can facilitate to broader reforms.
(CBO, 2008&2009; Buntin, Jain, and Blumenthal, 2010)

Billions of dollars are now devoted to encouraging hospitals and physicians to adopt electronic health records (EHRs) and use them regularly in the course of care.
(HITECH Act, 2009; Blumenthal, 2010)

Data on the improvements these systems facilitate is critical to the case for more widespread adoption, and ultimately helping providers and patients see benefits.

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Research Questions

- What does the recent literature conclude about the benefits of health IT?

- Do these findings differ from those of earlier reviews?

- Does the literature suggest that functions of electronic health records proposed in the "meaningful use" regulation are associated with a greater likelihood of realizing the benefits of health IT?

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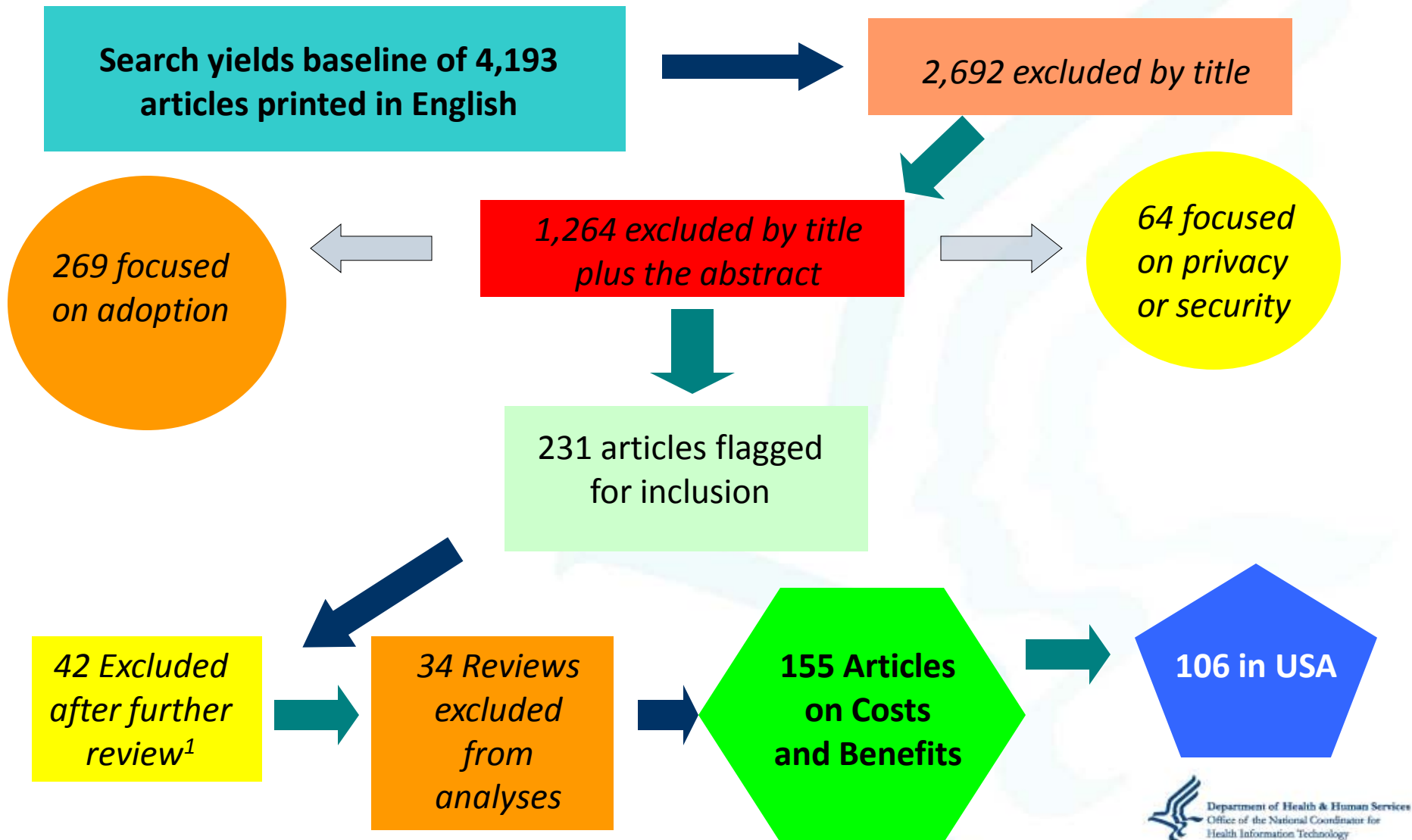Office of the National Coordinator for
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Prior Research – Goldzweig et al. 2009

