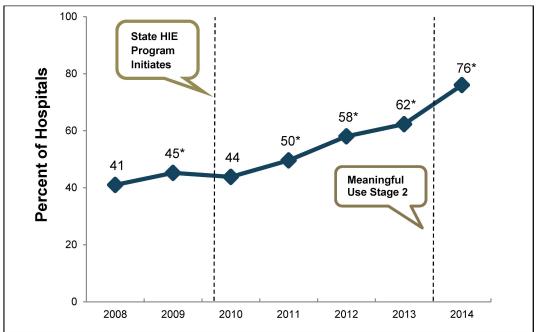# Health Information Exchange among U.S. Non-federal Acute Care Hospitals: 2008-2014

Matthew Swain, MPH; Dustin Charles, MPH; Vaishali Patel, PhD MPH; Talisha Searcy MPA

Increasing the interoperable exchange of health information across the care continuum and individuals is a nationwide priority (1,2). The Office of the National Coordinator for Health IT (ONC) recently issued *Connecting Health and Care for the Nation: A Shared Nationwide Interoperability Roadmap Version 1.0,* which specifies actions by public and private stakeholders to enable a majority of individuals and providers across the care continuum to send, receive, find, and use a common set of electronic clinical information by the end of 2017. Monitoring trends in electronic exchange of health information among hospitals is a critical component of assessing nationwide progress on exchange and interoperability across the care continuum. This brief updates analysis from 2013 (3), and describes trends in electronic health information exchange among non-federal acute care hospitals from 2008 to 2014.

Three-quarters of hospitals electronically exchanged health information with outside providers in 2014.

Figure 1: Percent of non-federal acute care hospitals that electronically exchanged laboratory results, radiology reports, clinical care summaries, or medication lists with ambulatory care providers or hospitals outside their organization: 2008-2014.
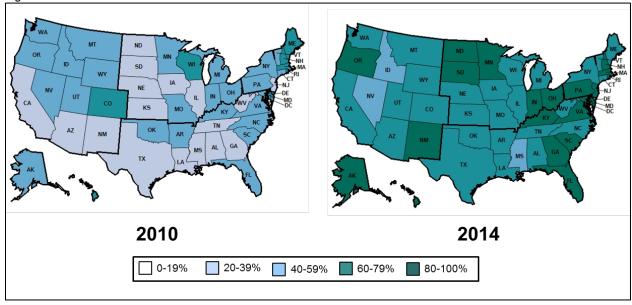

SOURCE: ONC/American Hospital Association (AHA), AHA Annual Survey Information Technology Supplement.
NOTES: *Significantly different from previous year (p < 0.05).

★ Hospitals' electronic health information exchange with hospitals or ambulatory care providers outside their organization increased by 85% from 2008 to 2014, and increased by 23% since last year (2013).

Since 2010, most states experienced growth in electronic health information exchange among hospitals and outside providers.

Figure 2: Percent of non-federal acute care hospitals that electronically exchanged laboratory results, radiology reports, clinical care summaries, or medication lists with ambulatory care providers or hospitals outside their organization: 2010 and 2014.
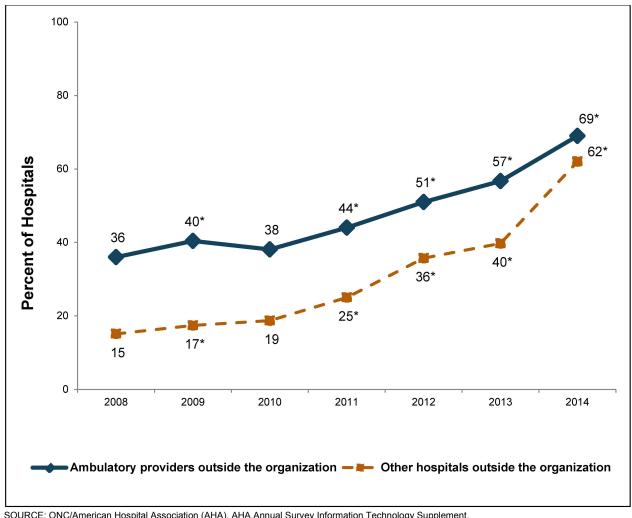

2010

2014

Legend: 0-19% | 20-39% | 40-59% | 60-79% | 80-100%

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

★ In 2014, 47 states and the District of Columbia had at least 60% or more of their hospitals electronically exchange key clinical data with outside providers. In contrast, in 2010, 10 states had 60% or more of their hospitals electronically exchange key clinical data with outside providers.

