EHRs, PHRs, and Health on the Web

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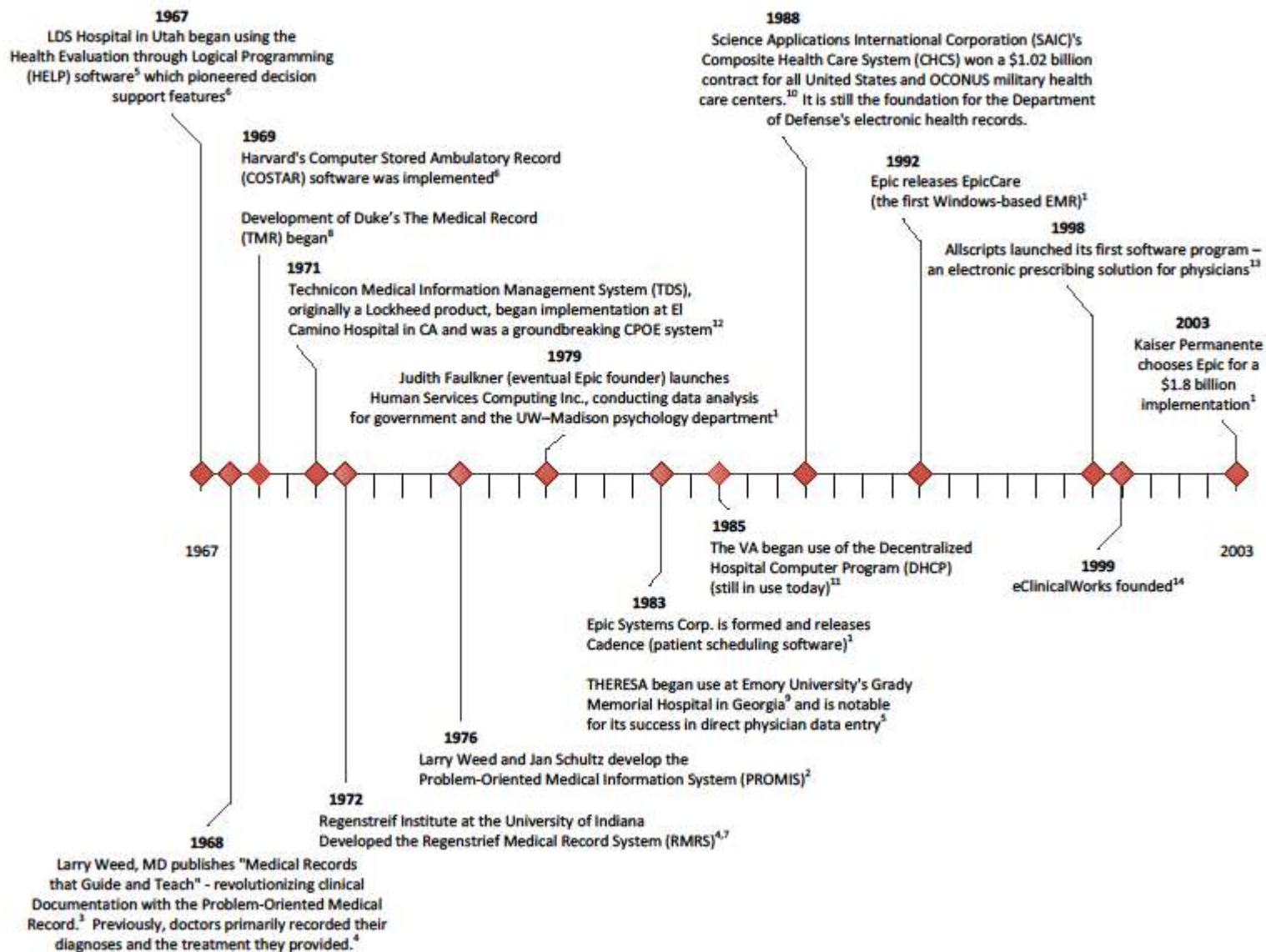
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The Permanente Federation

What's wrong with this picture?

