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Methods Used to Enable Interoperability among U.S. Non-Federal Acute Care Hospitals in 2017

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The 21st Century Cures Act (Cures Act) signaled the need for focused advancements in interoperable health information exchange.[1] Understanding the methods used by health care organizations to enable exchange and their capacity to do so is important. It provides context for how and where policy development and investments can streamline the complexity of exchange and address barriers to interoperability. This data brief uses nationally representative 2017 American Hospital Association IT Supplement survey data to describe the methods hospitals use to exchange summary of care records. We also present hospitals' participation rates in health information networks and variation in the methods used to exchange information by hospital type.

HIGHLIGHTS

▶ A majority of hospitals used more than one electronic method to routinely send (78 percent) and receive (61 percent) summary of care records with outside organizations.
▶ Health information service providers (HISPs) were commonly used to exchange summary of care records.
▶ Small, rural, and critical access hospitals (CAHs) had lower rates of using electronic methods to exchange summary of care records compared to their counterparts.
▶ About seven in 10 hospitals participated in at least one health information network that is nationwide in scope.
▶ About half of hospitals participated in both a national and a state, regional, or local health information exchange organization (HIO).

More than half of hospitals used four or more electronic methods to routinely send summary of care records to organizations outside their hospital system.

Figure 1: Number electronic methods U.S. non-federal acute care hospitals use to routinely send or receive summary of care records with sources outside their hospital system, 2017.
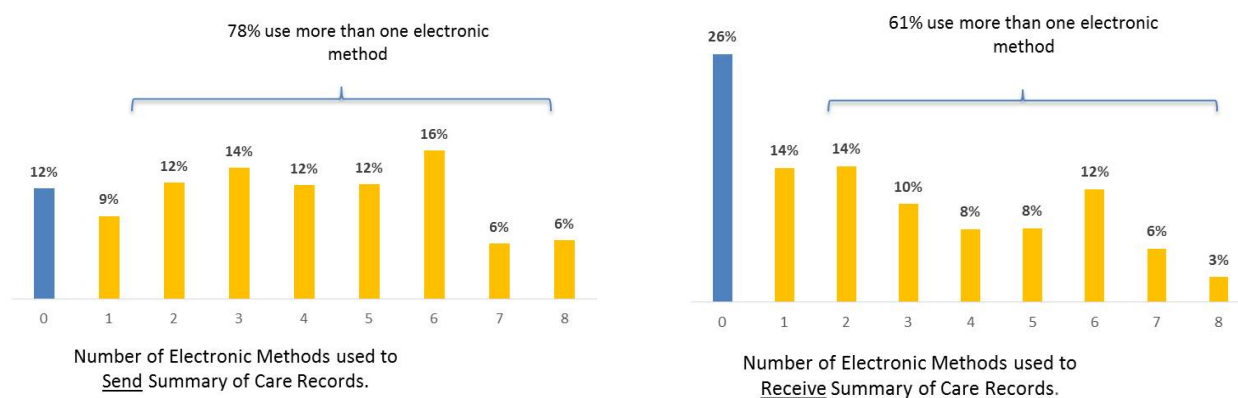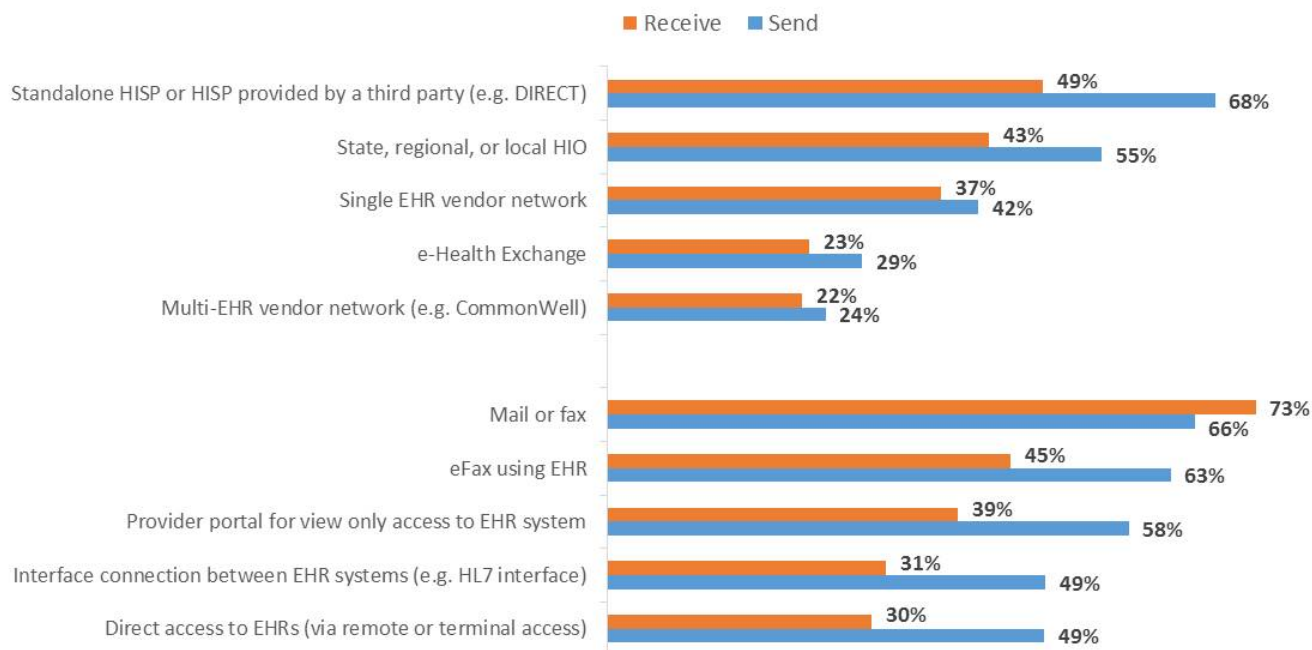