- 155 studies met inclusion criteria (prior study of 1994-2004 had found 257 relevant studies)

- Major Goldzweig et al. conclusion: "paucity of meaningful data on the cost-benefit calculation of actual HIT implementation"

- 40 literature reviews of specific aspects of HIT published since then, most with positive conclusions

Study Methods and Data

- Updates and expands Goldzweig et al. (2009) review of health IT studies published 2004 -2007.

- Focuses on peer-reviewed articles dealing with the costs and benefits of health IT.

- Focuses on individual outcomes within articles and articles' overall conclusions. Outcomes include….
  - Quality of care
  - Efficiency/costs of care
  - Provider and/or patient satisfaction.

- Results are still preliminary

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Systematic Review Process

Search yields baseline of 4,193 articles printed in English

2,692 excluded by title

1,264 excluded by title plus the abstract

269 focused on adoption

64 focused on privacy or security

231 articles flagged for inclusion

42 Excluded after further review[1]

34 Reviews excluded from analyses

155 Articles on Costs and Benefits

106 in USA

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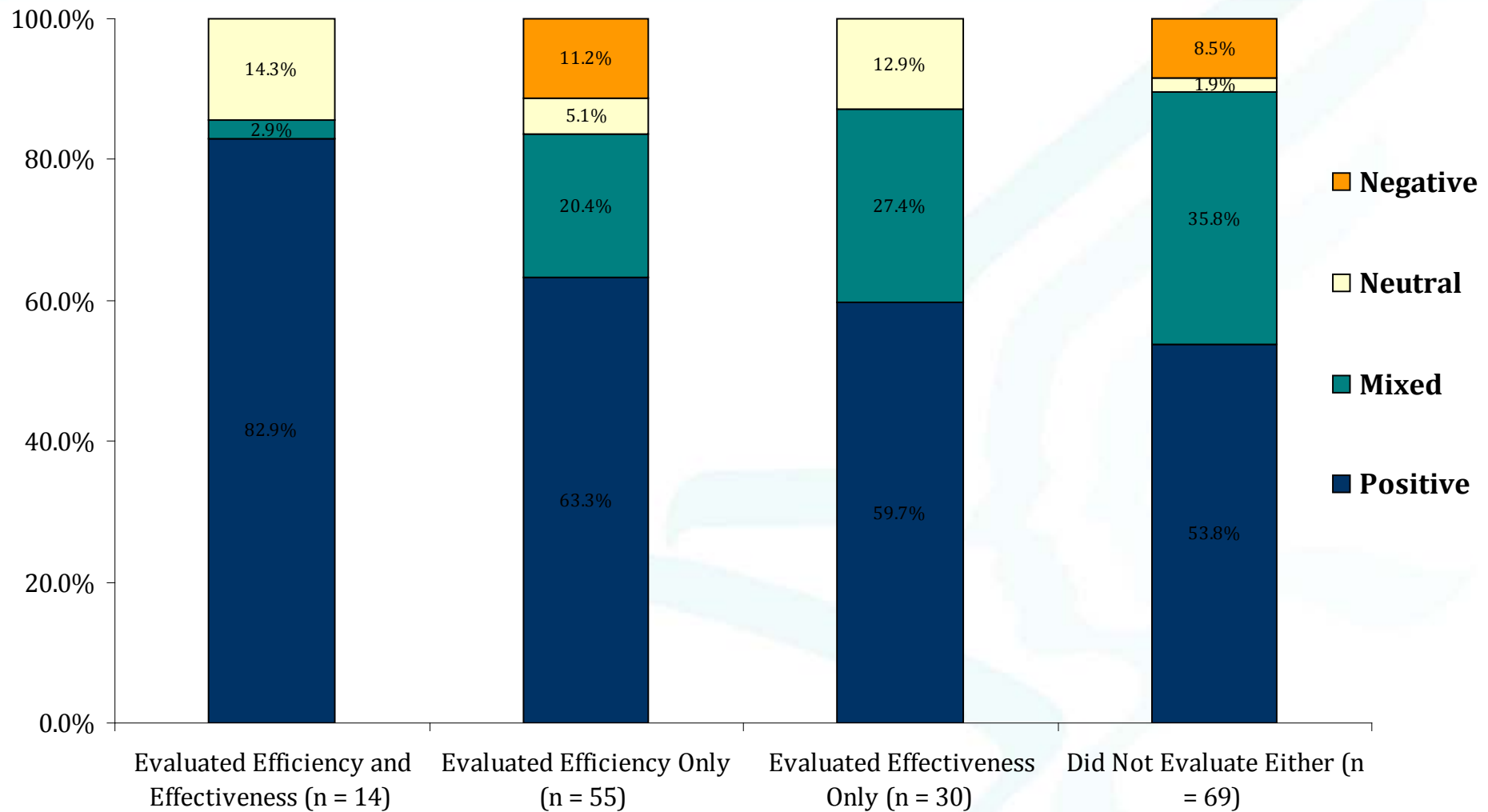Health Information Technology