Timeline of EHRs

1967
LDS Hospital in Utah began using the Health Evaluation through Logical Programming (HELP) software[5] which pioneered decision support features[6]

1969
Harvard's Computer Stored Ambulatory Record (COSTAR) software was implemented[6]

Development of Duke's The Medical Record (TMR) began[8]

1971
Technicon Medical Information Management System (TDS), originally a Lockheed product, began implementation at El Camino Hospital in CA and was a groundbreaking CPOE system[12]

1979
Judith Faulkner (eventual Epic founder) launches Human Services Computing Inc., conducting data analysis for government and the UW–Madison psychology department[1]

1988
Science Applications International Corporation (SAIC)'s Composite Health Care System (CHCS) won a $1.02 billion contract for all United States and OCONUS military health care centers.[10] It is still the foundation for the Department of Defense's electronic health records.

1992
Epic releases EpicCare (the first Windows-based EMR)[1]

1998
Allscripts launched its first software program – an electronic prescribing solution for physicians[13]

2003
Kaiser Permanente chooses Epic for a $1.8 billion implementation[1]

1967

2003

1985
The VA began use of the Decentralized Hospital Computer Program (DHCP) (still in use today)[11]

1999
eClinicalWorks founded[14]

1983
Epic Systems Corp. is formed and releases Cadence (patient scheduling software)[1]

THERESA began use at Emory University's Grady Memorial Hospital in Georgia[9] and is notable for its success in direct physician data entry[5]

1976
Larry Weed and Jan Schultz develop the Problem-Oriented Medical Information System (PROMIS)[2]

1972
Regenstreif Institute at the University of Indiana Developed the Regenstrief Medical Record System (RMRS)[4,7]

1968
Larry Weed, MD publishes "Medical Records that Guide and Teach" - revolutionizing clinical Documentation with the Problem-Oriented Medical Record.[3] Previously, doctors primarily recorded their diagnoses and the treatment they provided.[4]

ONC and the Stages of Meaningful Use

Stage 1: Data capture and sharing	Stage 2: Advance clinical processes	Stage 3: Improved outcomes
Electronically capturing health information in a standardized format	More rigorous health information exchange (HIE)	Improving quality, safety, and efficiency, leading to improved health outcomes
Using that information to track key clinical conditions	Increased requirements for e-prescribing and incorporating lab results	Decision support for national high-priority conditions
Communicating that information for care coordination processes	Electronic transmission of patient care summaries across multiple settings	Patient access to self-management tools
Initiating the reporting of clinical quality measures and public health information	More patient-controlled data	Access to comprehensive patient data through patient-centered HIE
Using information to engage patients and their families in their care		Improving population health

Meaningful Use Certification

Stage 1

Core Set – all required	
Demographics (50%)	e-Prescribing (40%)
Vitals: BP and BMI (50%	CPOE (30% including a med)
Problem list: ICD-9-CM or SNOMED (80%)	Drug-drug and drug-allergy interactions (functionality enabled)
Active medication list (80%)	Exchange critical information (perform test)
Medication allergies (80%)	Security risk analysis
Smoking status (50%)	Report clinical quality (BP, BMI, Smoke, plus 3 others)
Patient clinical visit summary (50% in 3 days)	Clinical decision support (one rule)
Hospital discharge instructions (50%) - or - Patient with electronic copy (50% in 3 days)	

Menu – 5 of 10
Drug-formulary checks (one report)
Structured lab results (40%)
Patients by conditions (one report)
Send patient-specific education (10%)
Medication reconciliation (50%)
Summary care record at transitions (50%)
Feed immunization registries (perform at least one test)
Feed syndromic surveillance (perform at least one test)
Send reminders to patients for preventative and follow-up care (20% > 65yrs. < 5yrs.)
Patient electronic access to labs, problems, meds and allergies (10% in 4 days)

Plenty of options

Ambulatory Certified EHR Products — 3,481

Inpatient Certified EHR Products — 1,163

Distinct EHR Vendors — 417

Source: CMS.gov, July 2013

So how are we doing?

