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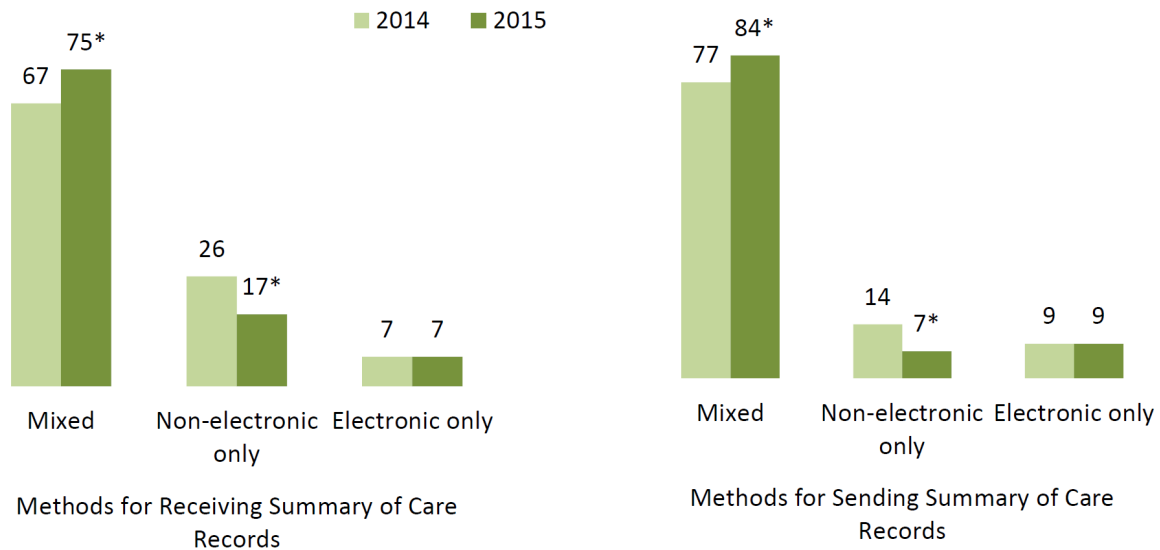
**Variation in Interoperability among U.S. Non-federal Acute Care Hospitals in 2015**

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The policy and technical actions needed to enable nationwide interoperability are described in the *Connecting Health and Care for the Nation: A Shared Nationwide Interoperability Roadmap* (Roadmap) (1). The Roadmap also identifies measures that will be used to monitor near-term progress related to interoperability. Recent ONC analyses used these measures to report on progress related to interoperability among U.S. non-federal acute care hospitals in 2015 (2). This brief describes variation in interoperability across different types of hospitals, rates of exchanging information between hospitals and other types of providers, and mechanisms hospitals used to exchange information.

**Hospitals using only non-electronic means of exchanging summary of care records with outside sources significantly declined.**

Figure 1: Percent of U.S. non-federal acute care hospitals that send or receive summary of care records to/from outside sources by electronic and non-electronic methods, 2014-2015.



