

HIMSS Analytics



2013 HIMSS Analytics Report

Barriers, Challenges and Opportunities
with Information Sharing in HIEs:
Output/Print Environments

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Background and Purpose

Managing today's healthcare organizations is a highly complex activity. In addition to demands for improvements in quality, safety and efficiency, hospital leaders must also manage the market's demand for electronic health information exchange between healthcare organizations and healthcare providers. This demand for information exchange is driven by a multiplicity of forces including meaningful use requirements, new payment approaches that stress care coordination, and federal financial incentives – as well as other federal mandates. While the exact nature of data exchange is highly dependent on community-specific drivers, there are two key factors impacting the exchange of information between all healthcare providers. First, the means by which patient information is captured and stored and second, the ways in which healthcare organizations share patient data with each other.

For decades, patient information was captured and stored in hard copy, which ultimately evolved into what we term a paper chart. Adoption of electronic means of capturing data is ever increasing among U.S. hospitals. In 1998, key foundational technologies of electronic medical records (EMRs) were not widely implemented. At that time, only one-third (33 percent) of U.S. hospitals had installed a clinical data repository and 32 percent had implemented a clinical decision support system¹. As of June 2013, installation rates for these applications each exceed 90 percent². While significant progress has been made, the conversion of U.S. hospitals from entirely paper-based to a completely digital environment still has a long way to go. According to the HIMSS Analytics EMR Adoption Model (EMRAMSM), only two percent of U.S. hospitals have achieved Stage 7, whereby the hospital no longer uses paper charts to deliver and manage patient care³.

The second component impacting all data sharing arrangements is the way in which organizations share information. In the past, the hallmark of sharing records was to make a photocopy of the patient record and have patients share the data with all clinicians that needed to access the information. As data has become digitized, healthcare organizations are increasingly using technology to facilitate the sharing of patient records. HIMSS Analytics has been tracking hospital participation in information exchanges for several years: at the end of 2008, 14 percent of U.S. hospitals reported they were part of an information exchange; by April 2013, this number had grown to 30 percent⁴.

Given the significance of these two factors in shaping the exchange of health data across the U.S., the purpose of this paper is to explore the current state of health information exchange in U.S. hospitals. Topics addressed include the means by which hospitals are sharing data, challenges and barriers hospitals face as they try to facilitate information exchange with the healthcare provider organizations in their community and the role that meaningful use plays in their decision to participate in health information exchange organizations (HIOs). As many medical records still exist in paper format, this

¹ The Clinical Systems Hospital IT Report: 1998 – 2005. <http://apps.himss.org/DorenfestInstitute/docs/ClinicalSystemsHospitalMarket.pdf>

² HIMSS Analytics® Database. www.himssanalytics.org

³ HIMSS Analytics EMRAM Model <http://www.himssanalytics.org/emram/emram.aspx>

⁴ HIMSS Analytics® Database. www.himssanalytics.org

report also addresses the role that document and output management plays in information exchange, particularly in relation to prescriptions and laboratory results.

Study Population and Approach

In order to obtain the information needed to meet our research objectives, HIMSS Analytics conducted a web-based survey of senior information technology (IT) executives from randomly-selected U.S. hospitals. Executives were e-mailed invitations to participate in this study and data collection occurred in May and June, 2013.

To be eligible to complete the survey, respondents were required to play some role in the organization’s IT purchasing decisions. Respondents indicating they played no role in making these purchases were excluded from the study. A total of 158 individuals responded to the e-mail invitation and completed all of the survey questions.

Table One: Respondents Role in IT Purchasing

Participant Role	Count	Percent
Decision Maker	85	53.80%
Influencer	68	43.04%
Technical Evaluator	5	3.16%
User	0	0.00%
No Role	0	0.00%
Total	158	100.00%

More than half of survey respondents (51 percent) reported their title to be Chief Information Officer (CIO). Another third (39 percent) indicated their title was Director of Information Technology (IT)/Information Services (IS). Other titles reported by survey respondents included Vice President of IT/IS, Chief Medical Information Officer (CMIO), and Chief Technology Officer (CTO).

Finally, the average number of licensed beds at respondents’ organizations was 320; the median was 200. For purposes of analysis, respondents were grouped into three categories by bed size: small, medium and large.

