

Interoperability in Practice: Leveraging health information exchange

Joshua R Vest, PhD, MPH
Indiana University
Regenstrief Institute
joshvest@iu.edu

Disclosures

Projects described were supported by:

- Center for Medicare & Medicaid Services
- Agency for Health Care Quality & Research
- Robert Wood Johnson Foundation (Systems for Action National Coordinating Center, ID 75549)
- New York eHealth Collaborative

Work was a collaboration with many colleagues:

- Unruh, MA, Hye-Young Jung, Kaushal R, and Vest JR. 2016. "Hospitalization Event Notifications and Reductions in Readmissions of Medicare Fee-for-Service Beneficiaries in the Bronx, New York." Journal of the American Medical Informatics Association in press (October): ocw139. DOI: 10.1093/jamia/ocw139.
- Vest, JR, and Ancker JS. 2016. "Health Information Exchange in the Wild: The Association between Organizational Capability and Perceived Utility of Clinical Event Notifications in Ambulatory and Community Care." Journal of the American Medical Informatics Association : JAMIA, April. DOI: 10.1093/jamia/ocw040.
- Vest JR, Unruh MA, Shapiro J, Casalino L. The associations between query-based and directed health information exchange with potentially avoidable use of health care services . doi: 10.1111/1475-6773.13169. Vest JR, Unruh MA, Casalino L, Shapiro J. The complementary nature of query-based and directed health information exchange in primary care practice. doi: 10.1093/jamia/ocz134.
- Ellis Hilts K, Vest JR, Ancker JS, Jung HY, Blackmon A, Unruh MA. End User Perceptions of Event Notification Usage and Impact in Three Community Health Information Organizations. Annual American Medical Informatics Association 2018 Annual Symposium. San Francisco, CA. November 3-7.



