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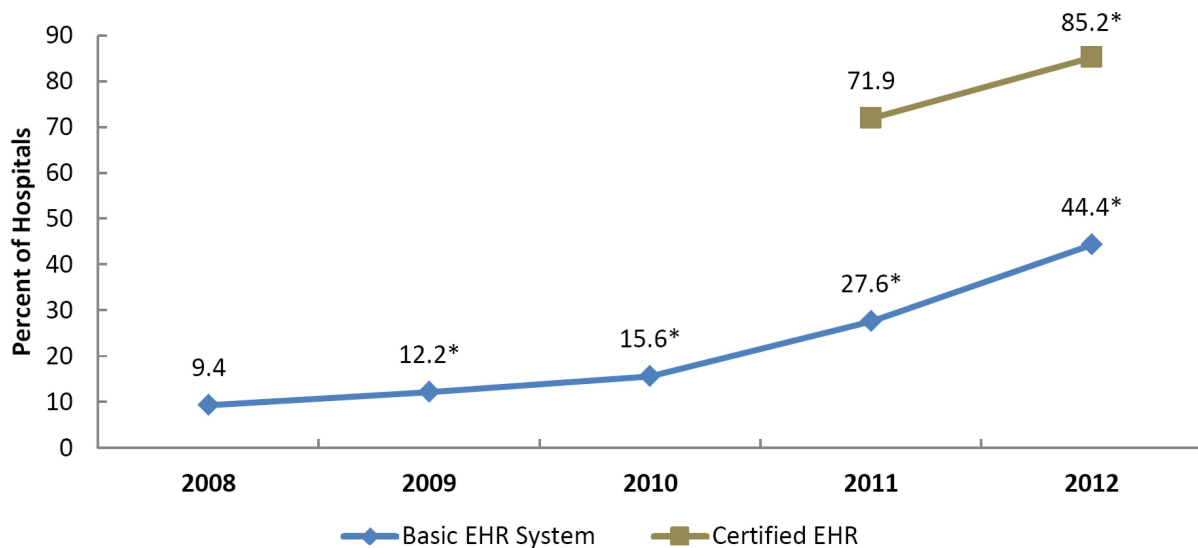
Adoption of Electronic Health Record Systems among U.S. Non-federal Acute Care Hospitals: 2008-2012

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The Health Information Technology for Economic and Clinical Health (HITECH) Act of 2009 directed the Office of the National Coordinator for Health Information Technology (ONC) to promote the adoption and meaningful use of electronic health records (EHRs). This brief describes trends in adoption of EHR systems among non-federal acute care hospitals from 2008 to 2012.

Hospital adoption of EHR systems has more than tripled since 2009.

Figure 1: Percent of non-federal acute care hospitals with adoption of at least a Basic EHR system and possession of a certified EHR: 2008-2012



NOTES: Basic EHR adoption requires the EHR system to have at least a basic set of EHR functions, including clinician notes, as defined in Table 2. A certified EHR is EHR technology that has been certified as meeting federal requirements for some or all of the hospital objectives of Meaningful Use. Possession means that the hospital has a legal agreement with the EHR vendor, but is not equivalent to adoption.

*Significantly different from previous year ($p < 0.05$).

SOURCE: ONC/American Hospital Association (AHA), AHA Annual Survey Information Technology Supplement

- ★ Hospital adoption of at least a Basic EHR system more than tripled since 2009, increasing from 12% to 44% (Figure 1).
- ★ The percent of hospitals possessing a certified EHR technology increased by 18% between 2011 and 2012, rising from 72% to 85%.

Hospital adoption of EHR systems varied significantly by state.

Table 1: Percent of non-federal acute care hospitals with adoption of at least a Basic EHR system and possession of a certified EHR by U.S. state: 2012