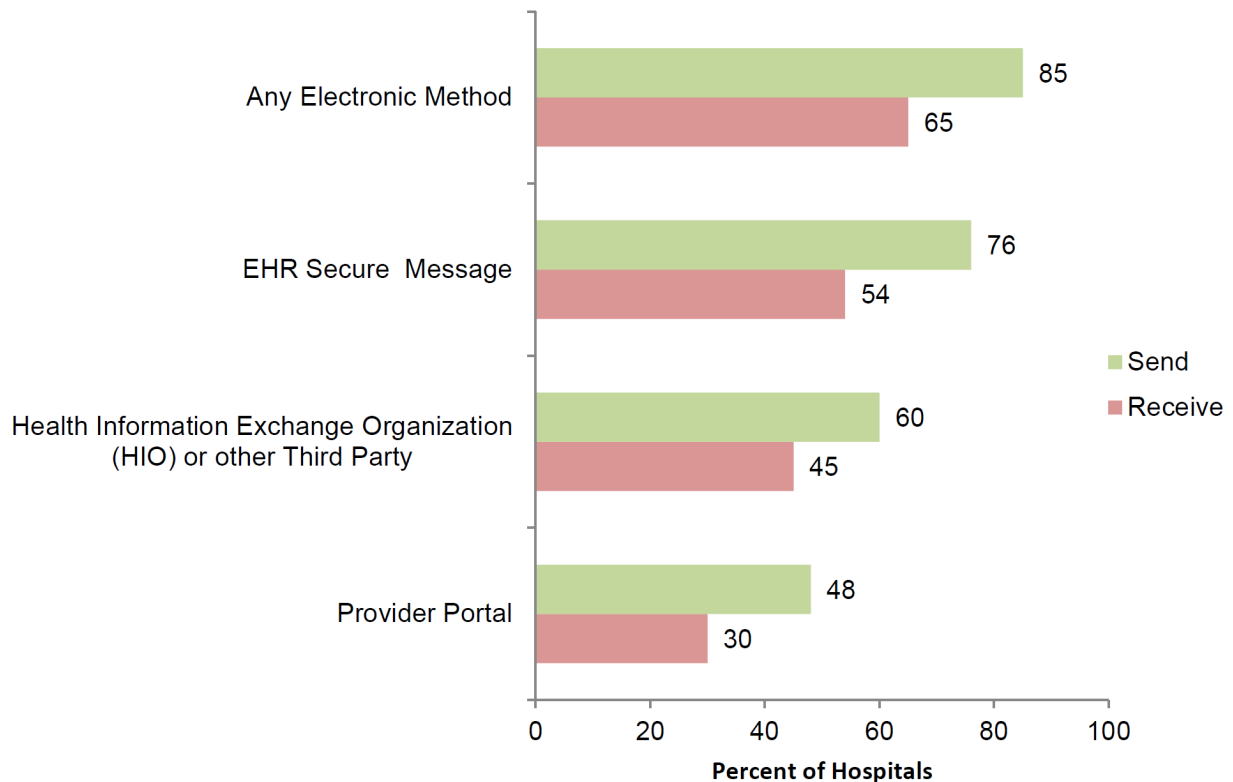
SOURCE: 2014-2015 AHA Annual Survey Information Technology Supplement.

NOTES: \*Significantly different from prior year (p<0.05). Non-electronic methods include Mail, Fax, or eFax. Electronic methods include secure messaging using an EHR, provider portals, or via health information exchange organizations or other third parties.

- ★ The percent of hospitals using a combination of electronic and non-electronic (mixed) means to send and receive summary of care records to/from outside sources increased between 2014 and 2015.

## Secure messaging using EHRs was the most common means to send and receive summary of care records electronically.

Figure 2: Percent of U.S. non-federal acute care hospitals that send or receive summary of care records electronically by method, 2015.



SOURCE: 2015 AHA Annual Survey Information Technology Supplement.

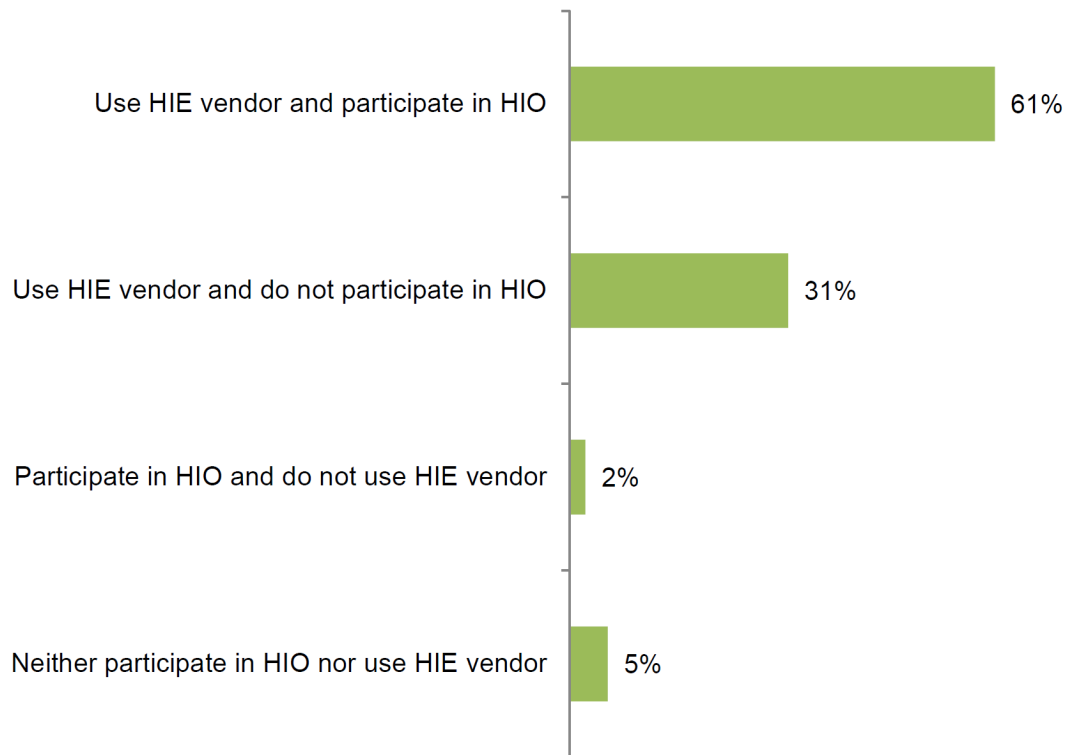
Notes: Does not include "eFax." Summary of care records are in a structured format (e.g., CCDA).