Table Two: Breakdown of Licensed Beds

Licensed Beds	Count	Percent
Small (Under 75 licensed beds)	48	30.38%
Medium (75 to 299 licensed beds)	53	33.54%
Large (300 or more licensed beds)	57	36.08%
Total	158	100.00%

EMR Environment

Approximately three-quarters of respondents (76 percent) characterized their vendor selection approach to their EMR environment as an enterprise solution approach, meaning organizations selected a single vendor they look to for the majority of their EMR application requirements. Another 20 percent of respondents indicated that they used a best-of-breed approach, meaning they used multiple vendors to satisfy their EMR application objectives. The remaining four percent of respondents reported using other strategies, including best of breed, or using a different vendor solution for their hospital and ambulatory environment.

Despite the fact that the majority of respondents indicated using an enterprise solution approach, 60 percent of respondents reported that managing the vendors that comprised their EMR environment was highly complex⁵. Conversely, 17 percent of respondents indicated that managing their EMR environment was not complex⁶. The average complexity score for hospitals in this sample was 4.91 based on a seven point Likert⁷ scale; the median score was 5.00.

Additionally, there was no evidence to indicate a direct association between bed size and organizational complexity. While approximately one-third (38 percent) of respondents working for small hospitals reported having a complex environment, more than three-quarters of respondents (79 percent) working for large hospitals reported the same.

Health Information Exchange

Health Information Exchange (HIE) is defined as “the electronic sharing of health-related information among organizations”⁸. And, while HIE can also refer to organizations that provide services to enable the electronic sharing of health-related information⁹, these organizations are more commonly referred to as HIOs. One goal of these organizations is to facilitate access to and retrieval of clinical data to provide safe, timely, efficient, effective, and equitable patient-centered care¹⁰. Financial and transactional information, such as claims and eligibility data, can also be a key component of health information exchange¹¹. In this paper, the exchange of data will be referred to as HIE, while the organization will be referred to as an HIO.

⁵ The question was “Using a scale of one to seven, where one is “not at all complex” and seven is “highly complex”, how would you characterize the complexity of managing the vendors and solutions that comprise your EMR environment.” Management of an environment was classified as complex for respondents that answered this question with a rating of 5, 6, or 7.

⁶ “Not complex” was a category assigned to those that scored this question with a one, two or three.

⁷ Definition of Likert Scale <http://www.businessdictionary.com/definition/Likert-scale.html>

⁸ Health Information Exchange at HealthIT.gov <http://www.healthit.gov/providers-professionals/health-information-exchange>

⁹ Health Information Exchange at HealthIT.gov <http://www.healthit.gov/providers-professionals/health-information-exchange>

¹⁰ What are health information exchange organizations. HRSA

<http://www.hrsa.gov/healthit/toolbox/HealthITAdoptiontoolbox/OpportunitiesCollaboration/infoexchange.html>

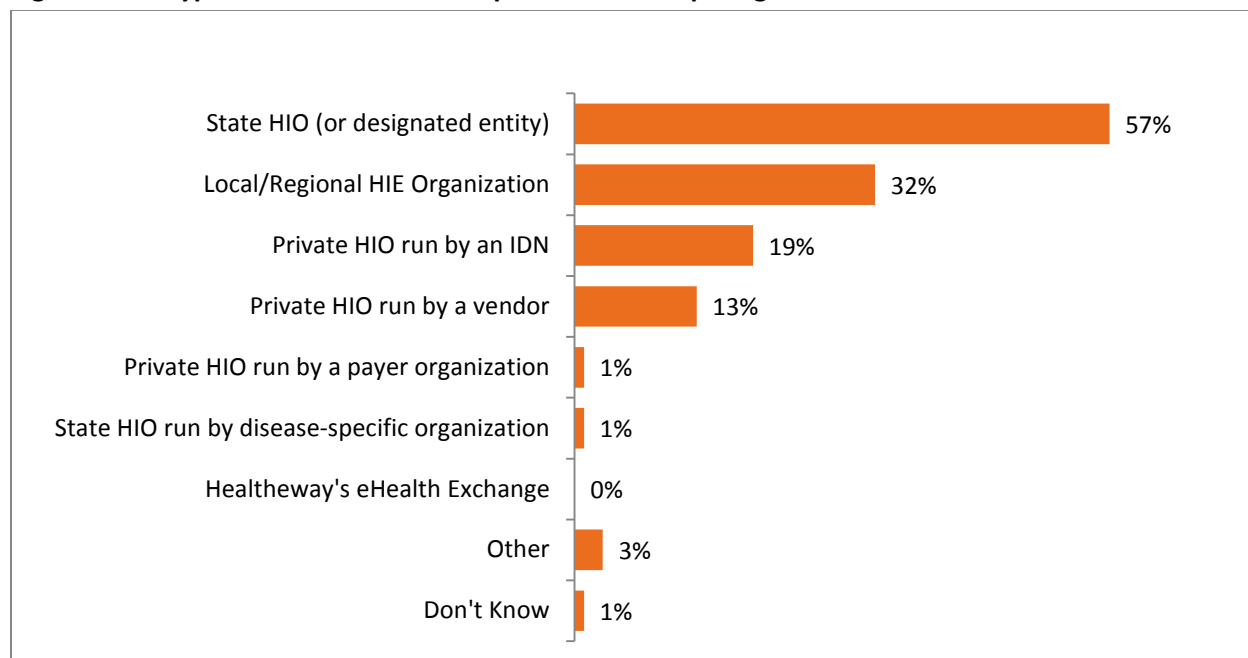
¹¹ A HIMSS Guide to Participating in a Health Information Exchange. November, 2009.

