



Identifying Barriers That Prevent the Usage of Health Information Exchange in Ohio

Journal of Pharmacy Technology
2020, Vol. 36(4) 148–156
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DOI: 10.1177/8755122520924607
journals.sagepub.com/home/pmt


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Abstract

Background: As clinical services expand in community pharmacies, access to patient information through a health information exchange (HIE) may be of increased benefit to patient care. **Objectives:** To identify perceptions and barriers to the use of HIE by high-performing clinical pharmacists within a grocery store chain and collect other health care provider perceptions of using HIE. **Methods:** Two web-based surveys consisting of multiple choice, select all that apply, and 5-point Likert-type scale questions were administered via email to Ohio pharmacists working in high clinical performing pharmacies and Ohio health care providers utilizing CliniSync, an Ohio-based HIE program. Outcomes measured included pharmacist perceptions of preparedness to participate in HIE, their relationship with patients and health care providers, and barriers to utilizing HIE. Provider outcomes included perceptions of relationships with patients, awareness of community pharmacy services, referral habits, and perceived benefit of a HIE. **Results:** Pharmacists tend to believe they have the skill (median 5, interquartile range [IQR] 1) and desire (median 5, IQR 1) to be a part of the HIE network. Pharmacists appear confident in their abilities to provide patient care as a part of HIE networks (median 4, IQR 1). While 66% of providers surveyed are aware of services provided by community pharmacists, 75% state that they do not refer patients to a pharmacy for those services. **Conclusion:** Implementing HIE into clinical pharmacy workflow and encouraging providers to use it to make patient health information available to pharmacists would provide additional information for pharmacists to review when providing clinical services in the community pharmacy setting, ultimately benefiting patient care.

Keywords

ambulatory care, community practice, medical informatics, medication therapy management, pharmacist/physician issues

Background

Health information exchange (HIE) allows health care professionals and patients to access and securely share patient medical information electronically.¹ Using HIE may help improve patient care and transitional care by increasing the speed at which patient records are available for health care professionals to use. It may also prevent errors in medication list records, allow for faster and smoother transmission of information rather than waiting for a phone call or fax, and may prevent duplication of testing for diagnosis and/or follow-up purposes. Additional benefits may include less paperwork, reduced health care costs through decreased readmission rates, and increased patient engagement.²⁻⁴ A quality improvement project conducted with the Department of Veteran Affairs (VA) demonstrated improved VA staff satisfaction after implementing an HIE system.⁵ However,

to date, the impact of HIE on clinical outcomes has been inadequately studied.^{6,7}

In 2009, CliniSync, a nonprofit HIE, was established in Ohio. At the time of this study, 151 hospitals, over 1300 organizations, and 7 health plans have connected with CliniSync, which is available to be utilized by hospitals, pharmacies, long-term care facilities, laboratories, and

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primary care practices.⁸ Patients are automatically enrolled in CliniSync if they see an enrolled provider that contributes to their care. The network allows providers to send encrypted emails to one another, transcribe patient laboratory results into different electronic health records (EHRs), and access patient health information.⁹

Pharmacy HIE usage has been studied and implemented in various settings. In one study, researchers surveyed 358 Indiana pharmacists on their familiarity, utilization, and beliefs about HIE; there was a 19% response rate consisting mostly of pharmacists who had been practicing for more than 20 years, and 70% of respondents worked in a hospital setting. Most pharmacists were familiar with HIE and were using some type of HIE. While respondents felt that having an HIE improved patient care, the biggest barrier identified was implementing and maintaining the technology for HIE.¹⁰ Another study implemented HIE within workflow in a community pharmacy in Tennessee to enhance patient care services. The study demonstrated that integrating and using HIE in the community setting was possible and identified 25 patients who qualified for a medication reconciliation intervention.¹¹ Although this was a small patient population, the authors demonstrated the ability to implement HIE in the community pharmacy setting and utilize it to enhance patient care. Another study conducted in a supermarket chain pharmacy identified patients of a nearby primary care clinic who had low health literacy, long medication lists, and many chronic disease states leading to frequent clarification questions for the clinic from the pharmacy. To improve efficiency, a pilot program was initiated to share the clinic's EHR with the pharmacist in order to more efficiently provide medication lists and additional health information to the pharmacist. Benefits noted by pharmacists studied included patient medication and health condition data being more readily collectible, enhanced communication between pharmacists and clinic providers, and enhanced relationships and trust between the pharmacists and clinic providers.¹²

Objective

The purpose of this study was to identify perceptions and barriers to the use of HIE by high-performing clinical pharmacists within a grocery store chain and to collect other health care provider perceptions of using HIE in daily activities.