Where
interoperability
can help
FQHCs

Opportunity #1

Address risk for costly services

Opportunity #2

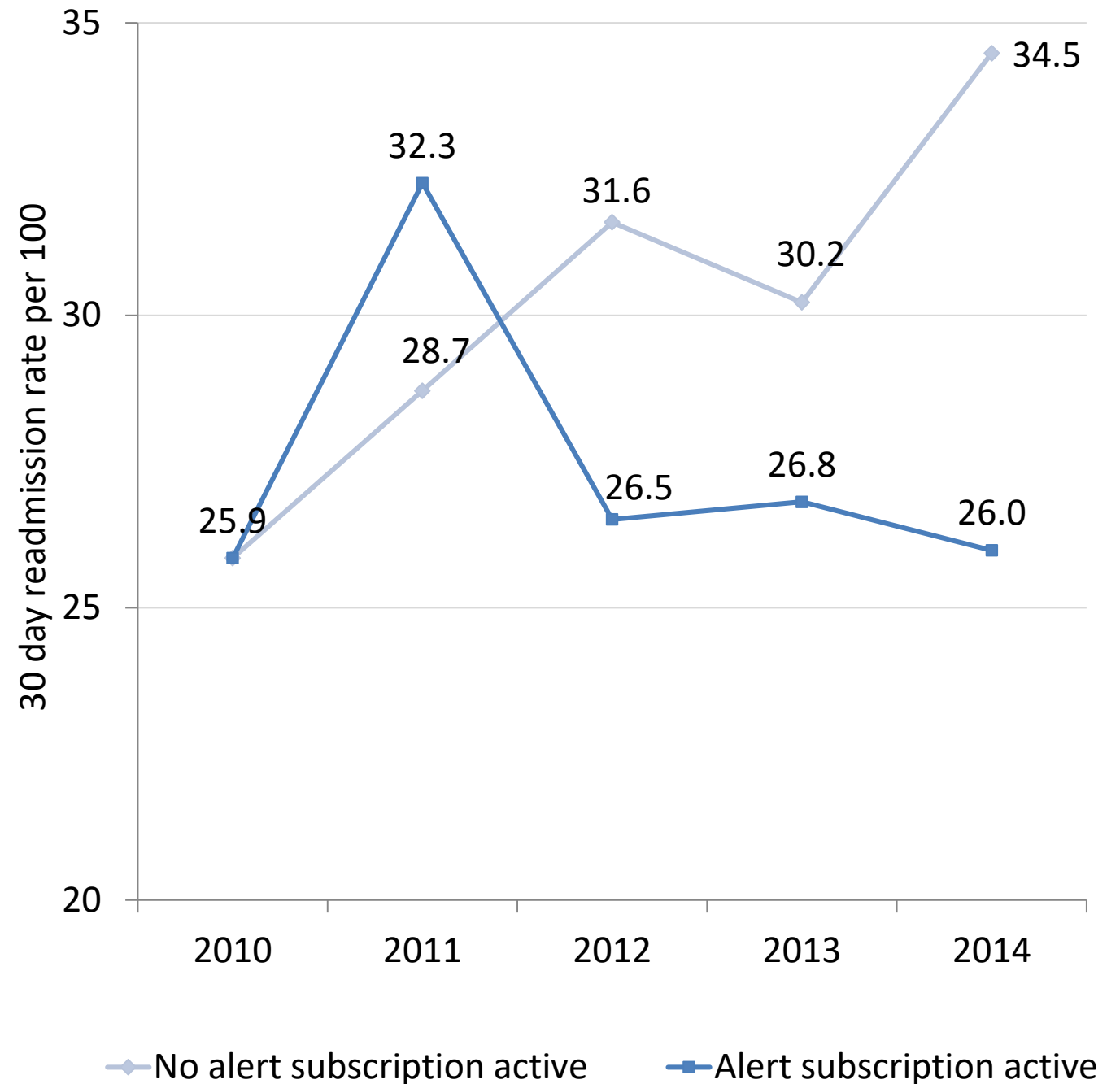
Support care coordination

Opportunity #3

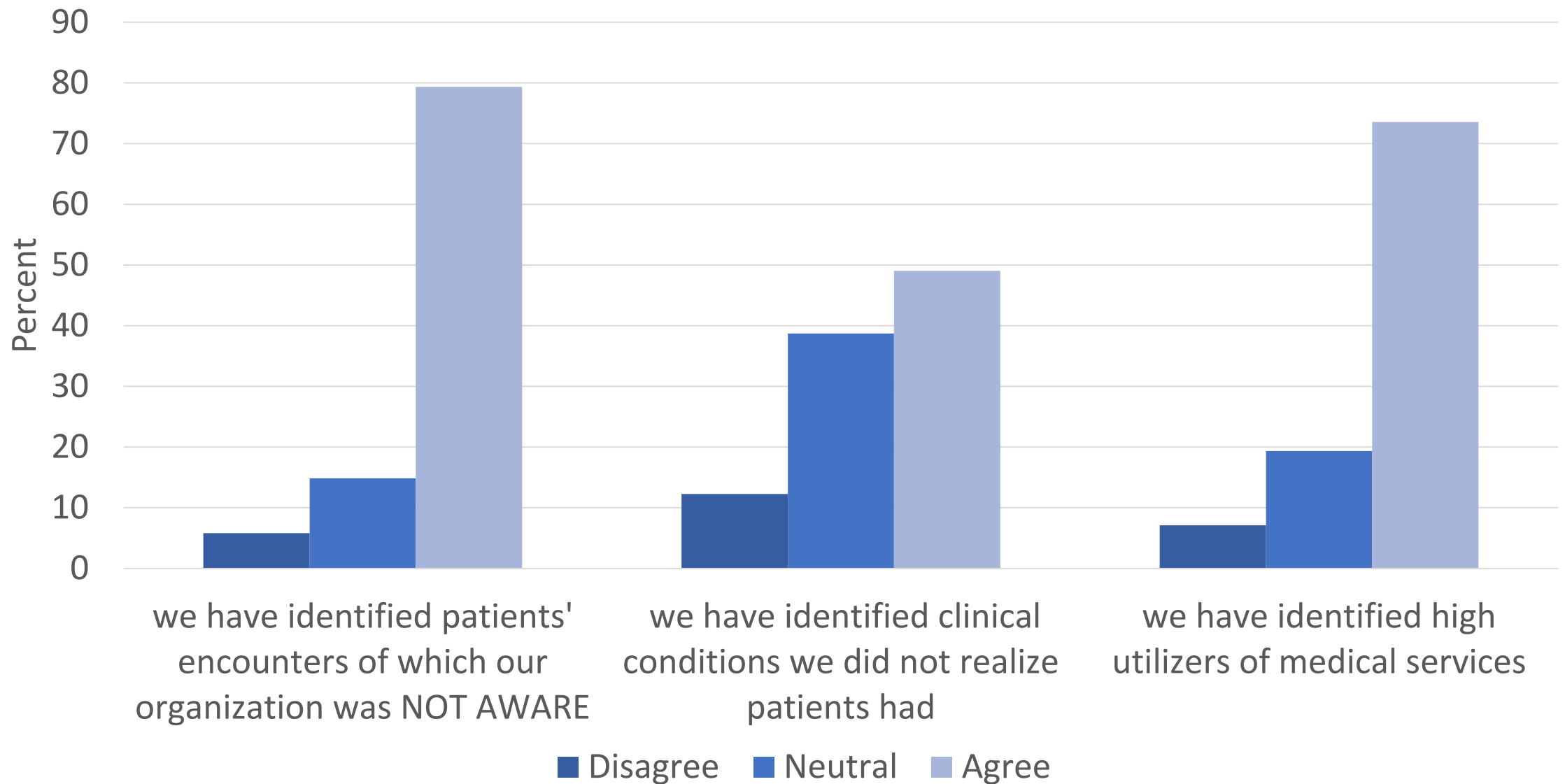
Effectively align resources to
patient needs