http://www.himss.org/files/HIMSSorg/Content/files/HIE/HIE_GuideWhitePaper.pdf

Respondents were asked to identify whether or not their hospital participated in an HIO. Nearly three-quarters of respondents (73 percent) indicated they were participating in an HIO, with the majority (57 percent) participating only in a single HIO. There is no evidence of a direct association between organization size and the number of HIOs in which a hospital participates.

Respondents reporting that their hospital participates in at least one HIO were most likely to indicate that their hospital participates in a state HIO (57 percent). None of the respondents reported that their hospital participates in Healthway's eHealth Exchange. A full list of the types of HIOs is listed in the table below.

Figure One: Types of HIOs in which Hospitals are Participating



All respondents were also asked to indicate the primary benefits their organizations gained from the data exchange initiatives in which they participated. Only 16 percent of respondents indicated they were receiving no benefit from data exchange initiatives. Among the respondents who identified a benefit, more than half (52 percent), reported benefits associated with improved access to patient information. However, respondents did not indicate that the exchange of data promoted improved patient safety (20 percent) or time savings by clinicians (12 percent).

Hospitals Participating in an HIO

Respondents participating in an HIO were asked to identify the types of tools/solutions that were used to share information within the HIO. Many respondents indicated that they shared information through a portal (44 percent). Another 40 percent of respondents noted that data was shared using DIRECT/Directed exchange, which is the ability to send and receive secure information electronically between care providers to support coordinated care¹². Finally, half of respondents indicated that they used a single tool/solution to facilitate exchange in their HIO. A full list of the types of tools and solutions used to facilitate data sharing is listed in the table below.

Table Three: Tools/Solutions Used to Exchange Data

Tools/Solutions	Count	Percent
Portal Access	51	43.97%
DIRECT/Directed exchange	47	40.52%
Organization-specific exchange requirements	40	34.48%
Query-Based Exchange	37	31.90%
Other	11	9.48%
Don't Know	5	4.31%
Total	116	100.00%

Respondents were also asked to indicate the greatest challenge they faced with respect to sharing data with HIOs. Nearly half of respondents (49 percent) indicated that other organizations in the HIO were not robustly sharing data. Another 44 percent of respondents indicated their ability to successfully share data with HIOs was constrained by staffing resources, while 40 percent reported financial constraints. Only six percent of respondents indicated that data sharing with HIOs was not a high priority from a strategic perspective within their organizations.

¹² What is HIE? HealthIT.gov <http://www.healthit.gov/providers-professionals/health-information-exchange/what-hie>