Methods

Eligibility Criteria

Kroger Co pharmacists were invited to participate in an anonymous web-based survey. Pharmacists were included if they worked in a high clinical performing pharmacy,

defined as a pharmacy having 76% comprehensive medication review completion, 75% medication therapy management (MTM) net effective rate, and 80% at goal for non-flu vaccine administration by the end of the 2017 fiscal year. These clinical goals were defined by the Kroger Co and held as standards for all pharmacies to meet in order to improve patient outcomes and maximize insurance reimbursements. Additionally, Ohio providers already using CliniSync were invited to complete a similar but unique web-based survey. While the research team was only targeting responses from providers, there was difficulty in separating contacts between providers and nonproviders. Therefore, an email was sent to all personnel that CliniSync interacted with throughout Ohio. However, respondents were excluded if they did not classify themselves as a provider (defined as being a physician [MD or DO], physician's assistant [PA], nurse practitioner [NP], licensed practical nurse [LPN], home health nurse, nurse case manager, or registered nurse). There were no other inclusion/exclusion criteria. The survey was sent to pharmacists and health care providers in January 2018 and was open until the end of February 2018.

Surveys

The pharmacist survey consisted of a 16-question online survey, and the provider survey contained 21 questions. Both surveys were developed by the authors and consisted of multiple choice, select all that apply, and 5-point Likert-type scale questions (ranging from 1 = strongly disagree to 5 = strongly agree). Demographic information gathered from both groups included age, gender, degree obtained (pharmacists), role in practice (providers), time since graduation with degree, practice location in Ohio, and familiarity with HIE prior to the survey. The pharmacist survey asked questions related to readiness to participate in an HIE network, perspectives on relationships with providers, how pharmacists communicate with providers, how they want information conveyed to the providers to be used, relationships with patients, and barriers to using an HIE network. The provider survey asked questions related to whether EHRs were integrated with an HIE network, reasons for patient referrals, whether they referred patients to pharmacists for disease management, familiarity with community pharmacy services, disease states they considered referring a patient to a pharmacist for, relationships with pharmacists, which components of the HIE network they commonly used, and benefits of the HIE network used. Neither survey was validated; however, questions were piloted for relevance and clarity with 4 individuals (2 pharmacists and 2 nurses) who were not in the pharmacist or provider population. SurveyMonkey (www.surveymonkey.com, San Mateo, CA) was used to administer both surveys.

Data Collection Procedures

Each pharmacist who worked in one of the pharmacies identified for study inclusion were sent a link to an anonymous web-based survey by the investigator via work email. There were 3 follow-up email reminders sent to pharmacists at weeks 1, 2, and 3 following the initial survey request. The provider survey was sent via email by CliniSync to all contacts in Ohio, which helped protect confidentiality by not disclosing email addresses, names, and location addresses of participants. There were also 3 email reminders sent to all providers at weeks 1, 2, and 4 following the initial survey request.

Data Analysis

Data were collected via Microsoft Excel to capture descriptive statistics of pharmacist and provider responses to the survey. Additionally, median and interquartile ranges (IQRs) were calculated for Likert-type scale questions. All results remained confidential and were reported in total. The study was approved by the University of Toledo, Social, Behavioral, and Educational Institutional Review Board.

Results

Pharmacist Sample

Eighty-five pharmacies were identified as high clinical performing pharmacies and were included in the study, which led to 254 pharmacists being sent the pharmacist survey. Informed consent was provided by 101 pharmacists (40% response rate). Demographic data for pharmacist respondents are shown in Table 1. Of note, 61% ($n = 52$) of respondents were women, the majority were 31 to 40 years of age (41%, $n = 35$), and 65% ($n = 55$) had their Doctor of Pharmacy degree. Furthermore, 64% ($n = 54$) were familiar with HIE prior to starting the survey.

Pharmacist Responses

Complete pharmacist respondent results are displayed in Table 2. Pharmacist respondents predominantly communicate with providers via fax (92%, $n = 78$) and phone (98%, $n = 83$), with the hope that information communicated would be used to modify the patient's therapy. When communicating with patients, phone (94%, $n = 80$) and face-to-face (96%, $n = 82$) was identified as the most commonly utilized communication methods.