State	Basic EHR, %	Certified EHR, %	n(N)	State	Basic EHR, %	Certified EHR, %	n(N)
United States	44.4	85.2	2836(4539)	Missouri	44.9	82.1 [§]	109(110)
Alabama	29.1 [§]	87.7	42(94)	Montana	29.5 [§]	72.5 [§]	33(55)
Alaska	33.2	65.9	12(22)	Nebraska	42.9	88.7	53(85)
Arizona	48.7	85.8	33(61)	Nevada	44.3	74.4	11(30)
Arkansas	44.4	81.6	48(71)	New Hampshire	21.1 [§]	100.0 [†]	14(26)
California	49.4	73.5 [§]	187(339)	New Jersey	42.6	86.9	40(63)
Colorado	68.3 [†]	95.1 [†]	40(72)	New Mexico	25.5 [§]	92.8 [†]	21(31)
Connecticut	45.7	95.8 [†]	24(30)	New York	43.1	92.1 [†]	125(177)
Delaware	39.4	39.1 [§]	5(6)	North Carolina	44.2	86.6	68(110)
District of Columbia	28.7	51.5 [§]	7(10)	North Dakota	49.3	76.5	18(42)
Florida	43.3	97.1 [†]	93(186)	Ohio	52.3 [†]	86.6	106(159)
Georgia	46.8	88.2	67(139)	Oklahoma	32.4 [§]	77.6 [§]	68(106)
Hawaii	51.8	83.2	13(21)	Oregon	49.0	56.8 [§]	34(59)
Idaho	52.4	77.4	18(39)	Pennsylvania	47.1	89.9 [†]	112(158)
Illinois	48.9 [†]	91.4 [†]	141(179)	Rhode Island	68.8 [†]	59.1	7(11)
Indiana	52.0 [†]	97.2 [†]	73(107)	South Carolina	29.6 [§]	83.4	31(58)
Iowa	47.9	87.8	73(117)	South Dakota	70.6 [†]	92.4	23(51)
Kansas	25.8 [§]	84.1	111(125)	Tennessee	33.3 [§]	90.5	49(117)
Kentucky	33.8 [§]	95.3 [†]	61(97)	Texas	34.8 [§]	81.4 [§]	233(347)
Louisiana	36.4	91.3	48(107)	Utah	12.0*	46.2 [§]	13(43)
Maine	27.5 [§]	96.3 [†]	26(36)	Vermont	70.2	100.0 [†]	7(14)
Maryland	54.1 [†]	90.8 [†]	34(46)	Virginia	58.2 [†]	94.7 [†]	44(79)
Massachusetts	57.8 [†]	89.4	38(69)	Washington	38.3	86.4	45(86)
Michigan	56.4 [†]	86.1	80(132)	West Virginia	51.2	96.1 [†]	24(49)
Minnesota	58.8 [†]	78.5 [§]	124(131)	Wisconsin	62.8 [†]	87.0	92(122)
Mississippi	34.9	84.6	41(91)	Wyoming	42.2	88.3	17(24)

NOTES: Basic EHR adoption requires the EHR system to have at least a basic set of EHR functions, including clinician notes, as defined in Table 2. A certified EHR is EHR technology that has been certified as meeting federal requirements for some or all of the hospital objectives of Meaningful Use. n = survey respondents; N = hospitals surveyed.