Table Four: Challenges with Respect to Sharing Data with HIOs

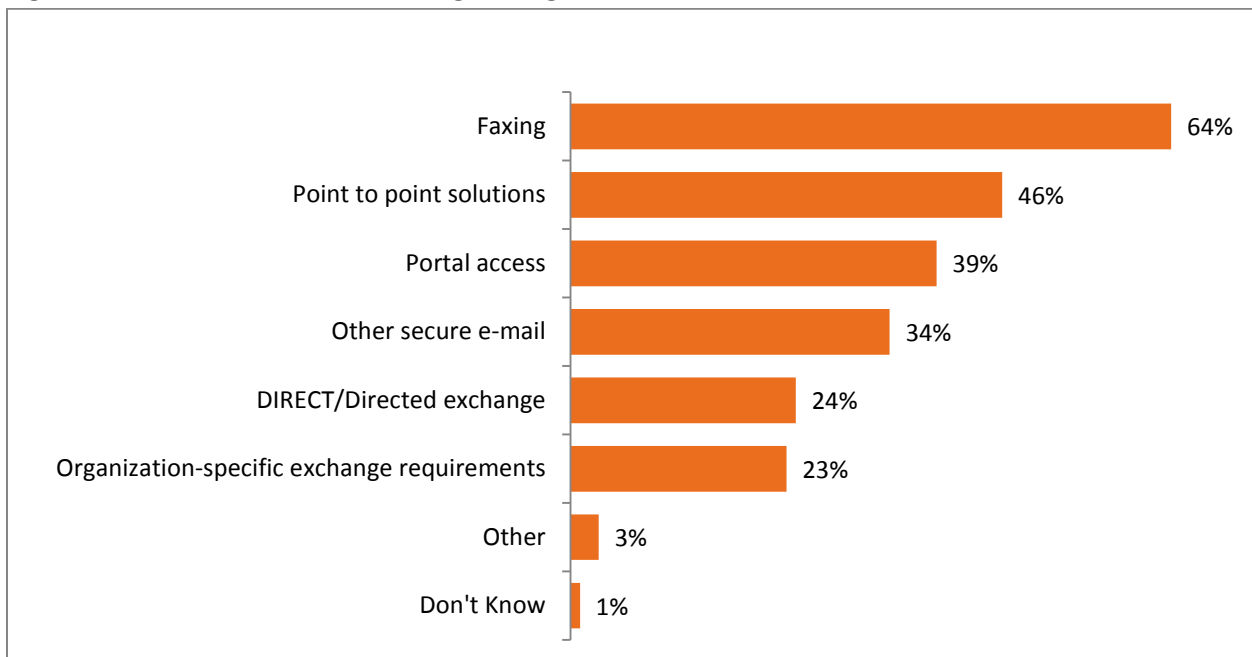
Challenges with Respect to Sharing Data with HIOs	Count	Percent
Other organizations are not robustly sharing data	57	49.14%
Constrained by staffing resources	51	43.97%
Constrained by budget limitations	46	39.66%
Concerned about privacy/security of shared electronic data	45	38.79%
Constrained by technological offerings in the market	27	23.28%
HIE organizations in our area make it difficult to share information	17	14.66%
Not a high priority on our organization's strategic plan	7	6.03%
Other	13	11.21%
Don't Know	1	0.86%
Total	116	100.00%

Sharing Data with Organizations that Are Not Part of an HIO

Respondents were also asked how their hospitals shared data with organizations that do not currently participate in an HIO. The primary means of sharing data with other healthcare organizations was via fax; this was identified by 64 percent of respondents as their primary method. However, in most instances, faxing was only one part of a broader strategy for sharing information. Indeed, only 15 percent of the respondents reported relying exclusively on faxing for data exchange.

Additionally, more than two-thirds of survey respondents (69 percent) reported using two or more methods of data sharing identified in this study. A full list of data sharing methods is identified below.

Figure Two: Methods of Data Sharing for Organizations that Are Not Part of HIOs



Regarding key challenges organizations are facing with respect to data exchange among organizations that do not participate in HIOs, respondents equally identified budget and staffing considerations – approximately 41 percent each. One-third of respondents (34 percent) also indicated that an unwillingness of other organizations to share data was of concern. A full list of challenges is listed below.

Table Five: Challenges in Sharing Data with Organization’s that Aren’t Part of an HIO

Challenges in Sharing Data with Organizations That Aren't Part of an HIO	Count	Percent
We are constrained by budget limitations	66	41.77%
We are constrained by staffing resources	65	41.14%
Other healthcare organizations in our market do not want to share information	54	34.18%
We are constrained by the technological offerings on the market	48	30.38%
Not a high priority on our organization's strategic plan	24	15.19%
Other	13	8.23%
Don't Know	8	5.06%
Total	158	100.00%

Reasons for Not Joining an HIO

Approximately one-quarter of respondents (26 percent) reported that their organization did not currently participate in an HIO. When asked to identify the reasons their organization has chosen not to participate, nearly half (49 percent) indicated that budget constraints were a key factor. Another third (34 percent) indicated that there were no HIOs in their area to join. Concerns that sharing data would undermine the organization’s strategic advantage in their market did not appear to be a significant factor. A full list of reasons for not participating in an HIO at this time is included in the table below.