★ In 2014, state rates of hospitals' electronic exchange of key clinical data with outside providers ranged from 42% to 100%; whereas in 2010, hospitals' health information exchange with outside providers ranged from 24% to 67% (Appendix Table 1).

Hospital to hospital electronic health information exchange increased by 55% between 2013 and 2014.

Figure 3: Percent of non-federal acute care hospitals that electronically exchanged laboratory results, radiology reports, clinical care summaries, or medication lists with outside providers and hospitals: 2008-2014.
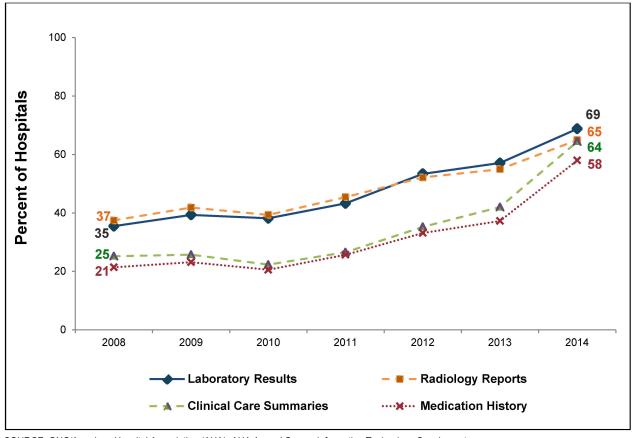

SOURCE: ONC/American Hospital Association (AHA), AHA Annual Survey Information Technology Supplement.
NOTES: *Significantly different from previous year (p < 0.05).

★ Close to seven in ten hospitals (69%) electronically exchanged health information with ambulatory providers outside of their system in 2014. This represents a 92% increase since 2008 and a 21% increase since last year.

★ In 2014, the exchange gap among hospitals and outside hospitals and ambulatory providers began to narrow as hospital to hospital exchange increased by 55%.

★ More than six in ten hospitals (62%) electronically exchanged health information with hospitals outside of their system in 2014. This represents a four-fold increase since 2008.

In 2014, there were significant increases in electronic health information exchange across all data types among hospitals and outside providers.

Figure 4: Percent of non-federal acute care hospitals that electronically exchanged laboratory results, radiology reports, clinical care summaries, and medication history with any outside providers: 2008 to 2014.
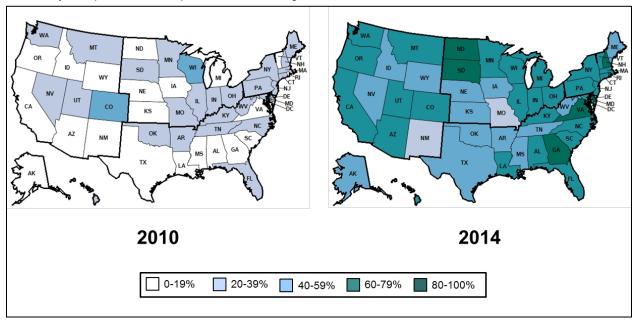

SOURCE: ONC/American Hospital Association (AHA), AHA Annual Survey Information Technology Supplement.
NOTES: Appendix Table A2 contains annual point estimates for each of the four data types.

★ Hospital exchange of laboratory results, radiology reports, clinical care summaries and medication history data with ambulatory care and hospitals outside their organization have all significantly increased between 2013 and 2014.

★ Approximately two-thirds of hospitals electronically exchanged laboratory results (69%), radiology reports (65%) and clinical care summaries (64%) with outside providers in 2014.

★ Close to six in ten (58%) hospitals exchanged medication history with outside providers. This is an increase of 176% since 2008 and an increase of 57% since last year.

★ Hospitals exchange of clinical care summaries with outside providers has more than doubled since 2008 and increased by 52% since last year.

Clinical care summary exchange among hospitals and outside providers increased in 49 states and in the District of Columbia between 2010 and 2014.

Figure 5: Percent of non-federal acute care hospitals that electronically exchanged clinical care summaries with ambulatory care providers or hospitals outside their organization: 2010 and 2014.

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

★ In 2014, 42 states had the majority of their hospitals electronically exchange clinical care summaries with outside providers. In contrast, in 2010, no states had the majority of their hospitals electronically exchange key clinical data with outside providers.