*Estimate does not meet standards of reliability

†Significantly higher than national average

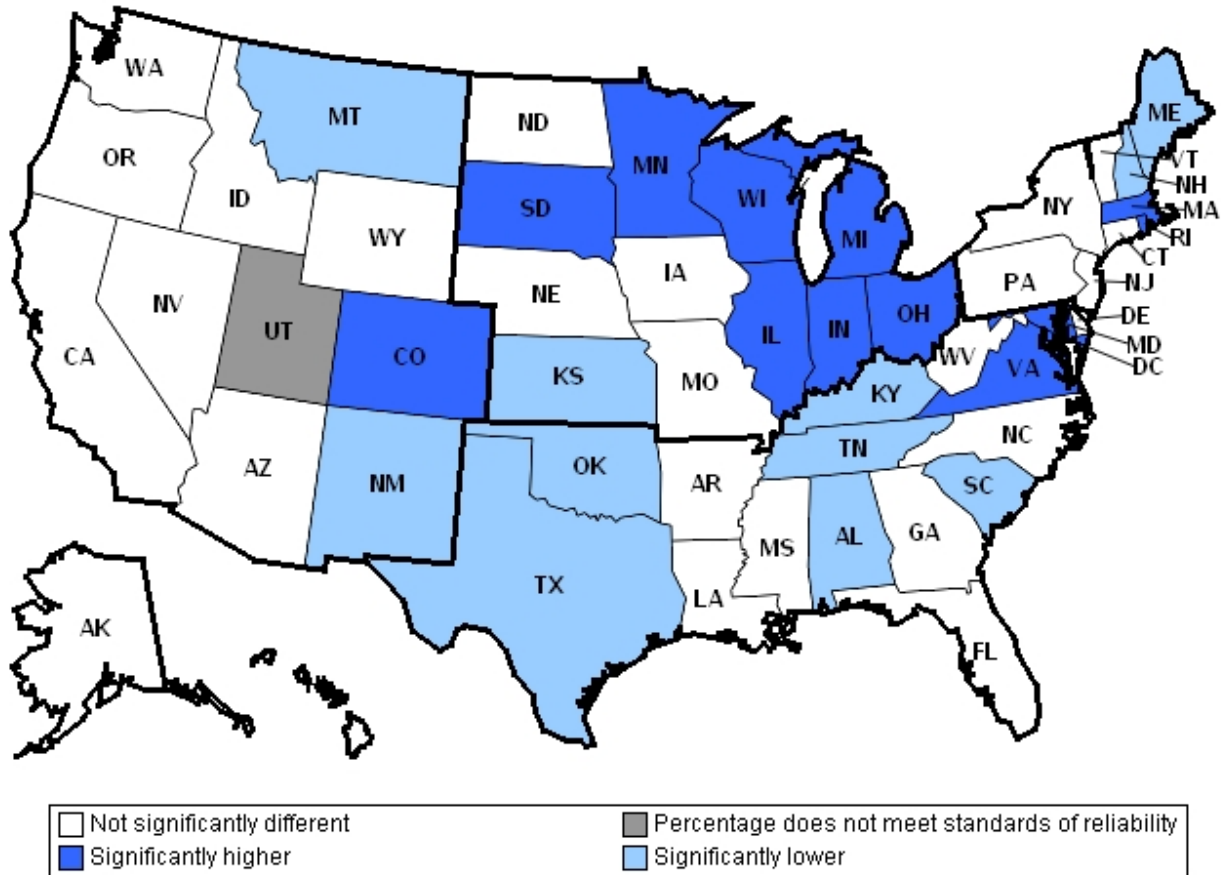
§Significantly lower than national average (p < 0.05)

SOURCE: ONC/AHA, AHA Annual Survey Information Technology Supplement

- ★ State rates of hospital adoption of at least a Basic EHR system ranged from 21% to 71% (Table 1).
- ★ South Dakota (71%), Rhode Island (69%), and Colorado (68%) had the highest percent of hospitals with adoption of at least a Basic EHR system.
- ★ New Hampshire (21%), New Mexico (26%), and Kansas (26%) had the lowest percent of hospitals with adoption of at least a Basic EHR system.

EHR adoption rates were significantly higher than the national average in twelve states.

Figure 2: State percent of non-federal acute care hospitals with adoption of at least a Basic EHR system compared with the national average (44.4%): 2012