SOURCE: 2017 AHA Annual Survey Information Technology Supplement.
NOTE: Percentages reflect hospitals that reported routinely send or receive summary of care records. We define routinely as use of a particular method often or sometimes. Percentages do not add up to 100% due to rounding.

★ One-quarter of hospitals are not using any electronic method to routinely receive summary of care records.

★ About one-third of hospitals use at least four different methods to routinely receive summary of care records.

HISPs were the most commonly used electronic method for routinely sending or receiving summary of care records.

Figure 2: Percent of U.S. non-federal acute care hospitals that routinely send or receive summary of care records with sources outside their hospital system by exchange method, 2017.

SOURCE: 2017 AHA Annual Survey Information Technology Supplement.
NOTE: Percentages reflect hospitals that reported routinely send or receive summary of care records. We define routinely as use of a particular method often or sometimes. More detailed percentages on the frequency of use for each method can be found in Appendix Table A1.

★ About seven in 10 hospitals sent (66 percent) or received (73 percent) summary of care records using mail or fax in 2017.

★ About a quarter of hospitals used multi-electronic health record (EHR) vendor networks to send or receive summary of care records; a similar percentage used e-Health Exchange to send or receive summary of care records.

★ Half of hospitals routinely used a state, regional, or local HIO to send summary of care records; four in 10 hospitals routinely used these entities to receive summary of care records.

★ Half of hospitals used interface connections between EHR systems to send summary of care records and three in 10 hospitals used interface connections to receive summary of care records.

Hospitals that used more electronic methods to receive summary of care records were more likely to have and use patient health information electronically available at the point of care.

Table 1: Percent of U.S. non-federal acute care hospitals that report having and using electronic health information at the point of care from sources outside their hospital system by number of exchange methods routinely used to receive summary of care records, 2017.

Number of electronic methods used to receive summary of care records	Health information from outside sources electronically available at the point of care (% hospitals)	Use health information received from outside sources (% hospitals)
1	37%	43%
2	47%*	50%
3	58%*	64%*
4	67%*	74%*
5	79%*	83%*
6+	94%*	94%*

SOURCE: 2017 AHA Annual Survey Information Technology Supplement.
NOTE: *Significantly different from lower number of method(s) (p<0.05). The denominator includes hospitals that reported receiving summary of care records from sources outside their hospital system often or sometimes. We define routinely as use of a particular method often or sometimes.

★ Among hospitals that used six or more electronic methods to receive summary of care records, over nine in 10 had this information available at the point of care and used this information for decision-making.