Question 1

When
Medicare
beneficiaries
enrolled in
alert services,
readmission
rates are
lower.



According to survey respondents , as a result of alert services...

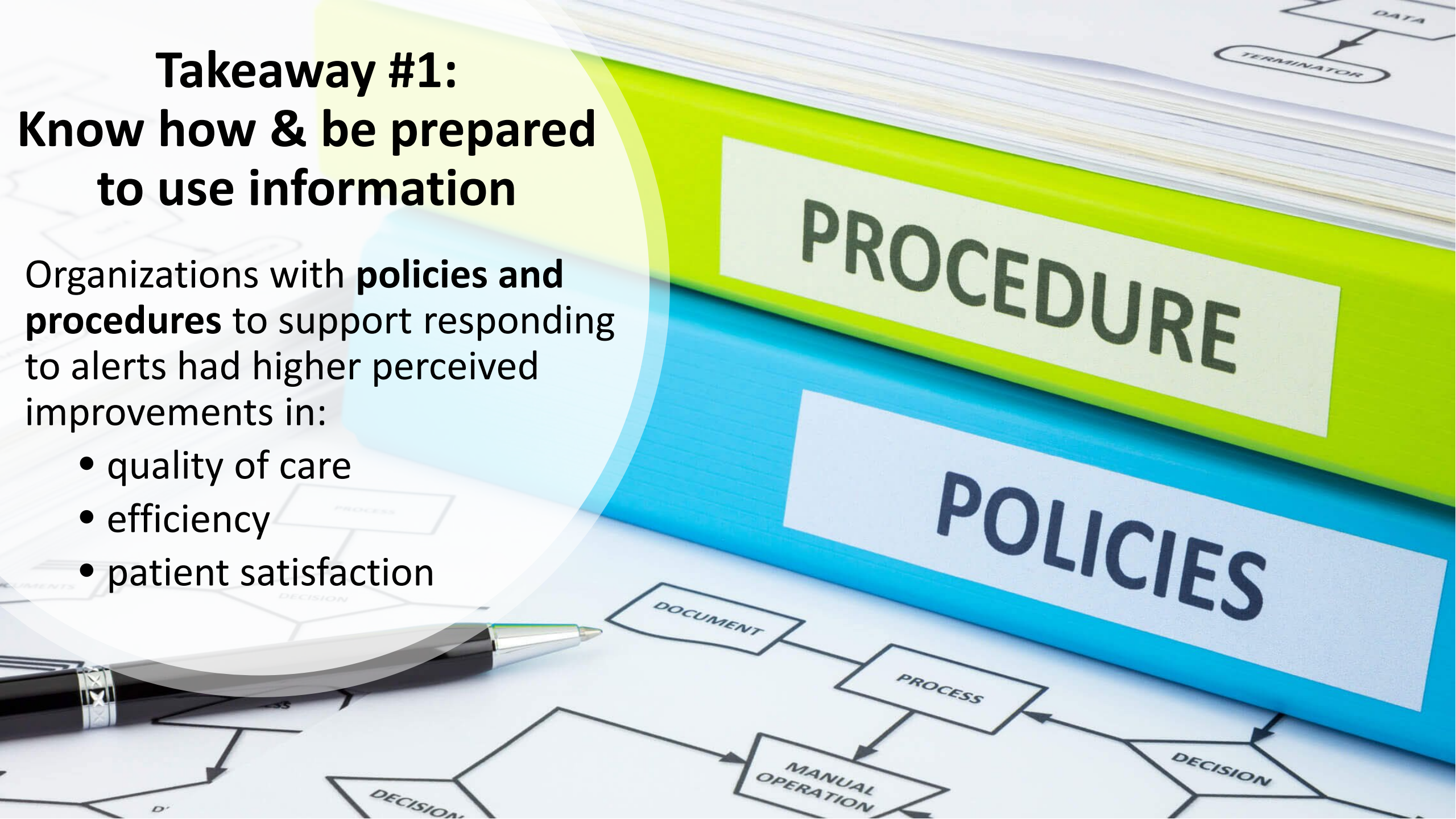