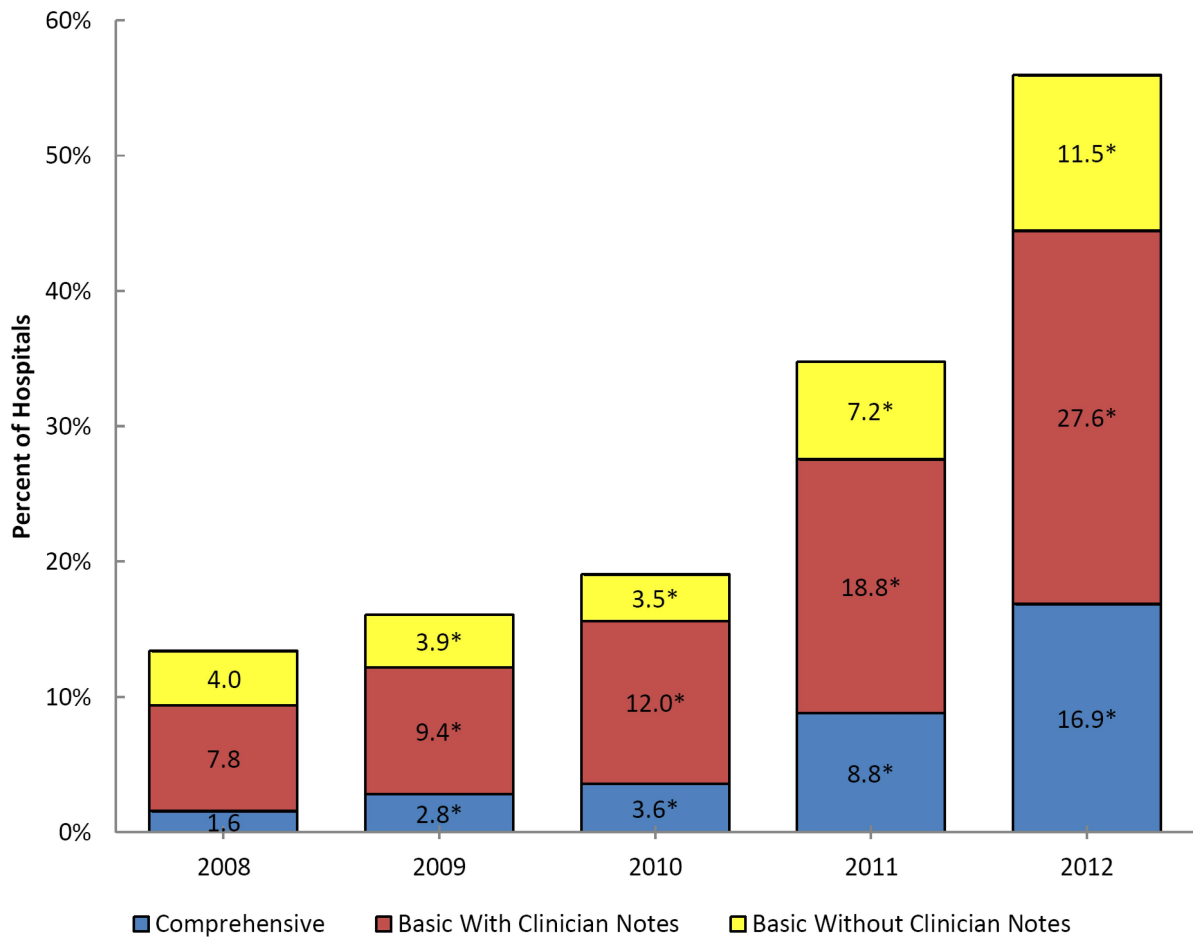
NOTES: Basic EHR adoption requires the EHR system to have at least a basic set of EHR functions, including clinician notes, as defined in Table 2.

SOURCE: ONC/AHA, AHA Annual Survey Information Technology Supplement

- ★ Hospital adoption of at least a Basic EHR system was significantly higher than the national average in twelve states (Colorado, Illinois, Indiana, Maryland, Massachusetts, Michigan, Minnesota, Ohio, Rhode Island, South Dakota, Virginia, and Wisconsin) (Figure 2).
- ★ Hospital adoption of at least a Basic EHR system was significantly lower than the national average in eleven states (Alabama, Kansas, Kentucky, Maine, Montana, New Hampshire, New Mexico, Oklahoma, South Carolina, Tennessee, and Texas).
- ★ Most of the states with adoption rates significantly higher than the national average were located in the Midwest.

Trends in EHR adoption show increasing use of advanced functionality.

Figure 3: Percent of non-federal acute care hospitals with adoption of EHR systems by level of functionality: 2008-2012



NOTES: Definitions of Basic EHR and Comprehensive EHR systems are reported in Table 2.

*Significantly different from previous year ($p < 0.05$).

A prior study reported estimates of hospital adoption based on at least Basic EHR with Clinician Notes (1).

Differences in the estimates in this brief from (1) are due to the inclusion of children's and cancer hospitals and small differences in the calculation of hospital-level weights.

SOURCE: ONC/AHA, AHA Annual Survey Information Technology Supplement

- ★ Hospital adoption of Comprehensive EHR systems has increased six-fold since 2009, rising to 17% in 2012 (Figure 3).
- ★ From 2009 to 2012, hospital adoption of at least a Basic EHR without Clinician Notes more than tripled, increasing from 16% to 56%.

Summary

Adoption of EHR systems by non-federal acute care hospitals has steadily increased since HITECH. In 2012, 44% of non-federal acute care hospitals had adopted at least a Basic EHR system with clinician notes. This represents a 61% increase from the previous year and a more than three-fold increase in EHR adoption since 2009. In addition, a vast majority of acute care hospitals (85%) possessed EHR technology certified as meeting federal requirements for Meaningful Use objectives.