Figure 1. Percentage of office-based physicians with EMR/EHR systems: United States, 2001–2010 and preliminary 2011–2012
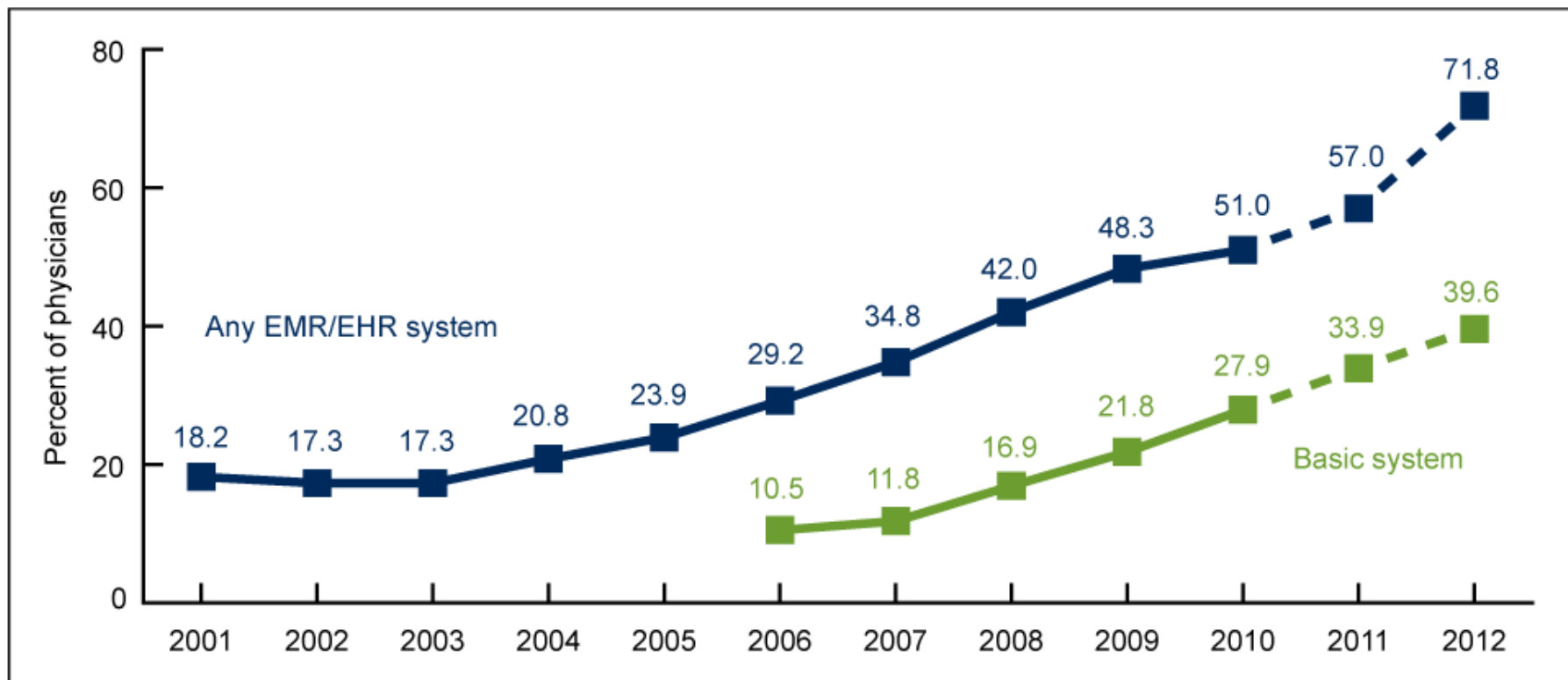
NOTES: EMR/EHR is electronic medical record/electronic health record. "Any EMR/EHR system" is a medical or health record system that is all or partially electronic (excluding systems solely for billing). Data for 2001–2007 are from in-person National Ambulatory Medical Care Survey (NAMCS) interviews. Data for 2008–2010 are from combined files (in-person NAMCS and mail survey). Data for 2011–2012 are preliminary estimates (dashed lines) based on the mail survey only. Estimates of basic systems prior to 2006 could not be computed because some items were not collected in the survey. Data include nonfederal office-based physicians and exclude radiologists, anesthesiologists, and pathologists.
SOURCE: CDC/NCHS, National Ambulatory Medical Care Survey, 2001–2012.