Regarding preparedness to participate, pharmacist respondents agreed that they have the skill (median 5, IQR 1) and desire (median 5, IQR 1) to be a part of the HIE network. However, pharmacist respondents disagreed that they have been sufficiently trained to participate (median 2, IQR 2).

For relationships with other health care providers, pharmacist respondents agreed that physicians respect the profession of pharmacy (median 4, IQR 1), are willing to work with

community pharmacists to provide enhanced patient services (median 4, IQR 1), and are willing to share patient information with community pharmacists (median 4, IQR 1).

Concerning relationships with patients, pharmacist respondents agreed that they have a strong relationship with their patients (median 4, IQR 1) and that patients have a desire to have their information shared between health care providers. However, respondents tended to be neutral toward patients accurately communicating pharmacists' recommendations to physicians/providers (median 3, IQR 1).

When asked about barriers to utilizing the HIE network in practice, pharmacist respondents reported agreement with a lack of access to an HIE (median 4, IQR 0) and not having adequate opportunities to review patient information in a patient chart (median 4, IQR 0). Pharmacists also stated that they agree there is a lack of time to participate in HIE networks (median 4, IQR 1), not enough support staff (median 4, IQR 1), and that support staff is not optimally utilized to help free up pharmacists' time (median 4, IQR 1). Furthermore, respondents agreed that they do not want to leave workflow to log into another portal (median 4, IQR 1) and are concerned that the information within a patient profile will not be complete (median 4, IQR 1).

Provider Sample

The survey was sent to 2800 individuals. There were 161 responses to the provider survey, and 50 of the respondents fit the defined criteria of being a provider. The overall response rate was 5.8%. However, an accurate provider response rate could not be calculated because at the time of sending out the survey, it was unknown to the HIE how many of the 2800 survey recipients were providers versus office staff. To identify provider respondents, a provider identifying question was included in the survey. Demographic data for provider respondents are shown in Table 1. A majority of provider respondents were female (60%, $n = 30$), older than 51 years (64%, $n = 32$), and held the role of physician in their practice (62%, $n = 31$). Ninety-six percent ($n = 48$) of providers stated that they had EHRs, while only 46% ($n = 23$) stated that an HIE network was integrated in their EHRs.

Provider Responses

Complete provider respondent results are displayed in Table 3. Seventy-five percent ($n = 36$) of provider respondents stated that they do not refer their patients to a pharmacy for other health care needs and disease state management. While 66% ($n = 33$) were aware of the different services provided by pharmacists in a community pharmacy (immunizations, diabetes coaching, smoking cessation programs, etc). When asked which disease states a provider respondent would consider making a referral to a pharmacist to improve patient care, 56% ($n = 28$) stated they do not refer patients to pharmacists.

Table 1. Pharmacist and Provider Respondent Demographics.

| Characteristics | Response, n (%) | |
|---|---------------------|-------------------|
| | Pharmacists, n = 85 | Providers, n = 50 |
| Gender | 85 | 50 |
| Male | 33 (39%) | 20 (40%) |
| Female | 52 (61%) | 30 (60%) |
| Age (years) | 85 | 50 |
| 20-30 | 23 (27%) | 2 (4%) |
| 31-40 | 35 (41%) | 8 (16%) |
| 41-50 | 14 (17%) | 8 (16%) |
| 51-60 | 10 (12%) | 17 (34%) |
| >61 | 3 (4%) | 15 (30%) |
| Highest degree earned | 85 | 50 |
| Bachelor of pharmacy | 30 (35%) | — |
| Doctorate of pharmacy | 55 (65%) | — |
| Physician (MD or DO) | — | 31 (62%) |
| Nurse practitioner | — | 2 (4%) |
| Licensed practical nurse | — | 3 (6%) |
| Nurse case manager | — | 4 (8%) |
| Registered nurse | — | 9 (18%) |
| Physician assistant | — | 1 (2%) |
| Location ^a | 85 | 50 |
| Toledo | 13 (15%) | 2 (4%) |
| Columbus | 33 (39%) | 5 (10%) |
| Cleveland | 0 (0%) | 11 (22%) |
| Cincinnati | 21 (25%) | 2 (4%) |
| Dayton | 3 (4%) | 0 (0%) |
| Lima | 1 (1%) | 0 (0%) |
| Findlay | 1 (1%) | 1 (2%) |
| Akron | 0 (0%) | 3 (6%) |
| Other ^a | 13 (15%) | 26 (52%) |
| Familiarity with HIE prior to survey ^b | 84 | 50 |
| Yes | 54 (64%) | 44 (88%) |
| No | 30 (36%) | 6 (12%) |
| Provider specific questions | Yes | No |
| I have an EHR system at my organization | 48 (96%) | 2 (4%) |
| My EHR system is integrated with the HIE | 23 (46%) | 27 (54%) |
| Do you use HIE networks? | 31 (62%) | 19 (38%) |