- ★ The least common method for electronically sending and receiving summary of care records with providers outside a hospital system was a provider portal.
- ★ Six in ten hospitals used a HIO or other third party to electronically send summary of care records to outside providers, and less than half (45%) received summary of care records using this method.
- ★ Over three-quarters of hospitals sent summary of care records via secure messages using EHRs and a little over half of hospitals (54%) received data using this method.



## Six out of 10 hospitals nationwide participated in a state, regional or local HIO and used a health information exchange (HIE) vendor to enable exchange.

Figure 3: Percent of U.S. non-federal acute care hospitals that participate and actively exchange data in local, regional or state HIO, or HIE vendor, 2015.



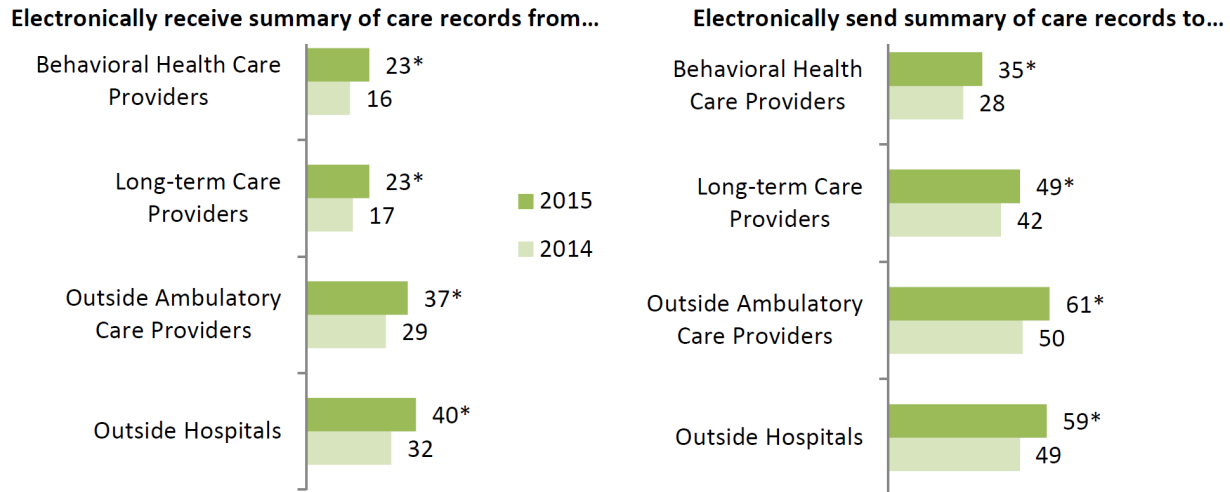
SOURCE: 2015 AHA Annual Survey Information Technology Supplement.

Notes: HIE vendor use excludes those who prefer not to disclose whether or which vendor they use.

- ★ About 3 in 10 hospitals used an HIE vendor but not a HIO to enable electronic exchange of health information.
- ★ Very few hospitals (2%) participated in HIOs alone to enable exchange.
- ★ About 5% of hospitals neither participated in a HIO nor used a HIE vendor to enable exchange.

## Rates of sending and receiving summary of care records between hospitals and other types of providers significantly increased between 2014 and 2015.

Figure 4: Percent of U.S. non-federal acute care hospitals that send or receive summary of care records electronically to/from various exchange partners, 2014-2015.



SOURCE: 2014-2015 AHA Annual Survey Information Technology Supplement.  
 Notes: \*Significantly different from prior year ( $p < 0.05$ ). Does not include "eFax." Summary of care records are in a structured format (e.g., CCDA). Exchange with long-term care providers and behavioral health providers includes both those inside and outside the hospital's health system.