Preliminary Findings

- Covers period July 2007 through February 2010.
- Articles classified by: elements of health IT addressed, functionalities/characteristics of the systems studied, study design, outcomes included, and characteristics of the care settings.
- Findings include:
  - Vast majority (143/155 non-review articles, 92 percent) positive or mixed finding*
  - Studies that evaluated **both** efficiency **and** effectiveness of care are overwhelmingly more positive (p = .0001) than those that did not.
  - Studies evaluating EHRs are also more positive than those that did not (e.g. an ERx stand-alone) (p = .03).
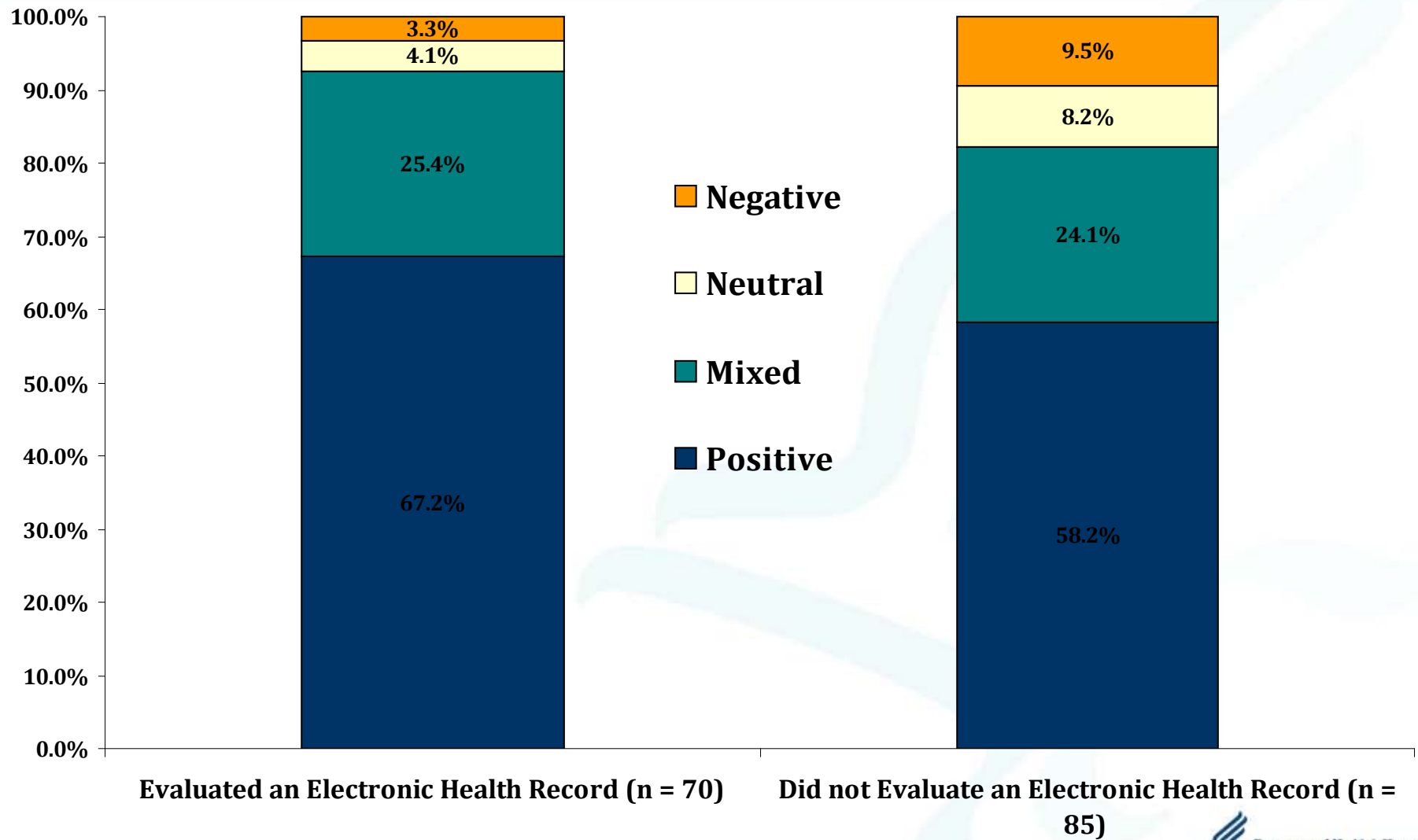
- Analyses are preliminary and ongoing.