Source: Hsiao CJ, Hing E. Use and Characteristics of Electronic Health Record Systems Among Office-based Physician Practices: United States, 2001-2012. NCHS data brief, no 111. Hyattsville, MD: National Center for Health Statistics. 2012

Motivation: Meaningful Use

Figure 2. Percentage of office-based physicians intending to participate in meaningful use incentive programs, by state: United States, preliminary 2012
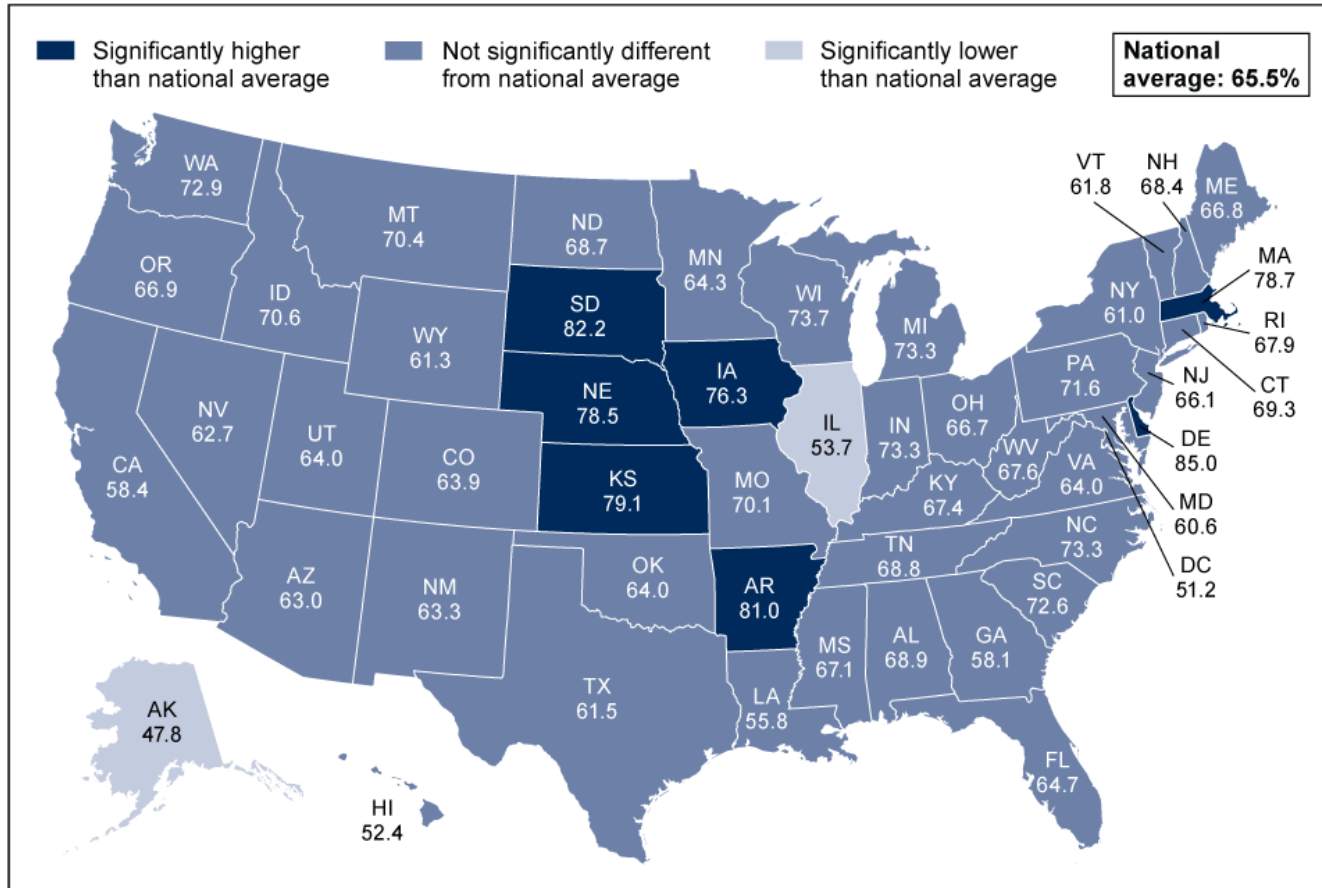
NOTES: Intent to participate in meaningful use incentive program was obtained from responses to the question, "Medicare and Medicaid offer incentives to practices that demonstrate 'meaningful use of health IT.' At this practice, are there plans to apply for these incentive payments?" Intent to participate includes "already applied" (40.5%) and "intend to apply" (25.0%). In 2012, 22.4% of physicians were uncertain about participating and 12.1% did not plan to participate. Estimates exclude missing data on the question.
SOURCE: CDC/NCHS, National Ambulatory Medical Care Survey, 2012.