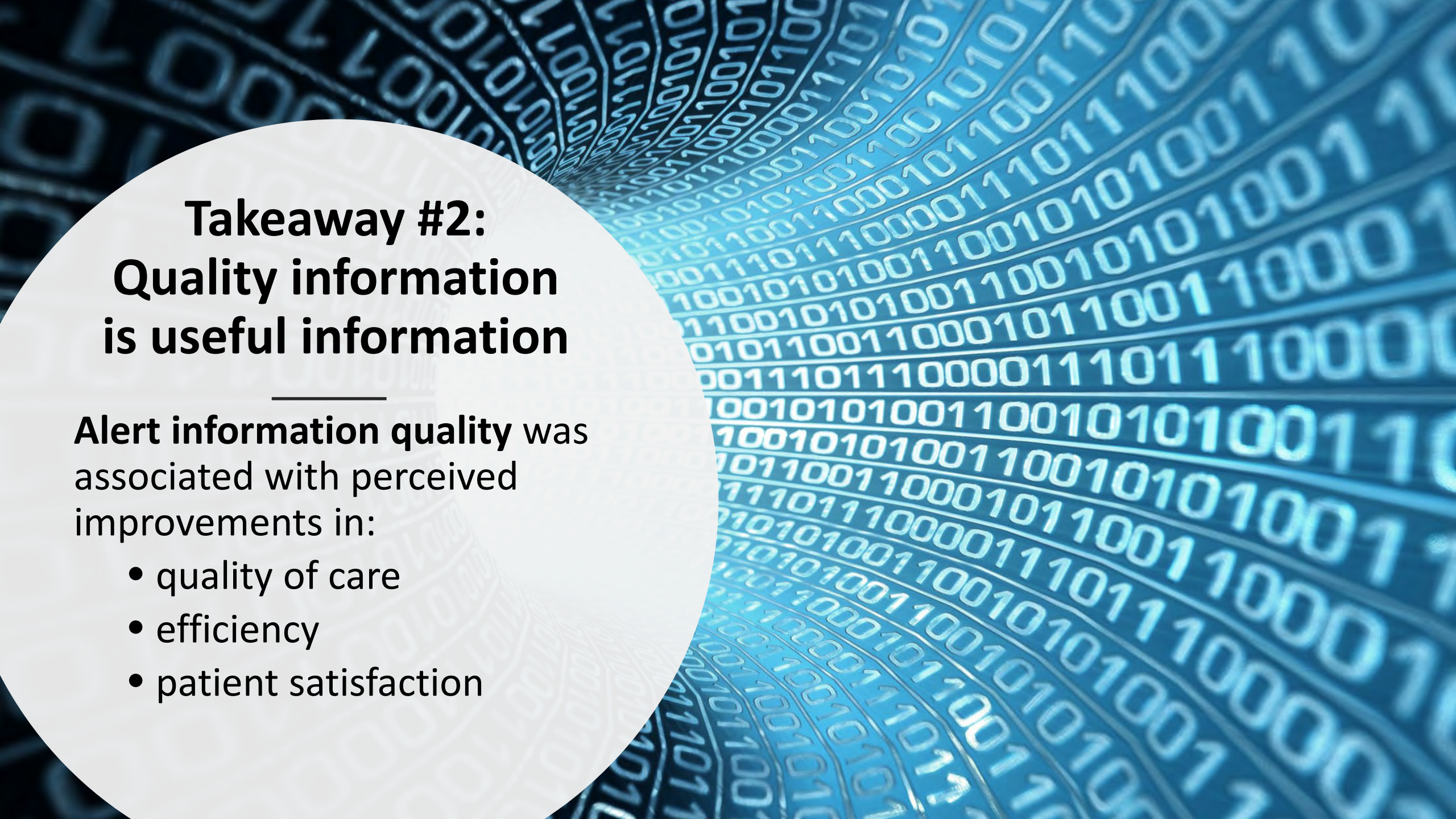
Question 2

Takeaway #1: Know how & be prepared to use information

Organizations with **policies** and **procedures** to support responding to alerts had higher perceived improvements in:

- quality of care
- efficiency
- patient satisfaction

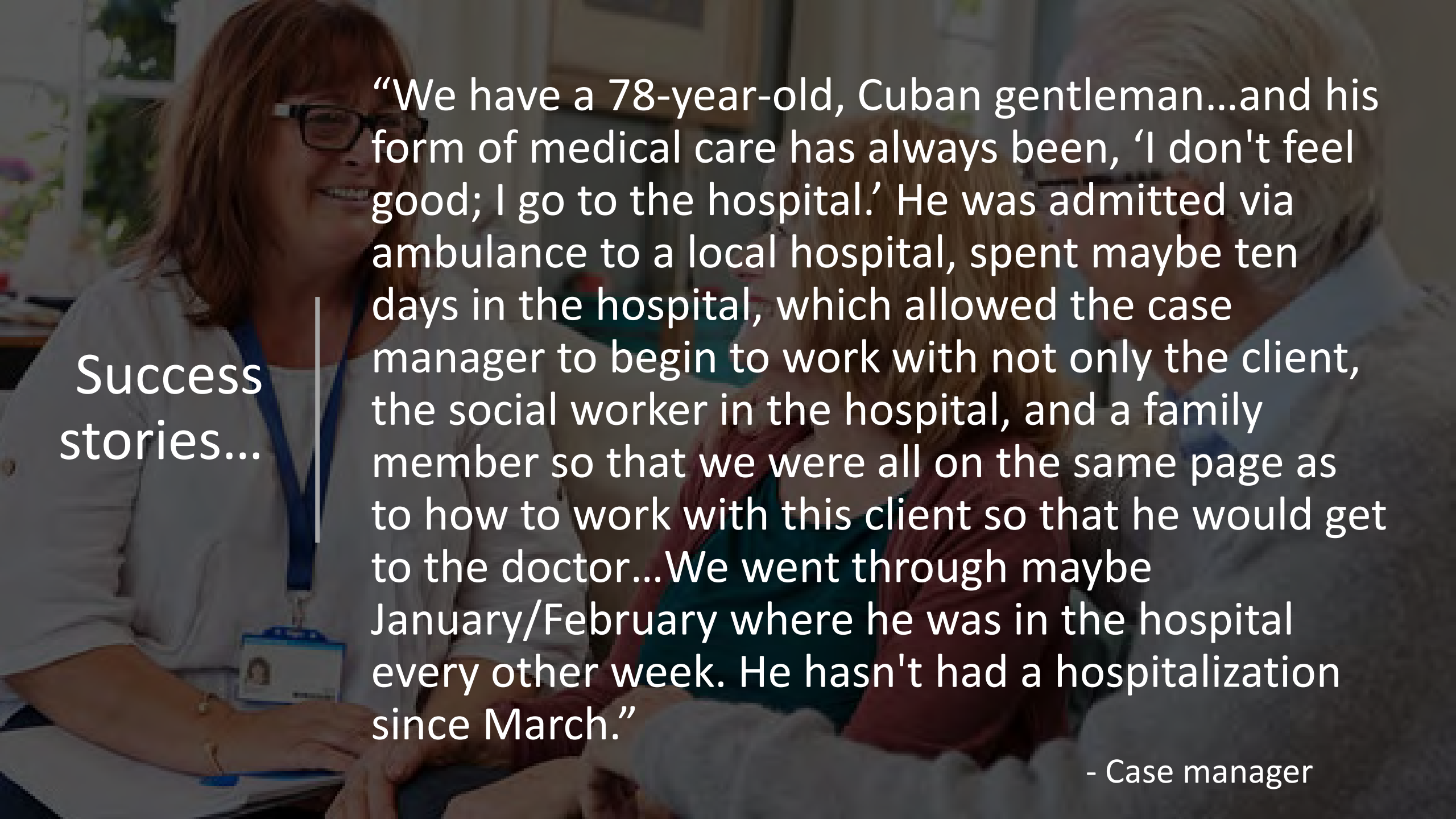


The background features a blue-toned image of binary code (0s and 1s) arranged in concentric, curved lines that create a sense of depth and motion. A large, light gray circle is positioned on the left side of the frame, serving as a container for the text.

Takeaway #2: Quality information is useful information

Alert information quality was associated with perceived improvements in:

- quality of care
- efficiency
- patient satisfaction



Success stories...

“We have a 78-year-old, Cuban gentleman...and his form of medical care has always been, ‘I don't feel good; I go to the hospital.’ He was admitted via ambulance to a local hospital, spent maybe ten days in the hospital, which allowed the case manager to begin to work with not only the client, the social worker in the hospital, and a family member so that we were all on the same page as to how to work with this client so that he would get to the doctor...We went through maybe January/February where he was in the hospital every other week. He hasn't had a hospitalization since March.”

- Case manager

Success stories...