"Mixed" findings were positive overall, but at least one specific outcome was negative

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What were the individual findings within articles addressing Efficiency and Effectiveness v. Others?

Legend:
- Negative
- Neutral
- Mixed
- Positive

Evaluated Efficiency and Effectiveness (n = 14):
- Positive: 82.9%
- Mixed: 2.9%
- Neutral: 14.3%

Evaluated Efficiency Only (n = 55):
- Positive: 63.3%
- Mixed: 20.4%
- Neutral: 5.1%
- Negative: 11.2%

Evaluated Effectiveness Only (n = 30):
- Positive: 59.7%
- Mixed: 27.4%
- Neutral: 12.9%

Did Not Evaluate Either (n = 69):
- Positive: 53.8%
- Mixed: 35.8%
- Neutral: 1.9%
- Negative: 8.5%

In addition to efficiency and effectiveness, measures include access to care, changes in care processes, patient safety, preventive care, and patient and provider satisfaction

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What about articles that evaluated EHRs versus Stand Alone Systems?

Chart showing percentage distribution of article evaluations.

Evaluated an Electronic Health Record (n = 70):
- Positive: 67.2%
- Mixed: 25.4%
- Neutral: 4.1%
- Negative: 3.3%

Did not Evaluate an Electronic Health Record (n = 85):
- Positive: 58.2%
- Mixed: 24.1%
- Neutral: 8.2%
- Negative: 9.5%