Abbreviations: EHR, electronic health record; HIE, health information exchange.

^aOther locations included Fremont, Troy, Lebanon, Marysville, Lambertville (Michigan), Delaware, Springfield, Steubenville, Port Clinton, Gahanna, Portsmouth, Lancaster, Minford, Cambridge, Huron County, Hillsboro, Bucyrus, London, Canton, Van Wert, Newark, Aurora, Medina, Millersburg, Westlake, Zanesville, East Liverpool, and Perrysburg. Lamertville, MI, was included as it is very close in proximity to Toledo Ohio, where many Kroger pharmacies are located.

^bNot all pharmacist respondents answered this question.

When asked about their relationship with pharmacists, provider respondents were neutral about having a strong relationship with pharmacists (median 3, IQR 1). However, provider respondents tended to agree that pharmacists are willing to share patient information with their team (median 4, IQR 1). Additionally, providers appeared to agree that pharmacists are willing to work together to provide enhanced patient care (median 4, IQR 1) and respect the provider's expertise (median 4, IQR 1).

With regard to why providers use HIE networks to retrieve medical information or make referrals, of 45 respondents, 64% (n = 29) stated that they use it to access patient laboratory results, 56% (n = 25) access complete medication records, 58% (n = 26) review discharge medications or medication reconciliation, and 53% (n = 24) access notes from visits with other health care professionals.

When evaluating benefits of using the HIE network, provider respondents agreed that using the HIE improves the

Table 2. Practices and Beliefs of High-Performing Clinical Pharmacists (n = 85).

| Question | Response, n (%) | |
|--|---------------------|-----|
| How do you typically communicate with providers? (Select all that apply), n = 85 | | |
| Fax | 78 (92%) | |
| Phone | 83 (98%) | |
| Email | 5 (6%) | |
| Face-to-face | 4 (5%) | |
| Other | 6 (7%) | |
| How do you normally communicate with patients? (Select all that apply), n = 85 | | |
| Fax | 4 (5%) | |
| Phone | 80 (94%) | |
| Email | 7 (8%) | |
| Face-to-face | 82 (96%) | |
| Other (please specify) | 1 (1%) | |
| How do you hope that the information provided by you will be used by providers? (Select all that apply), n = 85 | | |
| Change in therapy to resolve drug-drug interaction | 79 (93%) | |
| Adding therapy indicated by guidelines to optimize patient care | 76 (89%) | |
| Decrease/increase in dose of medications based on patient response (laboratories, vitals, adverse effects, etc) | 76 (89%) | |
| Change in therapy based on insurance coverage | 78 (92%) | |
| Other (please specify) | 6 (7%) | |
| Preparedness to participate | Median ^a | IQR |
| Pharmacists are sufficiently trained to participate in HIE networks, n = 85 | 2 | 2 |
| Pharmacists have the skills to participate in HIE networks, n = 85 | 5 | 1 |
| Pharmacists should be included in the exchange of patient health information, n = 85 | 5 | 1 |
| Pharmacist-provided patient information gathered from the community pharmacy is vital to a primary care physician when making decisions on a patient's course of therapy, n = 85 | 5 | 1 |
| I want to be part of the HIE network, n = 85 | 5 | 1 |
| I am willing to take on more responsibility to participate in HIE networks, n = 85 | 4 | 1 |
| I am confident in my abilities to provide enhanced patient care as part of an HIE network, n = 85 | 4 | 1 |
| I have the support from staff and administrators necessary to provide enhanced patient care as part of an HIE network, n = 85 | 3 | 1 |
| Relationships with other health care providers | Median ^a | IQR |
| Physicians respect the profession of pharmacy, n = 85 | 4 | 1 |
| Physicians are willing to work with community pharmacists to provide enhanced patient care, n = 85 | 4 | 1 |
| Physicians often accept recommendations provided by community pharmacists, n = 85 | 3 | 1 |
| Physicians are willing to share patient information with community pharmacists, n = 85 | 4 | 1 |
| Physicians are willing to work closely with community pharmacists, n = 85 | 3 | 1 |
| I have strong relationships with local physicians, n = 85 | 3 | 1 |
| Relationship with the patient | Median ^a | IQR |
| Patients respect the profession of pharmacy, n = 85 | 4 | 1 |
| Patients often accept recommendations provided by community pharmacists, n = 85 | 4 | 1 |
| Patients are willing to work closely with community pharmacists, n = 85 | 4 | 1 |
| Patients have a desire to have their information shared between health care providers, n = 84 ^b | 4 | 2 |
| Patients accurately communicate pharmacists' recommendations to physicians/providers, n = 85 | 3 | 1 |
| I have strong relationships with my patients, n = 84 ^b | 4 | 1 |