Source: Hsiao CJ, Hing E. Use and Characteristics of Electronic Health Record Systems Among Office-based Physician Practices: United States, 2001-2012. NCHS data brief, no 111. Hyattsville, MD: National Center for Health Statistics. 2012

Who does or doesn't have an EHR?

Figure 1. Percentage of electronic health record system adoption, by physician age and specialty and practice size and ownership, 2011
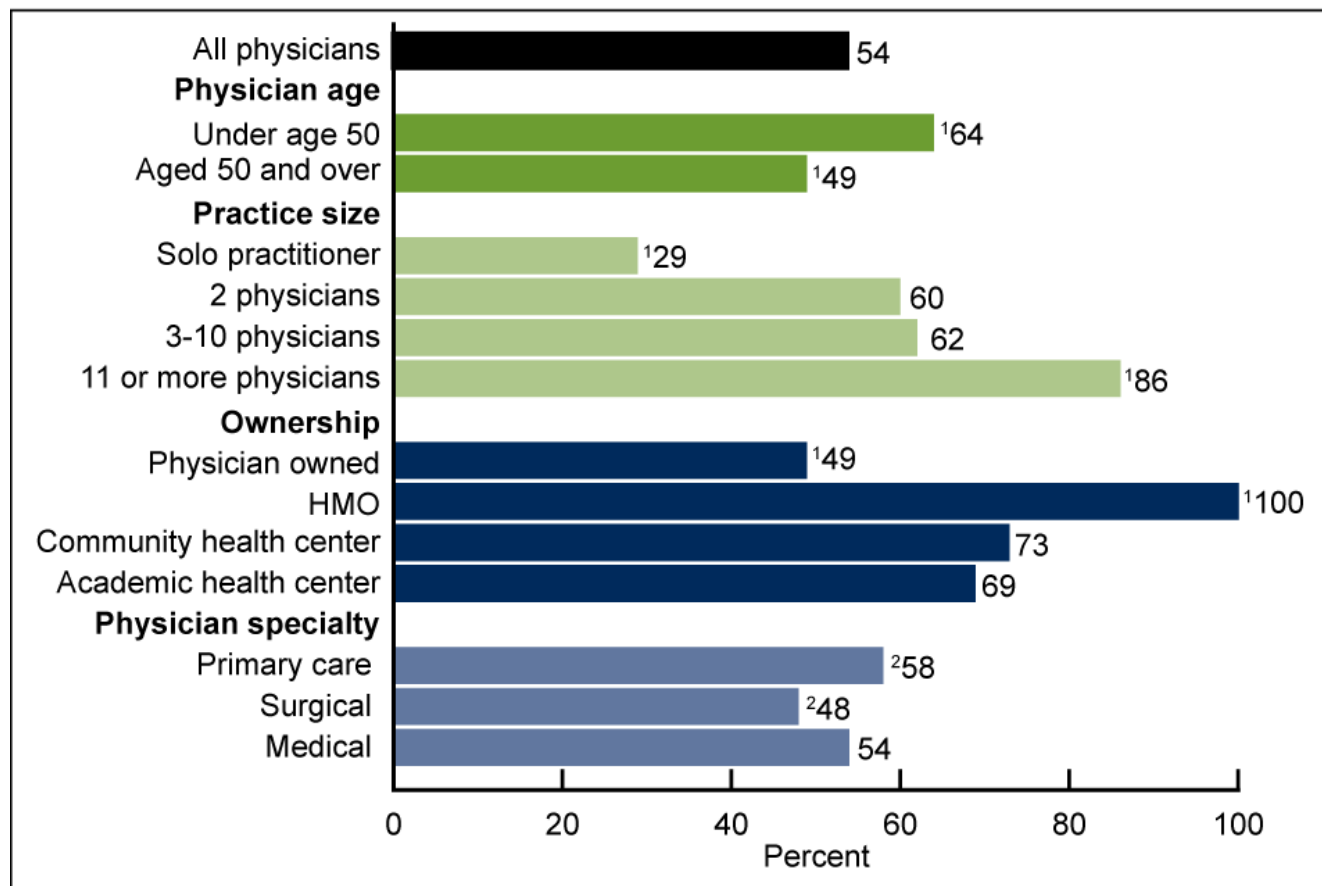
[1]Differences in adoption between this category and all others are statistically significant ($p < 0.01$).
[2]Significant difference between primary care and surgical specialists ($p < 0.01$).
NOTES: Adoption consists of physicians who use a health record system that is all or partially electronic (excluding systems solely for billing). The sample includes nonfederal, office-based physicians and excludes radiologists, anesthesiologists, and pathologists. HMO is health maintenance organization.
SOURCE: CDC/NCHS, Physician Workflow study, 2011.