Legend:
- Negative
- Neutral
- Mixed
- Positive

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Health IT Outcomes Measured

**(239 individual findings from 155 Non Review Articles – *Outcomes are mutually Exclusive)*
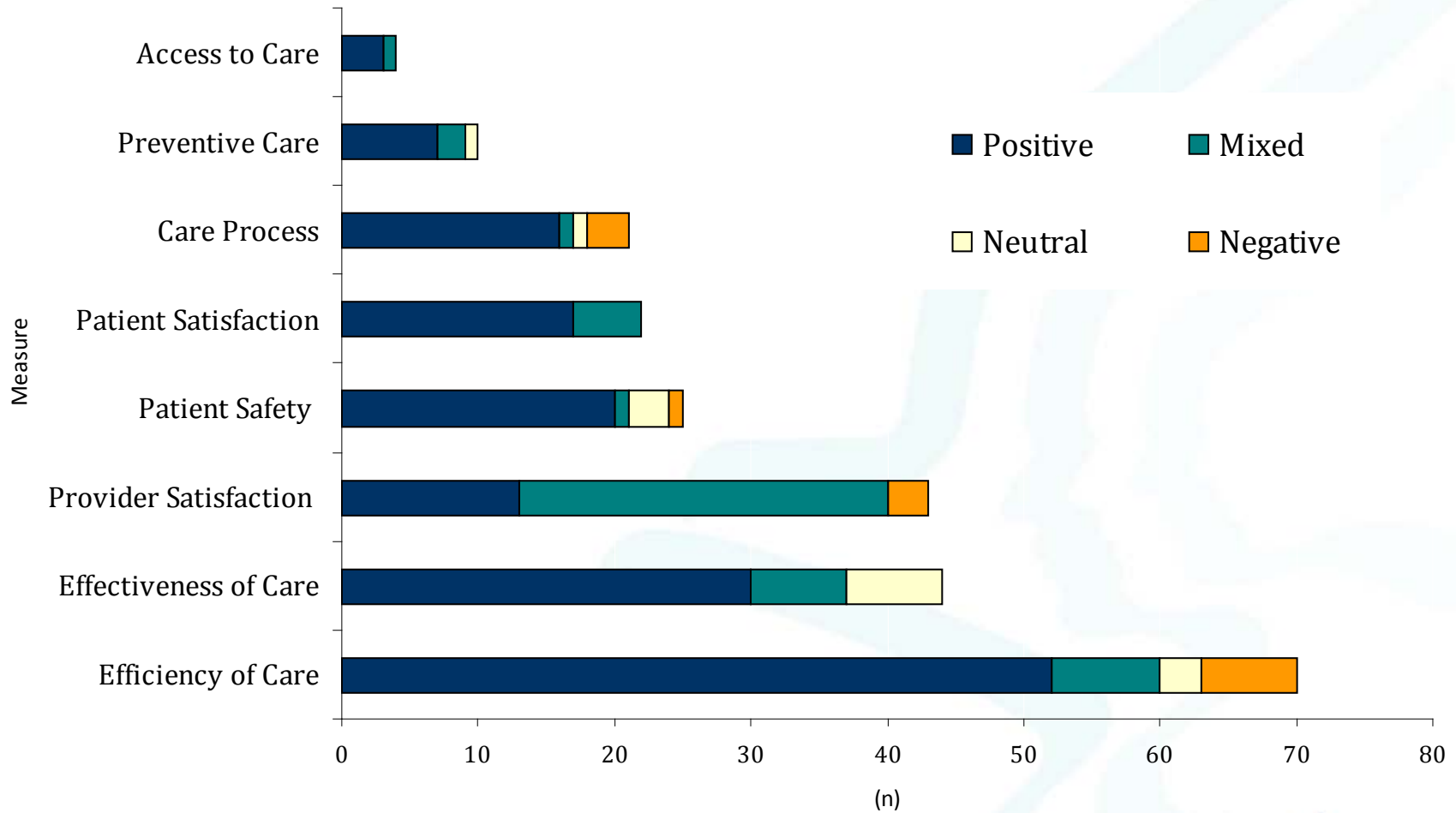
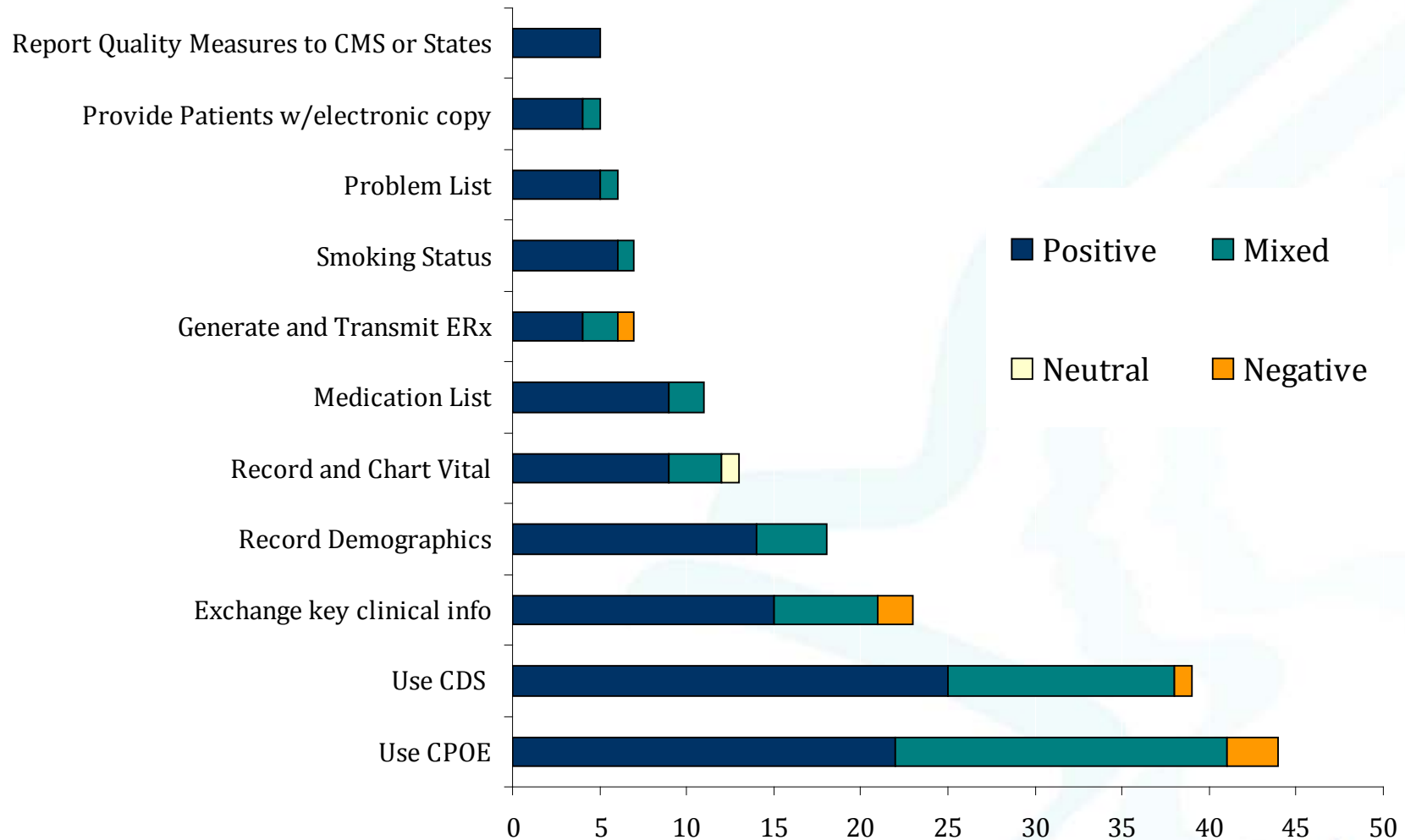# Main Health IT Elements Measured & Overall Article Conclusion