(continued)

Table 2. (continued)

| Barriers to an HIE | Median ^a | IQR |
|--|---------------------|-----|
| There is a lack of time to participate in an HIE network, n = 84 ^b | 4 | 2 |
| I feel that I have a lack of access to an HIE, n = 85 | 4 | 0 |
| I do not have adequate opportunities to review patient information in a patient chart, n = 85 | 4 | 0 |
| My level of knowledge is not adequate to provide benefit in HIE usage, n = 85 | 2 | 1 |
| Physicians do not want my input, n = 83 ^b | 3 | 2 |
| Patients do not want my input, n = 84 ^b | 2 | 1 |
| HIE network participation is outside of a pharmacist's scope of practice, n = 85 | 2 | 1 |
| Reimbursement for cognitive patient care services is not adequate, n = 84 ^b | 4 | 1 |
| Bad past experiences prevent me from wanting to participate in an HIE network, n = 84 ^b | 2 | 1 |
| There are not enough support staff to help free up pharmacists' time, n = 84 ^b | 4 | 1 |
| Support staff are not optimally utilized to help free up pharmacists' time, n = 85 | 4 | 1 |
| I am not educated on the security or privacy of an HIE network, n = 84 ^b | 3 | 2 |
| I am not knowledgeable of the patient consent process as it relates to HIE and Ohio law, n = 84 ^b | 3 | 1 |
| I do not want to leave my workflow to log into another portal, n = 85 | 4 | 1 |
| I am unsure of whether I need to obtain patient permission to access their information in an HIE network, n = 85 | 3 | 2 |
| I am concerned that the information within a patient profile will not be complete (there will be missing data), n = 85 | 4 | 1 |

Abbreviations: IQR, interquartile range; HIE, health information exchange.

^aMedian and IQR based on 5 point Likert-type scale (5 = Strongly Agree, 1 = Strongly Disagree).

^bNot all pharmacist respondents answered this question.

Table 3. Practices and Beliefs of Providers Using CliniSync in Ohio (n = 50).

| Question | Response, n (%) | |
|---|---------------------|----------|
| | Yes | No |
| Do you refer your patients to a pharmacy for other health care needs and disease state management? n = 48 ^a | 12 (25%) | 36 (75%) |
| Are you aware of the different services provided by pharmacists in a community pharmacy? n = 50 | 33 (66%) | 17 (33%) |
| How do you typically send a prescription to pharmacists? (Select all that apply), n = 50 | | |
| Electronic | 42 (84%) | |
| Fax | 12 (24%) | |
| Paper Rx | 19 (38%) | |
| What disease states would you consider making referrals to pharmacists to improve patient care? (Select all that apply), n = 50 | | |
| Diabetes | 16 (32%) | |
| Congestive heart failure | 9 (18%) | |
| Depression | 6 (12%) | |
| Osteoporosis | 4 (8%) | |
| Asthma/COPD | 12 (24%) | |
| Hypertension | 14 (28%) | |
| Rheumatoid Arthritis | 5 (10%) | |
| Dyslipidemia | 6 (12%) | |
| Cardiovascular disorders | 7 (14%) | |
| I don't refer patients to pharmacists | 28 (56%) | |
| Other (please specify) | 13 (26%) | |
| Relationships with pharmacists | Median ^b | IQR |
| Pharmacists respect my expertise, n = 49 ^a | 4 | 1 |
| Pharmacists are willing to work together to provide enhanced patient care, n = 50 | 4 | 1 |