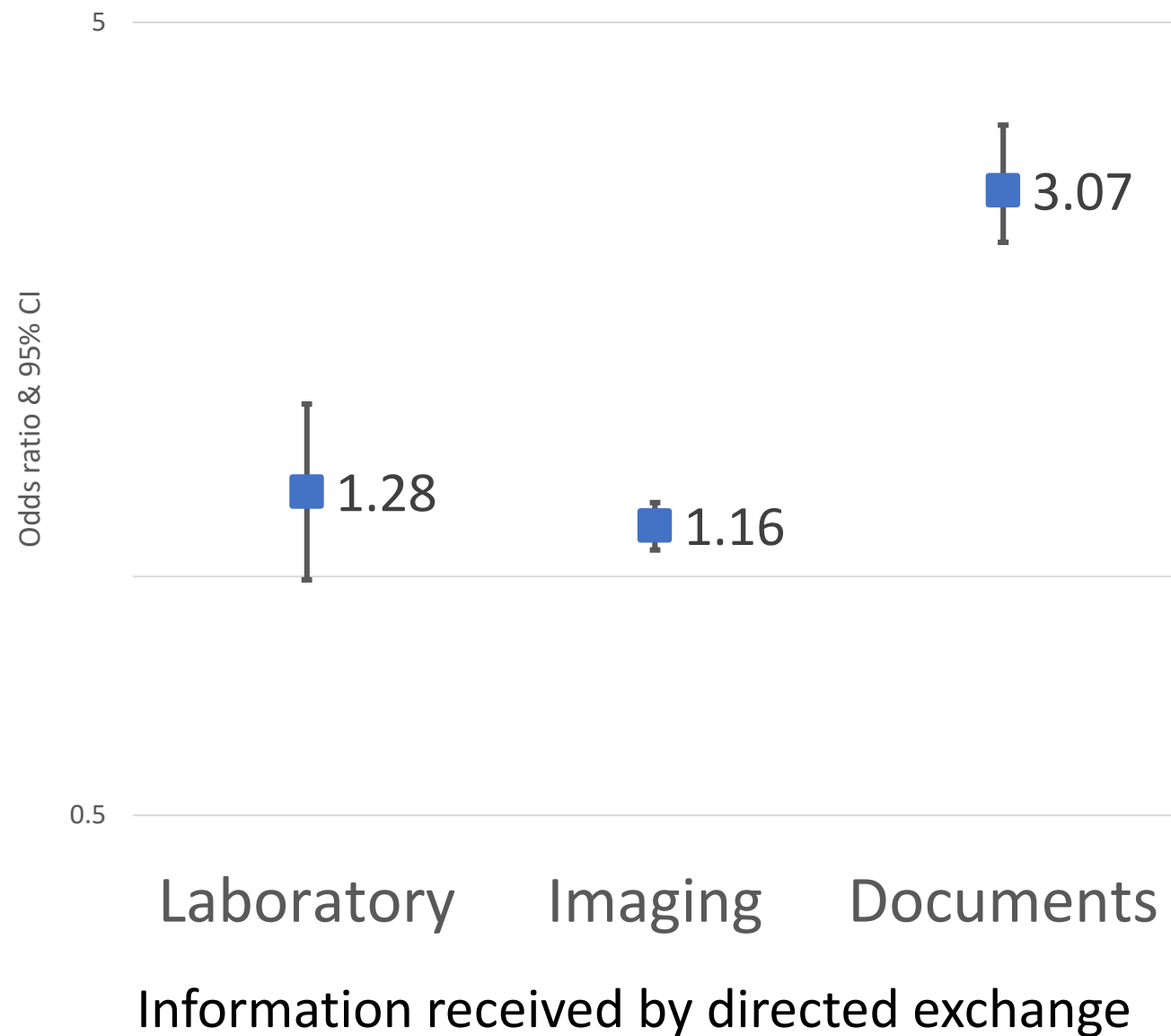
“I have a patient who has brain damage from an accident, but he cannot remember anything that anyone tells him, and he's really bad about telling people...So now when he shows up in the emergency room with belly pain or a sore throat, which he repetitively does, I can talk to the doctor and say, ‘You know, I know this man very well. What's going on with him? If he's stable and everything's okay, just have him see me tomorrow, and I will make sure that everything is ok.’ I've done that a couple of times.”

- Physician



Question 3

What
increases
usage of
querying a
portal-
based HIE
systems?