★ Hospitals that used five electronic methods were about two times more likely to have and use electronic health information compared to hospitals that used only one electronic method.

★ Hospitals that used two electronic methods compared to only one electronic methods to receive summary of care records increased the availability of electronic health information by about one-quarter.

Small, rural, and CAHs had higher rates of using non-electronic methods to send and receive summary of care records with sources outside their hospital system than their counterparts.

Table 2: Percent of U.S. non-federal acute care hospitals that routinely receive/send summary of care records by exchange method and hospital type, 2017.

Hospital Type	Small	Medium-Large	CAH	Non-CAH	Rural	Suburban-Urban
Method to Send Summary of Care Records						
Non-Electronic Only	12%*	3%	15%*	4%	12%*	4%
Electronic Only	10%*	19%	7%*	17%	9%*	18%
Mixed	78%	78%	77%	78%	79%	77%
Method to Receive Summary of Care Records						
Non-Electronic Only	26%*	12%	28%*	15%	28%*	13%
Electronic Only	10%*	20%	7%*	18%	9%*	19%
Mixed	59%*	65%	61%	63%	58%*	65%

SOURCE: 2017 AHA Annual Survey Information Technology Supplement.
NOTE: *Significantly different from counterpart (p<0.05). Percentages reflect hospitals that reported using a particular method often or sometimes. More detailed percentages comparing specific method type by hospital type can be found in Appendix A2.

★ A majority of hospitals—regardless of type—sent and received summary of care records using a mixture of electronic and non-electronic methods.

★ About a quarter of small, rural, and CAHs exclusively used non-electronic methods to receive summary of care records.

★ Small, rural, and CAHs were three times as likely to send summary of care records using only non-electronic methods, and about twice as likely to receive summary of care records using only non-electronic methods compared to their counterparts.

★ Small, rural, and CAHs were about half as likely to send and receive summary of care records using only electronic methods compared to their counterparts.

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About seven in 10 hospitals participated in at least one health information network that is nationwide in scope (national network).

Figure 3: Number of national networks that U.S. non-federal acute care hospitals report participating in, 2017.
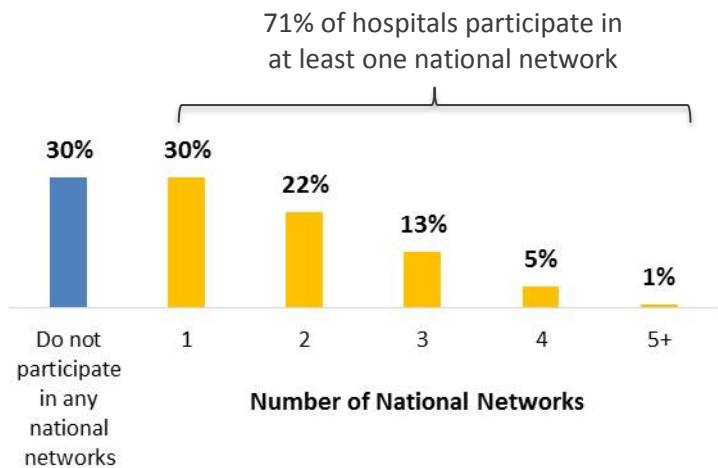

71% of hospitals participate in at least one national network

Do not participate in any national networks 30%

Number of National Networks

Table 3: Percent of U.S. non-federal acute care hospitals that report participating in national networks, 2017.

National Network	Percent
Surescripts	61%
e-Health Exchange	25%
DirectTrust	24%
CommonWell	14%
Carequality	8%
Strategic Health Information Exchange Collaborative (SHIEC)/Patient Centered Data Home (PCDH)	4%
Digital Bridge	0.4%

SOURCE: 2017 AHA Annual Survey Information Technology Supplement.

NOTE: As its first project, the Digital Bridge collaborative has designed a multi-jurisdictional approach to electronic case reporting and has begun implementations across different states and cities. The sites will be used to test the Digital Bridge technical infrastructure in a phased roll-out through 2018.[2] Hence, few hospitals reported using Digital Bridge in 2017. In Figure 3, numbers do not add up to 100% due to rounding.

★ About four in 10 hospitals participated in more than one national network.

★ About six in 10 hospitals participated in Surescripts.

★ Excluding Surescripts, about half (47 percent) of hospitals participated in at least one national network.