(continued)

Table 3. (continued)

| | | |
|--|---------------------------|------------|
| Pharmacists often accept recommendations provided by me, n = 50 | 3 | 1 |
| Pharmacists are willing to share patient information with my team, n = 49 ^a | 4 | 1 |
| Pharmacists are willing to work closely with my team, n = 50 | 3 | 1 |
| I have strong relationships with pharmacists, n = 50 | 3 | 1 |
| Select the reasons why you use HIE networks to retrieve patient medical information or make referrals (select all that apply), n = 45 ^a | | |
| Refer patients to specialists | 11 (24%) | |
| Access complete medication records | 25 (56%) | |
| Access patient laboratory results | 29 (64%) | |
| Access notes from visits with other health care providers for continuity of care | 24 (53%) | |
| Review discharge medications or medication reconciliation | 26 (58%) | |
| Update notes for visits with my team | 10 (22%) | |
| Query the OARRS database | 16 (36%) | |
| Other (please specify) | 12 (27%) | |
| Benefits to an HIE | Median^b | IQR |
| Using the HIE improves the quality of my work, n = 45 ^a | 4 | 1 |
| Using the HIE gives me greater control over my work, n = 45 ^a | 3 | 1 |
| Using the HIE enables me to accomplish tasks quickly, n = 45 ^a | 3 | 1 |
| Using the HIE supports critical aspects of my job, n = 45 ^a | 4 | 1 |
| Using the HIE increases my productivity, n = 44 ^a | 3 | 1 |
| Using the HIE improves my job performance, n = 45 ^a | 3 | 1 |
| Using the HIE makes it easier to do my job, n = 44 ^a | 3 | 1 |
| Using the HIE allows me to better coordinate patient care (using referrals), n = 46 ^a | 3 | 1 |
| I am not educated on the security or privacy of an HIE network, n = 45 ^a | 2 | 2 |
| I am not clear about how the HIE matches patients from disparate systems, n = 44 ^a | 3 | 3 |
| I am not knowledgeable of the patient consent process as it relates to HIE and Ohio law, n = 45 ^a | 3 | 2 |
| I do not want to leave my EHR workflow to log into another portal, n = 44 ^a | 4 | 2 |
| My vendor charges too much to integrate my EHR with the HIE, n = 44 ^a | 3 | 1 |
| I am concerned about the extra time it would take my staff to learn and use the HIE, n = 45 ^a | 3 | 2 |
| There is too much information available in the HIE that is not essential to my care of the patient; I just need a laboratory result, n = 45 ^a | 3 | 1 |
| There are too many clicks to get to the information I need quickly, n = 44 ^a | 3 | 2 |
| I have everything I need within my own system; I do not have a need to use the HIE, n = 43 ^a | 2 | 2 |
| I need to access information from a hospital that is not with CliniSync, n = 44 ^a | 3 | 1 |

Abbreviations: COPD, chronic obstructive pulmonary disease; IQR, interquartile range; OARRS, Ohio Automated Rx Reporting System; HIE, health information exchange; HER, electronic health record.

^aNot all provider respondents answered this question.

^bMedian and IQR based on 5 point Likert-type scale (5 = Strongly Agree, 1 = Strongly Disagree).

quality of their work (median 4, IQR 1) and supports critical aspects of their job (median 4, IQR 1). Regarding barriers to using an HIE network, provider respondents tended to agree they do not want to leave their EHR workflow to log into another portal (median 4, IQR 2). However, respondents were neutral to vendors charging too much to integrate their EHR with the HIE (median 3, IQR 1) or there being too much information available in the HIE (median 3, IQR 1).

Discussion

More than 60% of pharmacist respondents indicated that they were ready to participate in the HIE network and believed

that it is within the pharmacist scope to do so. Furthermore, over 80% gave responses stating that they were comfortable and had good relationships with their patients; however, when it comes to their confidence about whether patients accurately communicate pharmacists' recommendations to providers, very few pharmacists agreed that patients did this well. To address this perceived issue, the HIE network could be utilized by pharmacists to communicate with providers more accurately than relying on patients to share information and more efficiently than calling or faxing the provider. Moreover, utilization of the HIE could provide pharmacists an additional communication tool with patients in addition to phone and face-to-face interactions.