Table Six: Challenges that Have Led Us to Not Participate in an HIO

Challenges that Have Led Us to Not Participate in an HIE Organization	Count	Percent
We are constrained by budget limitations	20	48.78%
There are no HIE organizations in our area/region	14	34.15%
We are constrained by staffing resources	12	29.27%
We are constrained by the technological offerings on the market	10	24.39%
Not a high priority on our organization's strategic plan	6	14.63%
We are concerned about the privacy/security of shared electronic data	4	9.76%
Concerns that electronic data sharing will undermine our strategic advantage	3	7.32%
Other	10	24.39%
Don't Know	0	0.00%
Total	41	100.00%

Exchange of Paper-Based Data

Respondents were also asked to identify how they processed and exchanged paper-based patient information. Two-thirds of respondents (63 percent) indicated that all paper-based data is scanned into their electronic environment. Another third (31 percent) reported scanning some of these documents, but retaining others in hard copy. Only five percent of respondents indicated that all documents were retained as paper-based documents (which would then need to be faxed to other healthcare organizations as needed).

Output and Print Environment

In addition to the discussion of HIOs, respondents were asked a series of questions regarding their output and print environment. There are multiple ways in which an organization's output/print environment can support and facilitate the exchange of information, including faxing documents to other organizations, scanning and transmitting documents and facilitating the use of bar code technology.

Respondents were asked to classify ways in which they administered their print environment. More than one-third of respondents (37 percent) reported that their output/print environment was decentralized. Another 22 percent reported a centralized environment. However, respondents were most likely (39 percent) to report that their environment was a mix of a centralized and decentralized environment.

Approximately two-thirds of respondents (65 percent) indicated they were only responsible for their hospital's environment, while 37 percent reported that they have responsibility for all hospitals in their health system. In addition, 68 percent of respondents indicated that they administered the output/print environment at off-site care facilities such as physician's offices. One-third (31 percent) also noted they are responsible for administering the printing needs of remote workers/telecommuters.

Respondents were also asked to indicate the technology used to administer their output/print environment. More than 80 percent reported that they used multiple administration methods. Nearly all respondents (84 percent) indicated that the technology used for their output/print environment is integrated with their EMR/HIS system, while three-quarters (76 percent) indicated that they used Windows print servers. At least half (51 percent) also noted that they use a printing vendor. Only 15 percent stated they used an enterprise content management system.

Table Seven: Technology Used to Manage Print Environment

Technology Used for Print Environment	Count	Percent
EMR/EHR/HIS	132	83.54%
Windows Print Server	120	75.95%
Printing Vendor	81	51.27%
Enterprise Content Management System	24	15.19%
Other	9	5.70%
Don't Know	1	0.63%
Total	158	100.00%

Additionally, respondents were asked to identify the number of output/print solutions they managed. On average, respondents indicated that they managed slightly over three output/print solutions at their organization.

Level of Effort Required to Administer the Print Environment

With respect to the level of effort required to administer their print environment, 42 percent of respondents characterized their environment as high effort¹³, while approximately one-third of respondents (35 percent) indicated that their environment was a low effort¹⁴ environment.