★ In 2014, state rates of hospitals' electronic exchange of clinical care summaries with outside providers ranged from 30% to 88%; compared to a range of zero to 43% in 2010 (Appendix Table 3).

Summary

Accelerating the availability of electronic health information to guide decision making and promoting care coordination are core strategies of HHS efforts to improve U.S. health care delivery (4). Hospitals not only deliver care to millions of Americans, but also have a critical role in coordinating care with a variety of providers across numerous settings. To advance the sharing of electronic health information, stage 2 of the Medicare and Medicaid Electronic Health Record (EHR) Incentive Programs requires hospitals to exchange clinical information during care transitions using certified health IT to receive incentive payments (5).

We found evidence to support that electronic exchange of health information is increasing among hospitals. More than three-quarters (76%) of non-federal acute care hospitals electronically exchanged laboratory results, radiology reports, clinical care summaries, and/or medication lists with any outside providers. This represents an 85% increase since 2008 and a 23% increase since last year. Close to seven in ten hospitals (69%) electronically exchanged health information with ambulatory providers outside of their organization, representing a 92% increase since 2008 and a 21% increase since last year.

In 2008, prior to the Health Information Technology for Economic and Clinical Health (HITECH) Act, only 15% percent of hospitals electronically exchanged health information with hospitals not part of their system. Prior research found that hospitals had significantly higher rates of exchange with outside ambulatory care providers compared to outside hospitals (6). In the past, competition among hospitals and cross-vendor interoperability were cited as barriers to exchange among outside hospitals (7,8); however, we found that this gap has narrowed. The percent of hospitals that electronically exchanged clinical data with outside hospitals (62%) has quadrupled since 2008; and grew by 55% between 2013 and 2014.

We also had previously reported that hospitals' exchange with outside providers significantly varied by the type of data exchanged, with hospitals electronically exchanging laboratory results and radiology reports at much higher rates than clinical care summaries and medication history (3,6). In 2014, the gap in variation by data type started to close. More than six in ten hospitals exchanged laboratory results (69%), radiology reports (65%), and clinical care summaries (64%) with outside providers. Almost six in ten hospitals electronically exchanged medication history (58%) with outside providers.

In March 2010, The State Health Information Exchange Program funded states' efforts to rapidly build capacity for exchanging health information across the health care system both within and across states (9). Since 2010, exchange of health information by hospitals increased at the state level, such that by 2014, a majority of hospitals in most states electronically exchanged key clinical information with outside providers, including clinical care summaries. In contrast, less than half of states had a majority of hospitals electronically exchanging with outside providers in 2010, and no states had the a majority of hospitals electronically exchanging clinical care summaries with outside providers.

Definitions

<u>Non-federal acute care hospital</u>: 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.

<u>Any outside providers</u>: Encompasses ambulatory care providers, hospitals, or both that are outside the respondent's organization.

<u>Hospital health information exchange</u>: Assessed using survey questions asking respondents whether their hospital electronically exchanged or shared the following four types of clinical information: radiology reports, laboratory results, clinical care summaries, and medication lists.

Table 1: Survey questions assessing hospitals' health information exchange activity.

Which of following patient data does your hospital electronically exchange/share with one or more of the provider types listed below? (Check all that apply)					
	With Hospitals In Your System	With Hospitals Outside of Your System	With Ambulatory Providers Inside of Your System	With Ambulatory Providers Outside of Your System	Do not know
Laboratory results	☐	☐	☐	☐	☐
Medication history	☐	☐	☐	☐	☐
Radiology reports	☐	☐	☐	☐	☐
Clinical/Summary care record in any format	☐	☐	☐	☐	☐

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 2014 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 November 2014 to the end of February 2015.

The survey was administered to 4,451 non-federal acute care hospitals, with a response rate of 60%. 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.

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About the Authors

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Suggested Citation

Appendix

Table A1: Percent of non-federal acute care hospitals that electronically exchanged health information with outside ambulatory providers or hospitals by U.S. state: 2010 and 2014.