Question 4

NAME: Sample Patient, Nikhole (Urb)
ADMITTED: 4/3/04
DISCHARGED: 6/6/04

ADMISSION ID: 1234567
MED REC ID: 603433

PREGNANCY & LABOR

GP: OB FS.
PREGNATAL LABS: BLOOD TYPE A pos. SYPHILIS SCREEN: Nonreactive on 11/4/03. HEPATITIS SCREEN: Negative on 11/4/03. HIV SCREEN: Negative on 11/4/03. RUBELLA SCREEN: Immune on 11/4/03.
ESTIMATED DATE OF DELIVERY: 4/9/04. ESTIMATED GESTATION BY OB: 27 weeks. PREGNATAL CARE Adequate. PREGNANCY COMPLICATIONS: Bleeding and pregnancy-induced hypertension. PREGNANCY MEDICATIONS: Antihypertensive medication. ANTRNATAL STEROID DOSES: 4.
LABOR: Spontaneous. TOCOLYSIS: Terbutaline. BIRTH HOSPITAL: Jefferson Regional Medical Center. LABOR & DELIVERY COMPLICATIONS: Premature onset of labor and partial abruption.
Mother was admitted on the morning of delivery with bleeding. Ultrasound showed a partial abruption and an emergency cesarean section was done.

BIRTH

DATE: 4/3/04 TIME: 09:23 hours
WEIGHT: 0.852kg LENGTH: 34.0cm HC: 25.0cm
GEST AGE: 27 weeks GROWTH: AGA
RUPTURE OF MEMBRANES: At delivery. AMNIOTIC FLUID: Clear. PRESENTATION: Vertex DELIVERY: Emergent cesarean section. INDICATION: Suspected abruption. SITE: In the delivery room. ANESTHESIA: General
APGARS: 8 at 1 minute, 8 at 5 minutes. CORD pH: 7.29. CONDITION AT DELIVERY: Active, cyanotic and responsive.
TREATMENT AT DELIVERY: Stimulation, oral suctioning and endotracheal tube ventilation.
The infant was vigorous at birth with good spontaneous activity and respiratory effort, but air exchange was poor. She was intubated and given free-flow O2, then intubated with a 2.5 ETT.

ADMISSION

ADMISSION DATE 4/3/04 TIME: 09:30 hours
ADMISSION TYPE: Immediately following delivery. FOLLOW-UP PHYSICIAN: Dr. Smith. ADMISSION INDICATIONS: Prematurity and respiratory distress.
On admission to the NICU, the patient was pink with mild respiratory distress. She was placed on a ventilator.

ADMISSION PHYSICAL EXAM

WEIGHT: 0.852kg LENGTH: 34.0cm HC: 25.0cm
TEMP: 97.2. HR: 160. RR: 44. BP: 39/24. GLUCOSE SCREENING: 40-80mg%.
CONDITION: Pink and quiet in mild.
HEENT: Soft and flat fontanelle, opposed sutures, ET tube in place, red reflex bilaterally and patent nares.
RESPIRATORY: Mild-moderate retractions, good air exchange bilaterally and moderate scattered rales.
CARDIAC: Normal sinus rhythm, good perfusion, strong and equal pulses and no murmur.
ABDOMEN: Soft and nondistended abdomen and no organomegaly.
GU: Normal preterm female features and patent anus.
NEUROLOGIC: Responsive mental status, normal muscle tone for gestational age, fair Moro reflex and good grasp reflex.

EXTREMITIES: No hip click.

ADMISSION LABORATORY STUDIES

4/3/04 09:50h: WBC:9.0X10⁹/L Hgb:14.3 Hct:43.4 PLT:274X10³/L S:19 B:4 L:62 M:7 E:4 AL:4 NEBC8
4/3/04 22:00h: WBC:10.5X10⁹/L Hgb:13.4 Hct:40.4 PLT:285X10³/L S:52 B:9 L:41 M:4 E:2 Ba:1 NEBC2
4/3/04 22:00h: Na:134 K:4.3 Ca:8.5
4/3/04 22:00h: TBIL:3.0 DBIL:0.1
4/3/04 09:50h: RPR: nonreactive
4/3/04 09:50h: Direct Coombs: negative
4/3/04 09:50h: Blood Type: A pos

RESOLVED DIAGNOSES

RESPIRATORY DISTRESS SYNDROME MODERATE

ONSET: 4/3/04 RESOLVED: 4/9/04
PROCEDURES: UAC placement from 4/3/04 to 4/6/04; Surfactant therapy from 4/3/04 to 4/4/04 (4 doses).

Sometimes the discharge summaries don't have everything. . .[the discharge summary] will reference a consultation report that they didn't send and I'll go out and get that. Sometimes there will be labs pending and by the time I get it the labs are complete and I'll have to go out on the RHIO to get it.