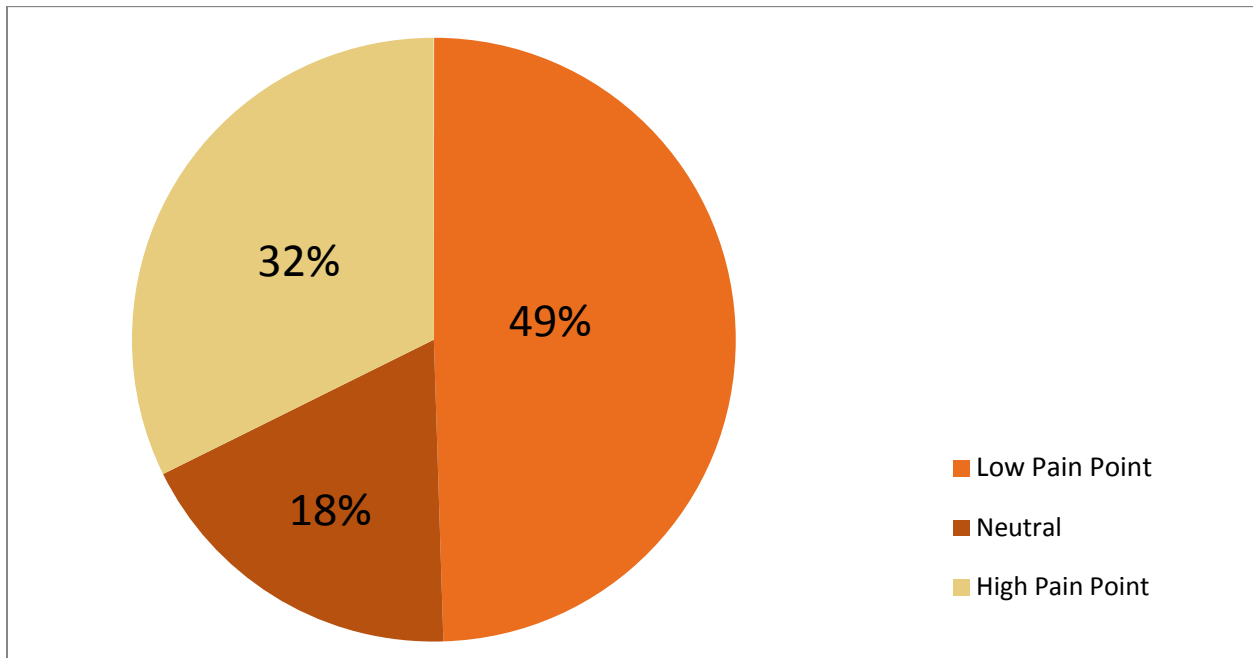
Despite the fact that 42 percent of respondents identified their environment as high effort, this did not translate to the output/print environment being a significant pain point: approximately half of the respondents indicated that their print environment was a low pain point¹⁵.

¹³ “High effort” was a category assigned to those that scored this question with a three, four or five.

¹⁴ Management of an environment was classified as “low effort” if a respondent answered this question with a rating of 1, 2, or 3. The question was “Using a scale of one to seven, where one is “easy to manage” and seven is “very difficult to manage”, how would you characterize the level of effort required to manage your organization’s print environment.

¹⁵ Low pain point is characterized with a rating of 1, 2, or 3 when answering the question “To what extent is managing your organization’s print environment a pain point in your organization’s IT environment”.

Figure Three: Extent to Which Print Environment is a Pain Point



Furthermore, in the three-month period leading up to data collection for this survey, issues within the output/print environment were not a leading cause of calls to the IT help desk. Approximately half of respondents (47 percent) indicated that less than 10 percent of the calls received by their help desk were related to printing issues. At the other end of the spectrum, only two percent of respondents indicated that more than half of their help desk calls were related to their output/print environment.

Lastly, respondents were asked to identify the barriers preventing their organization from reaching its desired output/print environment. While four percent of respondents indicated there were no barriers that prevented them from achieving an ideal environment, approximately 40 percent of respondents indicated that output/print was not a high priority relative to other initiatives for the organization's strategic plan. One-third of respondents also indicated that a lack of financial resources impacted their ability to move forward with their desired output/printing environment. A full list of options is identified in the table below.