★ A quarter of hospitals participated in e-Health Exchange; a similar percentage participate in DirectTrust.

★ About one in three hospitals (30 percent) did not report participating in a national network.

Half of hospitals participated in both a national network and a state, regional, or local HIO.

Table 4: Percent of U.S. non-federal acute care hospitals that participate in national and state, regional, or local health information networks, 2017.

		Participate in National Network	
		Yes	No
Participate in State, Regional, and/or Local HIO	Yes	51%	18%
	No	19%	12%

SOURCE: 2017 AHA Annual Survey Information Technology Supplement.

★ Nearly seven in 10 hospitals (69 percent) participated in a state, regional, and/or local HIO.

★ Approximately one in 10 hospitals (12 percent) did not participate in a national network or a state, regional, or local HIO.

★ About one in five hospitals (19 percent) participated in a national network, but not a state, regional, and/or local HIO.

Participation in national networks and state, regional, and/or local HIOs was lower among small, rural and CAHs compared to their counterparts.

Table 5: Percent of U.S. non-federal acute care hospitals by type that participate in national network and state, regional, or local HIO, 2017.

Type of Network	Small	Medium-Large	CAH	Non-CAH	Rural	Suburban-Urban
National Network	68%*	73%	66%*	72%	66%*	74%
State, Local, or Regional Network	62%*	76%	58%*	73%	62%*	74%

SOURCE: 2017 AHA Annual Survey Information Technology Supplement.
NOTE: *Significantly different from counterpart (p<0.05).

★ While six in 10 small hospitals participated in a state, local, or regional HIO, about three-quarters of medium to large hospitals did so.

★ About two-thirds of small, rural, and CAHs participated in at least one national network compared to about three-quarters of their counterparts.

Summary

Hospitals' electronic exchange of information is a complex process involving a variety of methods. Although a majority of hospitals used more than one electronic method to send and receive summary of care records, most hospitals still used both paper-based and electronic methods. About half of hospitals used four or more electronic methods to send summary of care records, and one-third used over three electronic methods to receive summary of care records. Hospitals that used more electronic methods to routinely receive summary of care records were more likely to have patient health information electronically available at the point of care and subsequently use this information for decision-making. Nine out of 10 hospitals that used at least six different electronic methods reported they had information electronically available at the point of care as compared to only one-third of hospitals that used one electronic method.

Hospitals used a variety of electronic methods to exchange information with outside organizations. These methods might involve third parties or intermediaries to facilitate exchange across many entities; such as HISPs, national networks, or state, regional and local HIOs. HISPs were the most commonly used electronic method for routinely sending (68 percent) or receiving (49 percent) summary of care records. Over half of hospitals routinely used state, regional and local HIOs to send summary of care records and 43 percent of hospitals routinely receive summary of care records using these methods. About one-quarter of hospitals routinely used national networks, such as multi-EHR vendor networks and e-Health Exchange, to exchange summary of care records. On the contrary, interface connections, which typically did not involve third parties and facilitate direct exchange between EHR systems, were also used. Hospitals routinely used interface connections to send or receive summary of care records at 49 percent and 31 percent respectively.

Overall, hospital participation in health information networks was sizable. Seventy-one percent of hospitals participated in at least one national network; including Surescripts, a third-party intermediary that enables the exchange of prescriptions and medication-related data. Excluding Surescripts, about half of hospitals participated in at least one national network. About seven in 10 hospitals participated in a state, regional, or local HIO. Nearly one in 10 hospitals did not participate in a national network or state, regional or local HIO.

Although participation in networks was common, there were disparities in participation between small, rural, and CAHs and their counterparts. While two-thirds of small, rural and CAHs participated in national networks, three-quarters of their counterparts participated. The gap was even wider for state, regional, and local HIO participation. These gaps likely reflect broader disparities that exist in the adoption of health information technologies between small, rural, and CAHs and their counterparts.[4-6] These types of hospitals were about half as likely to routinely send and receive summary of care records using only electronic methods compared to their counterparts. Instead, they largely relied on paper-based methods to routinely send and receive summary of care records with outside organizations.