Source: Jamoom E, Beatty P, Bercovitz A, et al. Physician adoption of electronic health record systems: United States, 2011. NCHS data brief, no 98. Hyattsville, MD: National Center for Health Statistics. 2012.

Who benefits?

Figure 4. Percentage of physicians whose electronic health records provided selected benefits: United States, 2011
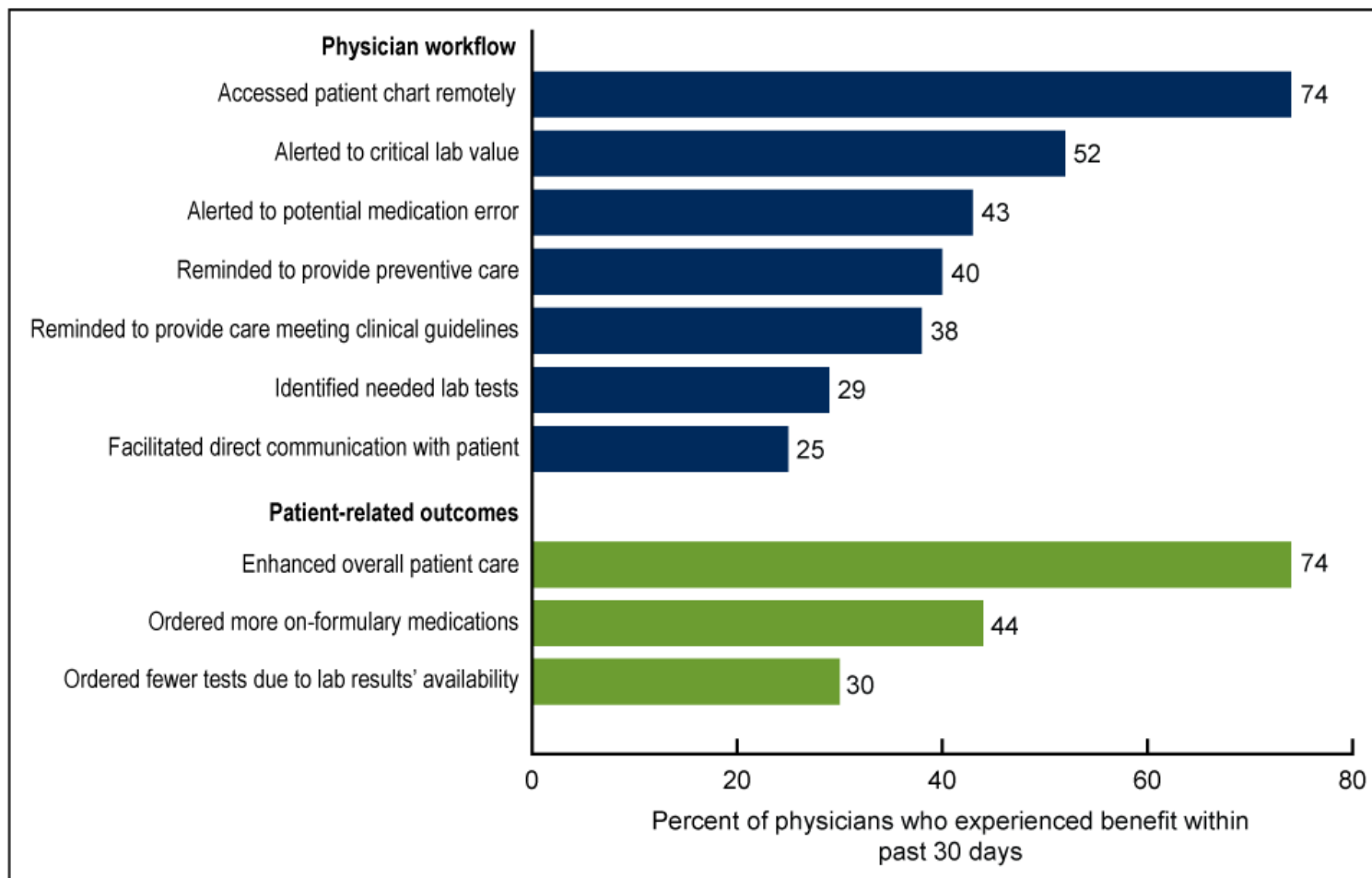
NOTES: Physicians with electronic health record (EHR) systems whose systems or scope of work did not include a specified capability responded not applicable. These responses are included in the denominator for percentages. Data represent office-based physicians who reported having adopted EHR systems (55% of sample). The sample includes nonfederal, office-based physicians and excludes radiologists, anesthesiologists, and pathologists. SOURCE: CDC/NCHS, Physician Workflow study, 2011.

Source: Jamoom E, Beatty P, Bercovitz A, et al. Physician adoption of electronic health record systems: United States, 2011. NCHS data brief, no 98. Hyattsville, MD: National Center for Health Statistics. 2012.