**(155 Non Review Articles - *Not Mutually Exclusive*)**

Legend: ■ Positive ■ Mixed □ Neutral ■ Negative

Y-axis (Main Health IT Element): HIE with an Ancillary Service, Eprescribing, Information Retrieval, HIE Between Distinct Institutions, PHR, HIE within an Organized Network, Registry, Telemedicine, Administrative, CPOE, Clinical Decision Support, EHR

X-axis (n) Articles: 0, 10, 20, 30, 40, 50, 60, 70, 80

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Aspects of "Meaningful Use" Addressed – Core Set

(155 Non Review Articles - *Not Mutually Exclusive*)

Aspects of "Meaningful Use" Addressed – Menu Set

(155 Non Review Articles - *Not Mutually Exclusive*)
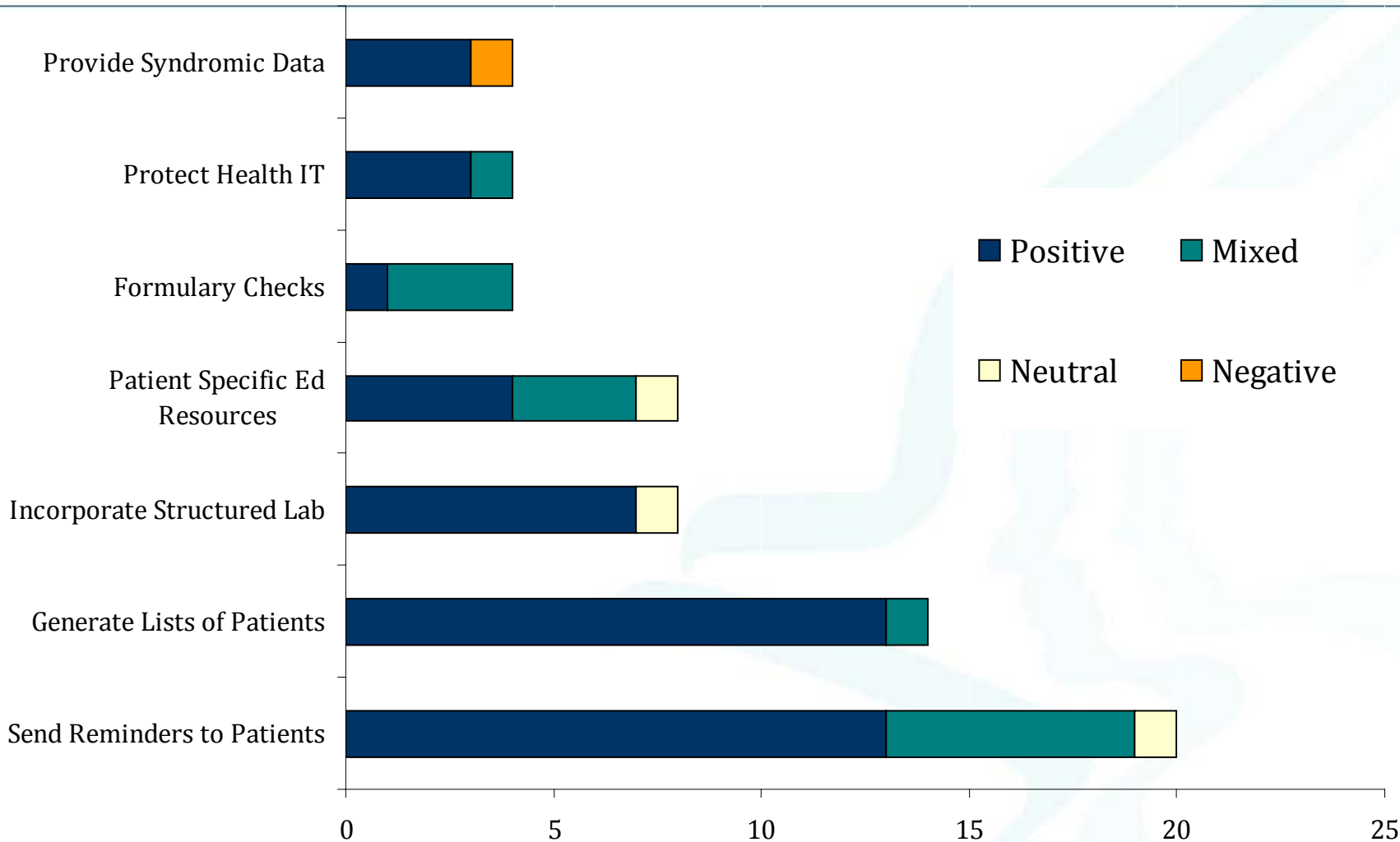
Two or fewer articles addressed Patient Access to Records in 4 business days, Allergy Lists, Electronic Discharge Info Patients, Medication Reconciliation, Provide Summary care record at transition, Advance Directives, Report lab data to PH agencies, Check Insurance Eligibility, and Provide Clinical Summaries to patients

Conclusions, by Study Type

Design	Positive	Mixed	Neutral	Negative	Total
Tested a Hypothesis	47	14	1	2	64
Descriptive - Quantitative	30	15	1	4	50
Descriptive - Qualitative	15	14	0	4	33
Other	5	3	0	0	8
					155

The vast majority of articles had positive findings...

- 60 of 70 articles that addressed efficiency of care (cost or utilization) showed improvements associated with health IT while 37 of 44 studies addressing effectiveness (quality of care) had positive findings.

- Of 64 papers that used statistical methods to test a formal hypothesis, 61 showed a significant positive impact of health IT.

- 134 of our 155 studies came from outside of health IT leaders (e.g. Kaiser, Partners), suggesting providers across different settings are experiencing benefits and publishing findings.