State	2010 %	2014 %	Percent Change	State	2010 %	2014 %	Percent Change
United States	44	76	73	Missouri	48†	65§	35
Alabama	37	76	105	Montana	45	63	40
Alaska	60	86	43	Nebraska	40	69	73
Arizona	37	79	114	Nevada	55	42§	(-24)
Arkansas	50	79	58	New Hampshire	64†	88†	38
California	36§	68§	89	New Jersey	38	83†	118
Colorado	65†	80	23	New Mexico	31	82	165
Connecticut	42	77	83	New York	59†	76	29
Delaware	61	100†	64	North Carolina	45	78	73
District of Columbia	43	66	53	North Dakota	39	85	118
Florida	50	82†	64	Ohio	53†	86†	62
Georgia	40	83†	108	Oklahoma	49	72	47
Hawaii	63	91†	44	Oregon	53	87†	64
Idaho	47	58§	23	Pennsylvania	52†	87†	67
Illinois	39§	79	103	Rhode Island	67†	100†	49
Indiana	60†	85†	42	South Carolina	44	81	84
Iowa	36§	66§	83	South Dakota	40	80	100
Kansas	31§	60§	94	Tennessee	40	69	73
Kentucky	42	82†	95	Texas	24§	66§	175
Louisiana	25§	77	208	Utah	51	76	49
Maine	62†	67	8	Vermont	43	80	86
Maryland	53†	88†	66	Virginia	44	93†	111
Massachusetts	64†	85†	33	Washington	58†	70	21
Michigan	52†	78	50	West Virginia	36	71	97
Minnesota	42§	83†	98	Wisconsin	62†	80	29
Mississippi	25§	55§	120	Wyoming	47	67	43

NOTES: *Estimate does not meet standards of reliability
†Significantly higher than national average (p < 0.05)
§Significantly lower than national average (p < 0.05)
Any Outside Exchange refers to exchange with ambulatory care providers or hospitals outside their organization.
SOURCE: ONC/American Hospital Association (AHA), AHA Annual Survey Information Technology Supplement.

Table A2: Percent of non-federal acute care hospitals that electronically exchanged laboratory results, radiology reports, clinical care summaries, and medication history with any outside providers: 2008 to 2014.

Data Type	2008	2009	2010	2011	2012	2013	2014
Laboratory Results	35	39†	38	43†	53†	57†	69†
Radiology Reports	37	42†	39§	45†	52†	55†	65†
Clinical Care Summaries	25	26	22§	27†	35†	42†	64†
Medication History	21	23	21§	26†	33†	37†	58†

NOTES: †Significantly above from previous year (p < 0.05)
§Significantly below from previous year (p < 0.05)
SOURCE: ONC/American Hospital Association (AHA), AHA Annual Survey Information Technology Supplement.

Table A3: Percent of non-federal acute care hospitals that electronically exchanged clinical care summaries with outside ambulatory providers or hospitals by U.S. state: 2010 and 2014.

State	2010	2014	Percent Change	State	2010	2014	Percent Change
United States	22	64	191	Missouri	35†	34§	(-3)
Alabama	18	71	294	Montana	22	61	177
Alaska	18	49	172	Nebraska	18	55	206
Arizona	17	75	341	Nevada	22	42§	91
Arkansas	36†	59	64	New Hampshire	32†	88†	175
California	14§	64	357	New Jersey	21	72	243
Colorado	41†	76†	85	New Mexico	20	30§	50
Connecticut	23	68	196	New York	28†	61	118
Delaware	21	80	281	North Carolina	31†	67	116
District of Columbia	11§	48	336	North Dakota	6§	85†	1,317
Florida	33†	75†	127	Ohio	30†	77†	157
Georgia	13§	80†	515	Oklahoma	21	45§	114
Hawaii	23	65	183	Oregon	12§	79†	558
Idaho	18	42§	133	Pennsylvania	24	73†	204
Illinois	22	62	182	Rhode Island	0§	83	8,300
Indiana	28†	74†	164	South Carolina	19	74	289
Iowa	17§	60	253	South Dakota	36†	80†	122
Kansas	10§	49§	390	Tennessee	24	53§	121
Kentucky	20	64	220	Texas	12§	56§	367
Louisiana	16	63	294	Utah	22	64	191
Maine	28†	51	82	Vermont	8§	80	900
Maryland	30†	72	140	Virginia	20	85†	325
Massachusetts	27	74	174	Washington	30	65	117
Michigan	20	70	250	West Virginia	23	59	157
Minnesota	27†	78†	189	Wisconsin	43†	72†	67
Mississippi	19	55	189	Wyoming	6§	40§	567

NOTES: *Estimate does not meet standards of reliability
†Significantly higher than national average (p < 0.05)
§Significantly lower than national average (p < 0.05)
Any Outside Exchange refers to exchange with ambulatory care providers or hospitals outside their organization.
SOURCE: ONC/American Hospital Association (AHA), AHA Annual Survey Information Technology Supplement.