Users could be happier

Figure 3. Percent distribution of electronic health record satisfaction among office-based physicians: United States, 2011
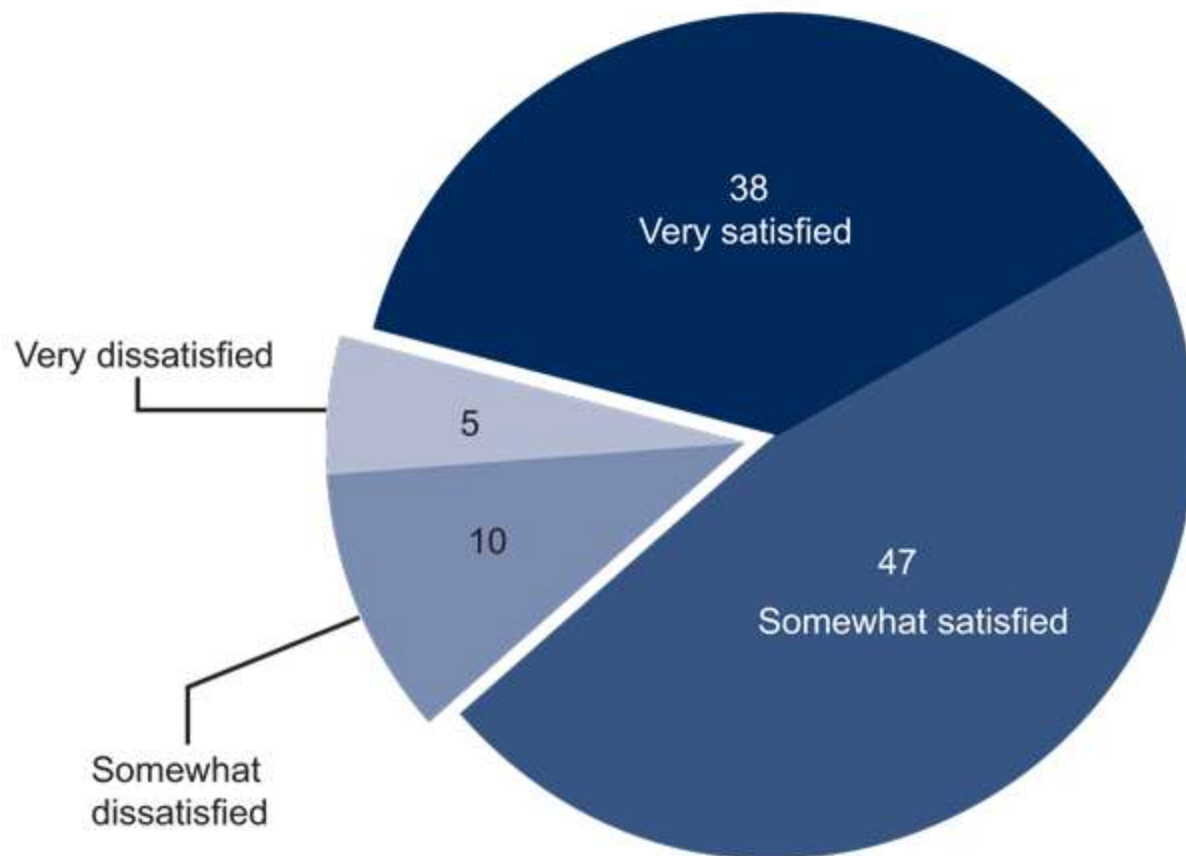
NOTES: Data represent office-based physicians who reported having adopted electronic health record systems (55% of sample). The sample includes nonfederal, office-based physicians and excludes radiologists, anesthesiologists, and pathologists. Missing values are excluded.
SOURCE: CDC/NCHS, Physician Workflow study, 2011.

Source: Jamoom E, Beatty P, Bercovitz A, et al. Physician adoption of electronic health record systems: United States, 2011. NCHS data brief, no 98. Hyattsville, MD: National Center for Health Statistics. 2012.

The big two: The Epic environment

The big two: Cerner

Different approach: Hello Health

PHRs: Google Health

PHRs: Microsoft HealthVault

HIPAA: The Privacy Rule

Protected Health Information

Privacy Rule protects all "individually identifiable health information" held or transmitted by a covered entity or its business associate, in any form or media, whether electronic, paper, or oral. The Privacy Rule calls this information "protected health information (PHI)."

"Individually identifiable health information" is information, including demographic data, that relates to:
- the individual's past, present or future physical or mental health or condition,
- the provision of health care to the individual, or
- the past, present, or future payment for the provision of health care to the individual,

and that identifies the individual or for which there is a reasonable basis to believe it can be used to identify the individual.13 Individually identifiable health information includes many common identifiers (e.g., name, address, birth date, Social Security Number).

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De-Identified Health Information

There are no restrictions on the use or disclosure of de-identified health information. De-identified health information neither identifies nor provides a reasonable basis to identify an individual. There are two ways to de-identify information; either:
(1) a formal determination by a qualified statistician; or
(2) the removal of specified identifiers of the individual and of the individual's relatives, household members, and employers is required, and is adequate only if the covered entity has no actual knowledge that the remaining information could be used to identify the individual

HIPAA in the age of Health Apps