- ★ Rates of hospitals electronically receiving information from long-term care providers and behavioral health care providers increased significantly from 2014, by 35% and 44%, respectively.
- ★ Almost half of hospitals were electronically sending summary of care records to long-term care providers and over one-third were electronically sending summary of care records to behavioral health care providers in 2015.
- ★ Hospitals continued to electronically exchange summary of care records with outside ambulatory care providers at higher rates compared to long-term care providers and behavioral health care providers.

## Small, rural, and CAHs had lower rates of electronically sending, receiving, finding and integrating information.

Table 1: Rates of electronically sending summary of care records, receiving summary of care records, querying and integrating summary of care records by hospital type, 2015.

	Send	Receive	Find	Integrate	All 4 domains
Small hospitals	80%*	58%*	43%*	31%*	18%*
Medium and Large hospitals	90%	71%	62%	45%	34%
Critical Access Hospitals (CAHs)	78%*	56%*	40%*	31%*	17%*
Non-Critical Access Hospitals	88%	68%	58%	41%	30%
Rural hospitals	79%*	57%*	38%*	32%*	15%*
Suburban and Urban Hospitals	90%	70%	63%	43%	34%

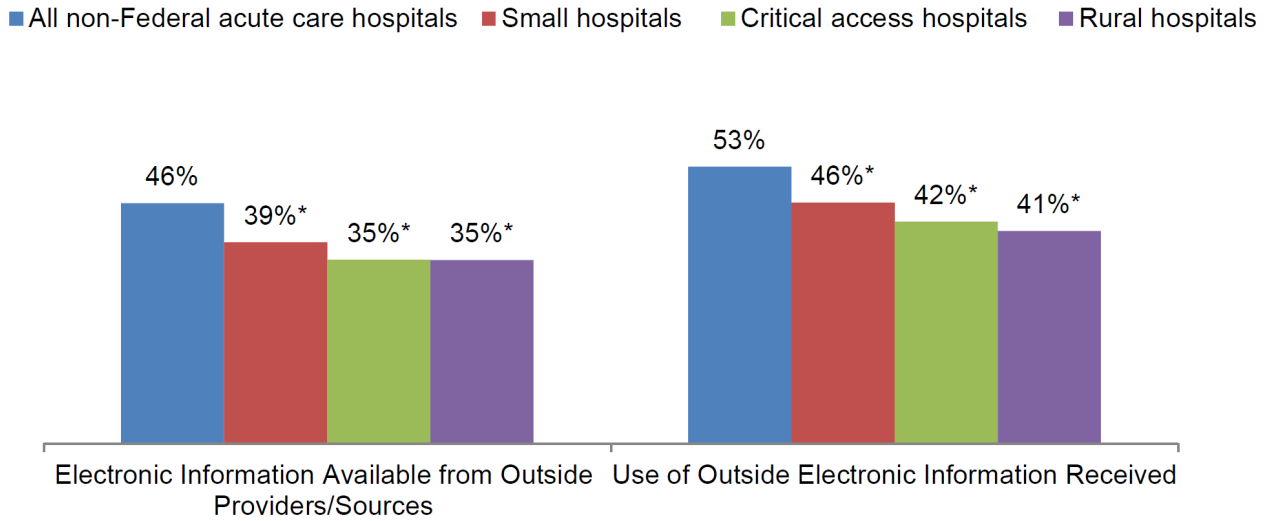
SOURCE: ONC/American Hospital Association (AHA), 2015 AHA Annual Survey Information Technology Supplement.  
 NOTES: See the [Appendix Table](#) for more definitions of find, send, receive and use/integrate, and hospital categories. \*All values across row significantly different from category listed directly below ( $p < 0.05$ ). For example, all values across CAHs significantly different from non-CAHs.

- ★ At least three-quarters of small hospitals, rural hospitals, and CAHs were electronically sending summary of care records.
- ★ A little less than 6 in 10 of small hospitals, rural hospitals, and CAHs were electronically receiving summary of care records.
- ★ About 4 in 10 of small hospitals, rural hospitals, and CAHs queried patient health information from outside sources.
- ★ About 3 in 10 small hospitals, rural hospitals, and CAHs had the ability to integrate summary of care records into their EHRs.
- ★ Small hospitals had significantly lower rates of electronically sending, receiving, finding, and integrating data compared to large and medium-sized hospitals.
- ★ Rural hospitals had half the rate of engaging in all 4 domains of interoperability (electronically finding, sending, receiving, and integrating) compared to suburban and urban hospitals (15% vs. 34%, respectively).
- ★ CAHs had significantly lower rates of engaging in the 4 domains of interoperability compared to non-CAHs.