Hospital adoption of EHR systems varied across U.S. states. Rates of hospital adoption of at least a Basic EHR system were significantly above the national average in twelve states and significantly below the national average in eleven other states. Hospitals in South Dakota, Rhode Island, and Colorado had the highest rates of adoption. Hospitals in New Hampshire, New Mexico, and Kansas had the lowest adoption rates.

In addition to growth in EHR adoption overall, hospital adoption of advanced functionality has increased significantly. Hospital adoption of comprehensive EHR systems has increased more than six-fold in just three years.

Definitions

Non-federal acute care hospital: Includes acute care general medical and surgical, children’s general, and cancer hospitals owned by private/not-for-profit, investor-owned/for-profit, or state/local government and located within the 50 states and District of Columbia. The inclusion of children’s general and cancer hospitals makes this definition different from previous peer-reviewed research (2). However, it is more consistent with the population of hospitals eligible for federal health IT adoption incentives.

Adoption of Basic EHR: Table 2 defines the electronic functions required for hospital adoption of a Basic or Comprehensive EHR system, which a consensus expert panel established (3). The panel disagreed on the need to include physician notes and nursing assessments to classify a Basic system, so they developed two definitions of Basic EHR adoption (Basic EHR without Notes and Basic EHR with Notes) (3). Since Meaningful Use Stage 1 did not require clinician notes, a previous brief reported Basic EHR without Clinician Notes (4). Since clinician notes are a requirement for Meaningful Use Stage 2 (5), the definition of Basic EHR in this brief includes clinician notes as a requirement for at least a Basic EHR system.

Possession of Certified EHR: A certified EHR is EHR technology that has been certified as meeting federal requirements for some or all of the hospital objectives of Meaningful Use. “Possession” of certified EHR technology is considered to be either the physical possession of the medium on which a certified Complete EHR, or certified EHR Module resides, or a legally enforceable right by an eligible health care provider to access and use, at its discretion, the capabilities of a certified Complete EHR or certified EHR Module. An eligible health care provider may determine the extent to which it will implement or use these capabilities, which will not affect the provider’s “possession” of the certified Complete EHR or certified EHR Module.

Table 2: Electronic Functions Required for Hospital Adoption of Basic or Comprehensive EHR Systems

EHR Functions Required	Basic EHR without Clinician Notes	Basic EHR with Clinician Notes	Comprehensive EHR
Electronic Clinical Information			
Patient demographics	★	★	★
Physician notes		★	★
Nursing assessments		★	★
Problem lists	★	★	★
Medication lists	★	★	★
Discharge summaries	★	★	★
Advance directives			★
Computerized Provider Order Entry			
Lab reports			★
Radiology tests			★
Medications	★	★	★
Consultation requests			★
Nursing orders			★
Results Management			
View lab reports	★	★	★
View radiology reports	★	★	★
View radiology images			★
View diagnostic test results	★	★	★
View diagnostic test images			★
View consultant report			★
Decision Support			
Clinical guidelines			★
Clinical reminders			★
Drug allergy results			★
Drug-drug interactions			★
Drug-lab interactions			★
Drug dosing support			★

NOTES: Basic EHR adoption requires each function to be implemented in at least one clinical unit, and Comprehensive EHR adoption requires each function to be implemented in all clinical units

Data Source and Methods

Data are from the American Hospital Association (AHA) Information Technology (IT) Supplement to the AHA Annual Survey. Since 2008, ONC has partnered with the AHA to measure the adoption and use of health IT in U.S. hospitals. ONC funded the 2012 AHA IT Supplement to track hospital adoption and use of EHRs and the exchange of clinical data.

The chief executive officer of each U.S. hospital was invited to participate in the survey regardless of AHA membership status. The person most knowledgeable about the hospital's health IT (typically the chief information officer) was requested to provide the information via a mail survey or secure online site. Non-respondents received follow-up mailings and phone calls to encourage response. The survey was fielded from October 2012 to the end of January 2013.

The response rate for non-federal acute care hospitals was 63%. A logistic regression model was used to predict the propensity of survey response as a function of hospital characteristics, including size, ownership, teaching status, system membership, availability of a cardiac intensive care unit, urban status, and region. Hospital-level weights were derived by the inverse of the predicted propensity.

Estimates considered unreliable had a relative standard error adjusted for finite populations greater than 0.49. Responses with missing values were assigned zero values. Significant differences were tested using $p < 0.05$ as the threshold.

References

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