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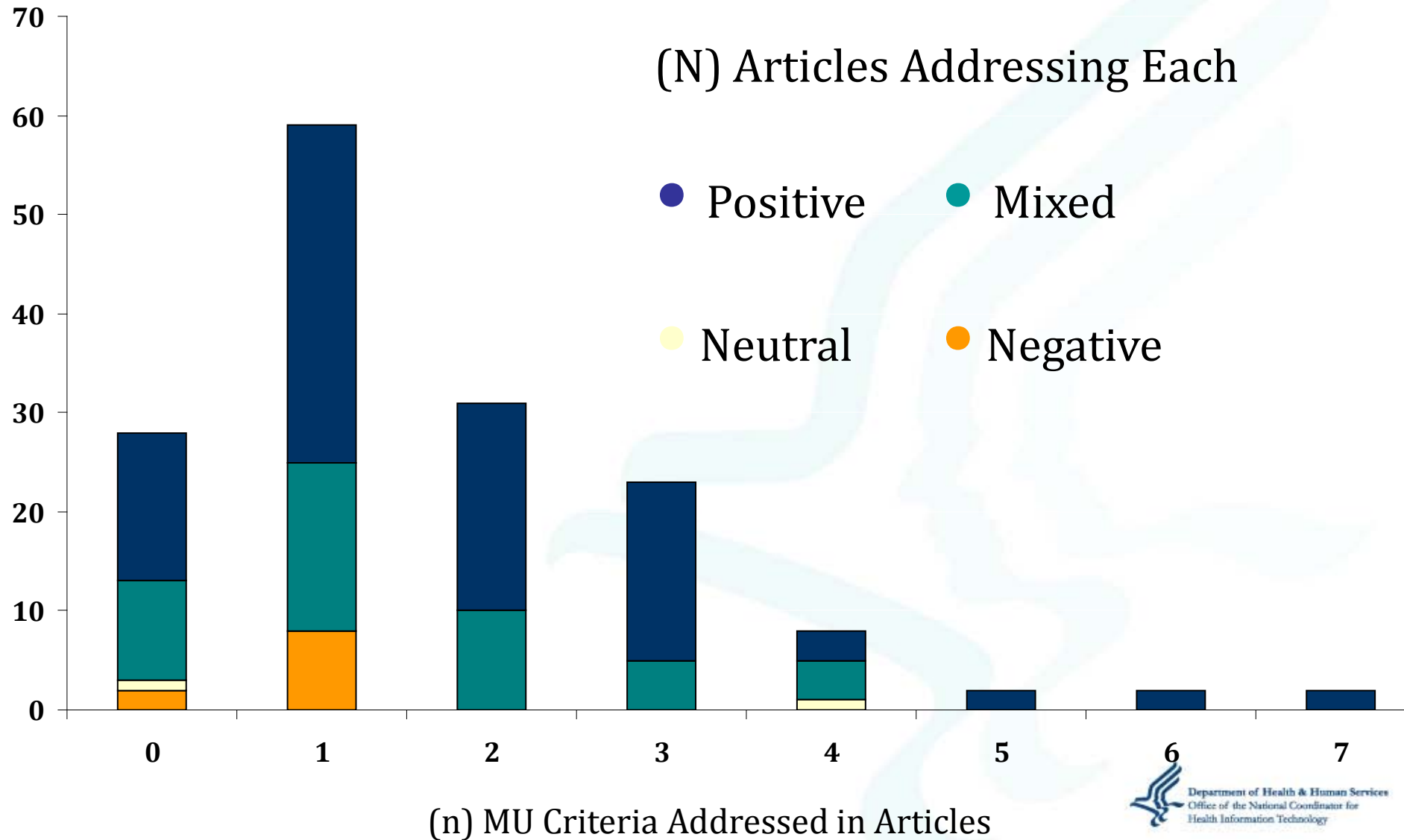# Of our 10 negative articles, what is notable?

- Three hospital studies of EHR implementations found high transition costs (financial and otherwise).

- A study in New Jersey saw an increase in "false positive" Lyme Disease cases after implementing electronic reporting, suggesting an incentive to over-report.

- A study evaluating the connection between health information exchange (HIE), emergency room visits, and ambulatory care sensitive conditions (ACSHs) saw higher rates in both events for patients whose information was transferred/accessed via an exchange.

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How does this compare to Goldzweig et al.?

Study Comparison		
	Goldzweig et al.	**Buntin et al.**
time period	06/04 – 06/07	07/07 – 02/10
total inclusions	182	155
Addresses		
EHRs	39	70
CPOE	40	44
Decision Support	22	44
From Health IT Leaders[1]	36	21

1 = Leaders from Goldzweig, et al. Partners, Regenstrief, Veteran's Affairs, Intermountain, Kaiser, Vanderbilt

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Does the literature suggest "meaningful use" is associated reaching the benefits of health IT?

Next Steps…

- Small sample size and overwhelmingly positive results make detecting statistically significant effects difficult, but we will continue to examine.

- We will also:
  - Complete abstractions and update with articles from February to Present
  - Examine effects of individual MU criteria
  - Look at each individual outcome, continue to examine by each outcome

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Thank you for your attention

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