Providers stated that there were benefits with HIE use; however, more than 70% are not referring patients to pharmacists even though more than 65% are familiar with the services that community pharmacies offer. There may be several reasons for this. Work by McDonough and Doucette synthesized a model for the stages of the Pharmacist-Physician Collaborative Working Relationship that include the following: Stage 0—Professional Awareness; Stage 1—Professional Recognition; Stage 2—Exploration and Trial; Stage 3—Professional Relationship Expansion; Stage 4—Commitment to the Collaborative Working Relationship.¹³ Our results indicate that providers are neutral regarding having a strong relationship with community pharmacists. This lack of referral and relational neutrality could indicate the Pharmacist-Physician Collaborative Working Relationship of those surveyed is at a lower stage of the model, such as Stage 0 or Stage 1. Additionally, 11% of providers stated that they were in Cleveland; of note, there are no Kroger pharmacies in Cleveland. Nonetheless, if more community pharmacists were able to utilize the HIE network to communicate with providers, the increase in positive professional interactions may advance the Stage of the Pharmacist-Physician Collaborative Working Relationship. As outlined by McDonough and Doucette, the exchange of information between pharmacists and providers may allow for the development of provider expectations regarding the pharmacist's abilities and competence, in turn, affecting the relationship.¹³

Recent literature has shown the benefits of having pharmacists review patient charts and utilize clinical information to make therapeutic decisions and reduce medication errors.¹⁴⁻¹⁸ Pharmacists respondents in our study indicated that they do not have adequate opportunities to review patient information from the patient's chart. Pharmacist access to patient information through an HIE is one way to improve the pharmacist's ability to review additional patient information. In a study conducted by Gernant and colleagues, pharmacists were divided into 2 groups; those completing MTMs using the last 6 months of provider-held patient information, and those who completed MTMs without soliciting the providers for patient information (only used information volunteered by the patient or caregiver). The pharmacists who solicited for patient health information from providers found significantly more medication-related problems than the pharmacists providing usual care ($P = .049$). The intervention group also found significantly more omissions ($P = .009$) than the usual care group of pharmacists.¹⁹ As clinical services expand in the community setting, HIE may be utilized to increase pharmacist access to patient information, improving patient care.

One limitation of this study is selection bias with the pharmacists that were surveyed. It was thought that selecting pharmacists who worked in high clinically performing pharmacies would be more likely to have used the HIE network in the past when providing clinical services. However, pharmacists working in a lower clinically performing pharmacy also had access

to the HIE and could have used it when providing clinical services. An additional limitation observed is the discrepancy in age between the pharmacist and physician respondents. Sixty-seven percent of pharmacist respondents were between the age of 20 and 40 years, while 64% of physicians were 51 years old or older. Younger pharmacists and providers may be more likely to have experienced interprofessional education during professional coursework as well as increased familiarity with technology. If older pharmacists and younger physicians had responded to the survey, we may have seen a different trend in the responses provided by both groups. Another limitation of this study is the inability to calculate the provider response rate. As mentioned above, the provider survey was sent out to all CliniSync contacts in Ohio due to the inability to determine which contacts were providers and which were not. A fourth limitation of our study is that it only involved 1 HIE network. As mentioned previously, all HIE networks differ from one another. Results obtained in one state may differ from another depending on the HIE networks available, since not all HIE networks are available nationwide.

Conclusion

Community pharmacists in high clinically performing pharmacies indicated readiness to use the HIE network and believed it is necessary to enhance patient care. However, barriers that prevented this were lack of training to use the HIE, lack of time, lack of support staff to assist the pharmacist while using the HIE, and lack of knowledge of the requirements that need to be in place prior to using HIE (ie, patient permission, etc). Providers indicated that using the HIE network was beneficial to their practice; however, they were not using it to communicate with pharmacists who were caring for their patients. Implementing HIE into clinical pharmacy workflow and encouraging providers to use it to make patient health information available to pharmacists would provide additional information for pharmacists to review when providing clinical services in the community pharmacy setting, ultimately benefiting patient care.

Acknowledgments

We would like to thank the Kroger Co and CliniSync for sharing time and expertise with the research team on this project.

Declaration of Conflicting Interests

The author(s) declared the following potential conflicts of interest with respect to the research, authorship, and/or publication of this article: Drs Carpenter, Lengel, DiDonato, and Azzi were employees of The Kroger Co.

Funding

The author(s) received no financial support for the research, authorship, and/or publication of this article.

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