- Nurse case manger

Question 5



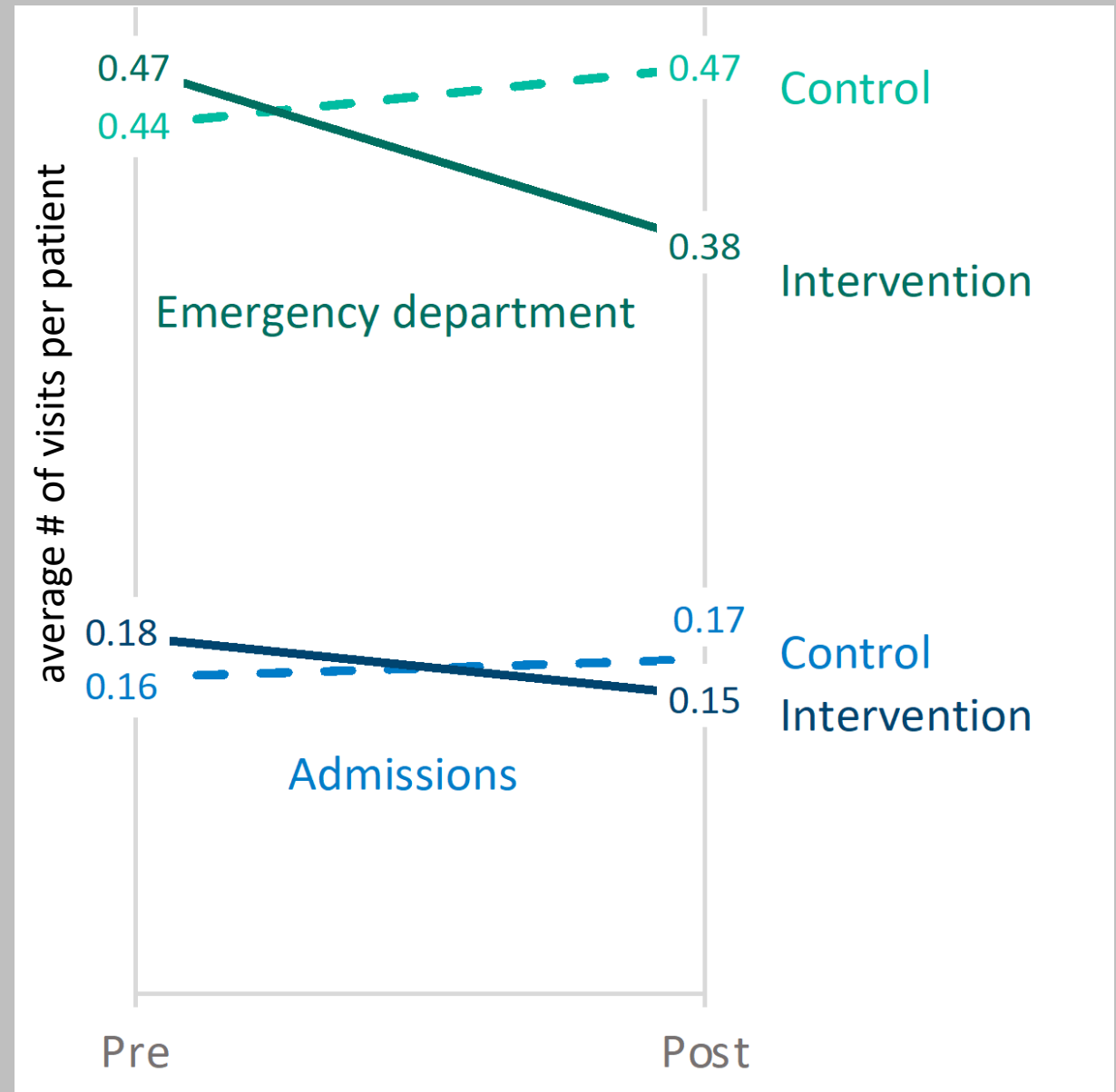
Demonstrated effectiveness

- Strong prediction performance across all performance metrics.
- 65% increase in social work referrals when risk scoring went live at primary care clinics
- 48% increase in odds that referred patients will keep their appointments



\$1.7 million in estimated cost savings

- 1 year pre-post analysis of ED visits and inpatients admissions after go-live
- \$171 cost reduction per patient





What does your organization need to use information more effectively?

Information exchange can
reduce utilization & save costs

Effective use of information
requires thoughtfulness & planning

Multiple systems work together to
for comprehensive patient information

Information must be put into action &
used to support decision making

Joshua R Vest, PhD, MPH
Indiana University
Regenstrief Institute
joshvest@iu.edu