The number of exchange methods hospitals need to ensure that they have information electronically available and subsequently used, contributes to the complexity and costs of exchange. These complexities and increased costs are often cited as barriers to interoperability.[3] Efforts, such as the Trusted Exchange Framework, might help to simplify the exchange of health information through the use of health information networks.[7] The data presented in this data brief is helpful to inform how such policy efforts may impact exchange methods used by hospitals in the future.

Definitions

Non-federal acute care hospital: Includes acute care general medical and surgical, general, children's 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.

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.

Health information exchange organization (HIO): State, regional, or local health information network. This does not include local proprietary or enterprise networks.

National network: Health information networks that are nationwide in scope. This includes multi-EHR vendor networks (e.g. Commonwell or e-Health Exchange) which can be used to exchange health information either directly through an EHR or health information exchange (HIE) vendor.

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 2017 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 the beginning of January 2018 to the middle of May 2018. The response rate for non-federal acute care hospitals was 64 percent. 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.

References

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Appendix

Appendix Table A1: Percent of U.S. non-federal acute care hospitals that send or receive summary of care records electronically by method, 2017.

Method to Send Summary of Care Records	Often	Sometimes	Rarely	Never	Don't Know
Methods not using a Third Party					
Mail or fax	35%	31%	18%	10%	1%
eFax using EHR	32%	31%	9%	20%	3%
Provider portal for view only access to EHR system	29%	29%	11%	21%	4%
Interface connection between EHR systems (e.g. HL7 interface)	29%	20%	9%	32%	4%
Direct Access to EHRs (via remote or terminal access)	26%	22%	11%	30%	4%
Methods using a Third Party					
Standalone HISP or HISP provided by a third party (e.g. DIRECT)	45%	23%	6%	13%	8%
State, regional, or local HIO	35%	21%	7%	24%	8%
Single EHR vendor network	27%	14%	6%	40%	7%
Multi-EHR vendor network (e.g. CommonWell)	12%	12%	9%	51%	10%
e-Health Exchange	15%	13%	6%	33%	16%
Method to Receive Summary of Care Records	**Often**	**Sometimes**	**Rarely**	**Never**	**Don't Know**
Methods not using a Third Party					
Mail or fax	42%	30%	11%	9%	2%
eFax using EHR	18%	27%	13%	30%	7%
Provider portal for view only access to EHR system	11%	28%	17%	31%	8%
Interface connection between EHR systems (e.g. HL7 interface)	16%	15%	12%	46%	5%
Direct Access to EHRs (via remote or terminal access)	13%	17%	14%	45%	6%
Methods using a Third Party					
Standalone HISP or HISP provided by a third party (e.g. DIRECT)	27%	21%	15%	22%	10%
State, regional, or local HIO	19%	23%	10%	34%	8%
Single EHR vendor network	22%	15%	7%	43%	7%
Multi-EHR vendor network (e.g. CommonWell)	10%	11%	8%	54%	10%
e-Health Exchange	11%	12%	5%	30%	11%

SOURCE: 2017 AHA Annual Survey Information Technology Supplement.
NOTE: Percentages do not add up to 100% due to missing values. Percentages may not add up to the percentage displayed in Figure 2 due to rounding.

Appendix Table A2: Percent of U.S. non-federal acute care hospitals that send and/or receive summary of care records with sources outside their hospital system by exchange method and hospital type, 2017.