## Fewer small hospitals, critical access hospitals (CAHs), and rural hospitals had outside information electronically available at the point of care.

Figure 5: Percent of hospitals with clinical information electronically available from outside providers or sources at the point of care and providers' use of information received from outside providers or sources by hospital type, 2015.



SOURCE: ONC/American Hospital Association (AHA), 2015 AHA Annual Survey Information Technology Supplement.  
Notes: \*Significantly different from all hospitals not within respective hospital type category ( $p < 0.05$ ). Usage is defined as providers using the information “often” or “sometimes.” See Appendix Table 1 for details.

- ★ Four out of ten CAHs and rural hospitals’ providers used outside information received electronically for clinical decisions compared to over half (53%) of all non-federal acute care hospitals nationwide.
- ★ About half (47%) of non-federal acute care hospitals nationwide had outside information electronically available, compared to one-third of CAHs and rural hospitals.



## Summary

Hospitals are shifting their means of exchanging data away from using paper-only methods of exchange. The percentage of hospitals that used only non-electronic means to send and receive information significantly declined between 2014 and 2015. There was a corresponding increase in the percentage of hospitals that used a mixture of paper and electronic methods to send and receive information.

As hospitals transition to electronic means of sending and receiving summary of care records, they may still have to rely on paper-based methods to exchange information due to their exchange partners' limited capability to electronically receive information; this was the most common barrier to interoperability reported by hospitals (2). This analysis found that the percentage of hospitals that sent or received summary of care records with long-term care and behavioral health care providers increased significantly between 2014 and 2015, suggesting that there has been some progress in these providers' capabilities to electronically exchange data with external providers. However, hospitals' rates of both electronically sending and receiving patient summary of care records to and from long-term care and behavioral health care providers remained lower than with outside hospitals and ambulatory care providers. With potential Medicare Access and CHIP Reauthorization Act of 2015 (MACRA) and Medicaid funding to enable exchange among providers not previously eligible for Meaningful Use incentives, it is likely that hospitals will continue to increase their electronic exchange of information with a variety of providers across the care continuum (3, 4,5). This is an important near-term priority of the Roadmap (1).

Hospitals were using a variety of means to enable interoperable exchange. Secure messaging using an EHR served as the most common means of electronically sending and receiving summary of care records, followed by the use of a HIO or other third party. A majority of hospitals leveraged external entities to enable exchange. About 6 in 10 hospitals used both a HIO and a HIE vendor to enable their exchange capabilities, and another 3 in 10 hospitals used a HIE vendor alone.

Recent ONC analyses indicate that a majority of non-federal acute care hospitals electronically sent and received summary of care records in 2015, and rates of electronically sending, receiving, and finding information from outside sources or providers increased significantly from the prior year (2). This data brief shows that interoperability varies across hospitals. Small, rural, and critical access hospitals have lower rates of engaging in the 4 domains of interoperability (e.g. sending, receiving, finding, and integrating). They also had lower rates of information electronically available from outside sources or providers, and lower rates of their providers' using information electronically received from outside their hospital system. However, further analysis is needed to better understand the cause of these specific disparities.

In summary, progress has been made over the last year with regards to interoperability across hospitals nationwide. However, monitoring variation in interoperability by hospital and area characteristics is critical to ensuring that all hospitals are engaging in the core domains of interoperability so that information from outside providers are electronically available at the point of care and are used to inform clinical decisions. Examining the mechanisms used by hospitals to exchange information can help further refine strategies outlined by the Roadmap that are needed to enable interoperability. Hence, ONC will conduct additional analysis in these areas to monitor progress.



## 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.

Interoperability: The ability of a system to exchange electronic health information with and use electronic health information from other systems without special effort on the part of the user (1). This brief further specifies interoperability as the ability for health systems to electronically send, receive, find, and use health information with other electronic systems outside their organization.

Integrate: Whether the EHR integrates summary of care record received electronically (not eFax) from providers or sources outside your hospital system/organization without the need for manual entry.

Find: Whether providers at your hospital query electronically for patients' health information (e.g., medications, outside encounters) from sources outside of your organization or hospital system.

Small hospital: Non-federal acute care hospitals of bed sizes of 100 or less.

Rural hospital: Located in a non-metropolitan statistical area.

Critical Access Hospital: Less than 25 beds and at least 35 miles away from another general or critical access hospital.