Table Eight: Barriers to Moving Forward with Desired Printing Environment

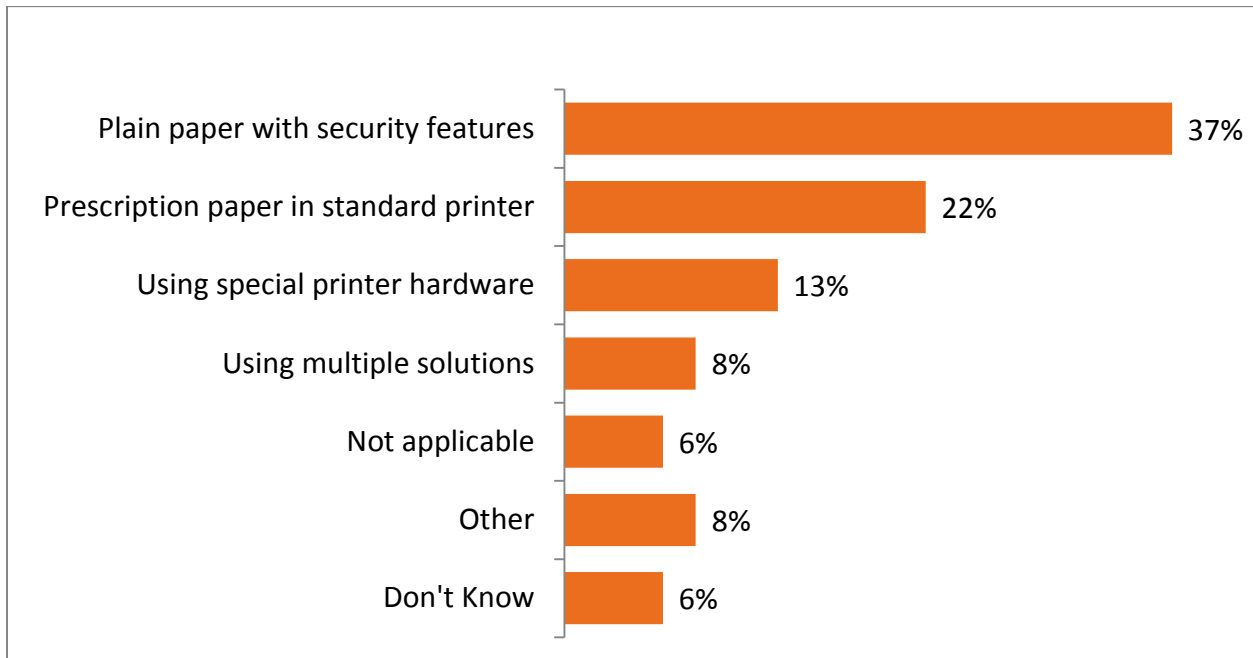
Barriers	Count	Percent
Not a high priority on our organization's strategic plan	63	39.87%
Not enough demand from other business drivers in the organization	41	25.95%
Lack of financial resources	55	34.81%
Lack of staffing resources	35	22.15%
Limitations of available vendors	28	17.72%
Other	16	10.13%
No Barriers	6	3.80%
Don't Know	11	6.96%
Total	158	100.00%

Prescription Printing

Respondents were also asked to identify how they addressed printed prescriptions. The vast majority of respondents (86 percent) reported they rely on a single method to print prescriptions. More specifically, more than one-third of respondents (38 percent) indicated that pre-printed prescription paper was used in a standard printer. One-quarter also noted they used special printer hardware (27 percent). The same number of respondents (27 percent) indicated using plain paper with special prescription security features. Nineteen (19) percent of respondents indicated that all prescriptions are generated electronically.

When asked to identify their preferred method of printing prescriptions, approximately half of respondents (49 percent) indicated that they were already using their preferred method of printing prescriptions. By type, one-third of respondents noted that their preference would be to use plain paper with special prescription security features. Only thirteen percent of respondents indicated they would prefer to use special printer hardware to generate prescriptions. There were also a number of write-in votes noting that respondents would like to move to an entirely electronic environment.

Figure Four: Ideal Method for Handling *Printed* Prescriptions



In addition to prescriptions, respondents were asked to identify functionality in several other key areas. Nearly all respondents (96 percent) indicated that they were presently able to print bar codes for medications, specimens and patient tracking. Approximately half of respondents (52 percent) stated they are able to output documents directly to the medical record. Finally, 11 percent of respondents indicated having the ability to output a document to a mobile device.

In the future, respondents were most eager to add functionality surrounding mobile devices to enhance their output/print strategy. One-third of respondents (34 percent) indicated they would add the ability to deliver a document to a mobile device in the future. Another 30 percent plan to add the ability to deliver a document to a medical record. However, five percent of respondents indicated no future plans for updating their print/output environment.