Method to Send Summary of Care Records	Small	Medium-Large	CAH	Non-CAH	Rural	Suburban-Urban
Methods not using a Third Party						
Mail or fax	70%*	61%	75%*	62%	72%*	61%
eFax using EHR	60%*	66%	57%*	66%	59%*	66%
Provider portal for view only access to EHR system	46%*	70%	39%*	66%	42%*	70%
Interface connection between EHR systems (e.g. HL7 interface)	40%*	58%	36%*	54%	37%*	58%
Direct Access to EHRs (via remote or terminal access)	42%*	56%	39%*	53%	41%*	54%
Methods using a Third Party						
Standalone HISP or HISP provided by a third party (e.g. DIRECT)	58%*	77%	51%*	75%	57%*	76%
State, regional, or local HIO	47%*	63%	42%*	61%	46%*	62%
Single EHR vendor network	33%*	50%	30%*	46%	28%*	51%
Multi-EHR vendor network (e.g. CommonWell)	21%*	28%	19%*	27%	19%*	29%
e-Health Exchange	22%*	35%	17%*	33%	19%*	35%
Method to Receive Summary of Care Records	**Small**	**Medium-Large**	**CAH**	**Non-CAH**	**Rural**	**Suburban-Urban**
Methods not using a Third Party						
Mail or fax	77%*	68%	80%*	69%	77%*	69%
eFax using EHR	42%*	48%	40%*	47%	40%*	49%
Provider portal for view only access to EHR system	33%*	45%	30%*	43%	29%*	47%
Interface connection between EHR systems (e.g. HL7 interface)	25%*	38%	22%*	35%	22%*	38%
Direct Access to EHRs (via remote or terminal access)	27%*	32%	28%	30%	25%*	33%
Methods using a Third Party						
Standalone HISP or HISP provided by a third party (e.g. DIRECT)	40%*	58%	36%*	54%	38%*	57%
State, regional, or local HIO	34%*	51%	28%*	49%	32%*	51%
Single EHR vendor network	30%*	45%	26%*	42%	24%*	47%
Multi-EHR vendor network (e.g. CommonWell)	18%*	25%	16%*	24%	16%*	26%
e-Health Exchange	17%*	28%	15%*	26%	15%*	28%

SOURCE: 2017 AHA Annual Survey Information Technology Supplement.
NOTE: *Significantly different from counterpart (p<0.05). Percentages reflect hospitals that reported using a particular method often or sometimes.

Appendix Table A3: Survey questions assessing interoperability methods used among hospitals.

Question Text	Response Options
When a patient transitions to another care setting or organization <u>outside your hospital system</u>, how often does your hospital use the following methods to **send** a summary of care record?	Often | Sometimes| Rarely |Never | Don't Know/NA Methods without intermediaries • Mail or fax • eFax using EHR • Provider portal for view only access to EHR system • Interface connection between EHR systems (e.g. HL7 interface) • Direct access to EHRs (via remote or terminal access) Methods with intermediaries • Standalone HISP or HISP provided by a third party that enables secure messaging (such as DIRECT) • Community (regional, state, or local) health information exchange organization (HIO) *NOT local proprietary, enterprise network* • Single EHR vendor network (use your EHR vendor's network that enables connection to vendor's other users such as Epic's Care Everywhere) • Multi-EHR vendor networks, like CommonWell • e-Health Exchange
When a patient transitions to another care setting or organization <u>outside your hospital system</u>, how often does your hospital use the following methods to **receive** a summary of care record?	Often | Sometimes| Rarely |Never | Don't Know/NA Methods without intermediaries • Mail or fax • eFax using EHR • Provider portal for view only access to EHR system • Interface connection between EHR systems (e.g. HL7 interface) • Direct access to EHRs (via remote or terminal access) Methods with intermediaries • Standalone HISP or HISP provided by a third party that enables secure messaging (such as DIRECT) • Community (regional, state, or local) health information exchange organization (HIO) *NOT local proprietary, enterprise network* • Single EHR vendor network (use your EHR vendor's network that enables connection to vendor's other users such as Epic's Care Everywhere) • Multi-EHR vendor networks, like CommonWell e-Health exchange
Do providers at your hospital <u>routinely have</u> necessary clinical information available <u>electronically</u> (not e-Fax) from outside providers or sources when treating a patient that was seen by another health care provider/setting?	• Yes • No • Do not know

Question Text	Response Options
How frequently do providers at your hospital <u>use</u> patient health information received <u>electronically (not e-Fax)</u> from <u>outside</u> providers or sources when treating a patient?	• Often • Sometimes • Rarely • Never • Don't know
Which of the following health information networks does your hospitals participate in (either directly or through your EHR or HIE vendor?	• CommonWell • Digital Bridge • DirectTrust • e-Health Exchange • Surescripts • Strategic Health Information Exchange Collaborative (SHIEC)/Patient Centered Data Home (PCDH) • Other • Do not participate in any networks (either via vendor or directly) • Do not know
Please indicate your level of participation in a state, regional, and/or local health information exchange (HIE) or health information organization (HIO). *Note: this does not refer to a private, enterprise network.*	• HIE/HIO is operational in my area and we are participating and actively exchanging data in at least one HIE/RHIO • HIE/HIO is operational in my area but we are not participating • HIE/HIO is not operational in my area • Do not know