## 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 October 2015 to the end of February 2016. The response rate for non-federal acute care hospitals was 56%. 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, and 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. In Figure 3 results were generated on hospitals with not missing responses. Significant differences were tested using  $p < 0.05$  as the threshold.



## References

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## Appendix

Appendix Table: Survey questions assessing interoperability among hospitals.

Question Text	Response Options
<p>When a patient transitions to or from another care setting or organization, does your hospital routinely electronically send and/or receive (NOT eFax) a summary of care record in a structured format (e.g. CCDA) with the following providers? Check <i>all</i> that apply.</p>	<p style="text-align: center;"><u>Send   Receive   Don't Know</u></p> <ul style="list-style-type: none"> <li>▪ Other Hospitals outside your system</li> <li>▪ Ambulatory Care Providers outside your system</li> <li>▪ Long-term Care Providers (inside or outside system)</li> <li>▪ Long-term Care Providers (inside or outside system)</li> </ul>
<p>Does your EHR integrate any type of clinical information received electronically (not eFax) from providers or sources outside your hospital system/organization without the need for manual entry? <i>This could be done using software to convert scanned documents into indexed, discrete data that can be integrated into EHR.</i></p>	<ul style="list-style-type: none"> <li>▪ Yes, routinely   Yes, but not routinely   No   Do not know   NA</li> </ul>
<p>If yes, does your EHR integrate the information contained in summary of care records received electronically (not eFax) without the need for manual entry? <i>This could be done using software to convert scanned documents into indexed, discrete data that can be integrated into EHR.</i></p>	<ul style="list-style-type: none"> <li>▪ Yes, routinely   Yes, but not routinely   No   Do not know   NA</li> </ul>
<p>Do providers at your hospital query electronically for patients' health information (e.g. medications, outside encounters) from sources outside of your organization or hospital system?</p>	<ul style="list-style-type: none"> <li>▪ Yes   No   No, don't have capability   Do not know</li> </ul>
<p>When a patient transitions to another care setting or organization outside your hospital system, how does your hospital routinely send and/or receive a summary of care record? Check all that apply.</p>	<p style="text-align: center;"><u>Send   Receive   Neither send nor receive   Don't Know</u></p> <ul style="list-style-type: none"> <li>▪ Mail or fax</li> <li>▪ eFax using EHR</li> <li>▪ Secure messaging using EHR (via DIRECT or other secure protocol)</li> <li>▪ Provider portal (i.e., post to portal or download from portal)</li> <li>▪ Via health information exchange organization or other third party</li> </ul>
<p>Do providers at your hospital routinely have necessary clinical information available electronically (not e-Fax) from outside providers or sources when treating a patient that was seen by another health care provider/setting?</p>	<ul style="list-style-type: none"> <li>• Yes</li> <li>• No</li> <li>• Do not know</li> </ul>
<p>How frequently do providers at your hospital use patient health information received electronically (not e-Fax) from outside providers or sources when treating a patient?</p>	<ul style="list-style-type: none"> <li>• Often</li> <li>• Sometimes</li> <li>• Rarely</li> <li>• Never</li> <li>• Do not know</li> </ul>
<p>Please indicate your level of participation in a state, regional, and/or local health information exchange (HIE) or health information organization (HIO).</p>	<ul style="list-style-type: none"> <li>• HIE/HIO is operational in my area and we are participating and actively exchanging data in at least one HIE/RHIO</li> <li>• HIE/HIO is operational in my area but we are not participating</li> <li>• HIE/HIO is not operational in my area</li> <li>• Do not know</li> </ul>



Question Text	Response Options
Which vendor(s) below does your hospital directly use to electronically exchange patient health information?	<ul style="list-style-type: none"><li>• The same system as our primary inpatient EMR/EHR system</li><li>• MedFX</li><li>• Intersystems</li><li>• Harris</li><li>• Surescripts</li><li>• Medicity</li><li>• Truven Analytics</li><li>• Mirth</li><li>• Relay Health</li><li>• Orion Health</li><li>• Inpriva</li><li>• Care Evolution</li><li>• Optom/Axlotl</li><li>• MaxMD</li><li>• Covinst</li><li>• Sandlot</li><li>• ICA</li><li>• MedAllies</li><li>• Microsoft</li><li>• Certify Data Systems</li><li>• Other (please specify)</li><li>• Do not exchange patient health information electronically</li><li>• Would prefer not to disclose</li></ul>