Table Nine: Current and Desired Printing Environment

Printing Functionality	Current	Future
Capability to print bar codes for medication/specimens/patient tracking	96.20%	6.96%
Ability to print a document directly to the medical record	51.90%	29.75%
Ability to print a document to a mobile device screen	11.39%	33.54%
Other	0.63%	10.13%
Don't Know	1.90%	31.01%
Future Plans	N/A	5.06%
Total	100.00%	100.00%

The Output/Print Environment and Meaningful Use Status

Many organizations have embarked on the journey to a full EMR environment using Meaningful Use as a guide. Meeting the different requirements to comply with Meaningful Use is a complex process. In order to achieve the multiple stages of Meaningful Use, healthcare organizations must fully assess their IT and patient care environments to determine which technologies and equipment they need to move their organization forward to qualify for Meaningful Use incentives. Because of its role in the facilitation of data exchange, the output/print environment is one that needs to be explored.

More than three-quarters of respondents (80 percent) indicated that their organization had already attested to Stage One Meaningful Use. Another six percent indicated that they would attest by the end of June 2013, and have presumably already done so. Another eight percent indicated that they would attest in 2014. Only one respondent indicated that they had no plans to attest at this time.

Respondents were also highly prepared to move forward with Stage Two. Three-quarters of respondents (77 percent) indicated that they expected to attest in 2014, with another 18 percent expecting attestation to take place in 2015. Only two percent indicated that their organization would wait until 2016 or later.

With respect to their organization's output/print strategy, respondents indicated that Meaningful Use would have a limited impact. Additionally, when looking at the scores that respondents attributed this question, nearly three-quarters of respondents (71 percent) can be classified the impact that Meaningful Use would have on their output/print strategy as minimal¹⁶, while 18 percent of respondents can be classified as believing that Meaningful Use will have a high impact¹⁷ on their output/print strategy. The average rating recorded by respondents on the Likert scale was 2.74, with a median score of 2.00.

Respondents were somewhat more likely to indicate that Meaningful Use would impact their organizations' faxing and report distribution strategies. Nearly one-quarter of respondents (22 percent) indicated that Meaningful Use would have a high impact¹⁸ on their faxing and report distribution strategy. Conversely, two-thirds (64 percent) indicated that the impact would be minimal¹⁹. On average, respondents recorded a score of 3.10 to this answer on the Likert scale; the median score was 3.00.

¹⁶ Respondents included in the minimal impact category answered the question "To what degree has Meaningful Use impacted the following? – Your organization's print strategy with a 1, 2 or 3.

¹⁷ Respondents included in the minimal impact category answered the question "To what degree has Meaningful Use impacted the following? – Your organization's print strategy with a 4, 5 or 6.

¹⁸ Respondents included in the minimal impact category answered the question "To what degree has Meaningful Use impacted the following? – Your organization's faxing/report distribution strategy with a 4, 5 or 6.

¹⁹ Respondents included in the minimal impact category answered the question "To what degree has Meaningful Use impacted the following? – Your organization's faxing/report distribution strategy with a 1, 2 or 3.

Conclusion

The goal of health information exchange is to improve the speed, quality, safety and cost of patient care. While approximately three-quarters of respondents indicated that they were participating in an HIO, simply belonging to an HIO does not ensure complete access to patient information. There is a widespread belief that data sharing within HIOs is not robust, which reduces the value of the information that is available to healthcare providers. There are also concerns with regard to being able to completely staff and fund information exchange initiatives, including participation in HIOs. As such, respondents indicated that the impact on patient care from participation in information exchanges was limited. While half of respondents reported that data sharing initiatives improved their access to patient information, only 20 percent reported that this improved access led to improved patient safety.

For the foreseeable future, information exchange among healthcare providers will continue to include information that is documented and stored on paper. As such, organizations need to have sound strategies in place for exchanging paper-based records. For most respondents in this study, this involves converting the paper record into an electronic form; one that can be uploaded into the EMR environment. Note that only 15 percent of respondents in this study reported that faxing was their sole strategy of exchanging patient information.

There are multiple ways in which an organization's output/print environment can support and facilitate the electronic exchange of information. A strong output/print strategy ensures that documents of all types – lab results, consent forms, physician notes, etc. – can be scanned and archived, or distributed to the appropriate complimentary technology (e.g., an EMR) or individual (e.g., physician, other provider), faxed, or augmented as necessary (e.g., by adding bar codes). As such, the output/print environment becomes highly strategic in terms of facilitating the exchange of information. However, at this time, many respondents indicated that their output/print environment was not a high priority in their organization's strategic plan, which challenged their ability to create a desirable output/print environment that can continue to facilitate the effective exchange of information.

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