A Qualitative Study of Master Patient Index (MPI) Record Challenges from Health Information Management Professionals' Perspectives

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Abstract

This study aimed gain a better understanding of the challenges associated with Master Patient Index (MPI) records in healthcare delivery from health information management (HIM) professionals' perspectives. The study was a content analysis of in-depth interviews conducted by the organization using a semistructured questionnaire to collect information from HIM professionals ($n = 5$). Purposive sampling was used by the organization. The setting was an urban nonprofit healthcare facility located in Dallas, Texas, primarily serving uninsured adults in an outpatient clinic. Participants were HIM professionals employed by the healthcare facility. The collected data were coded to analyze interview responses. Phrases were used to identify the challenges indicated by HIM professionals regarding how well the available data matched the specific requirements of the organization. Using the "Why Patient Matching Is a Challenge" model outlined by Just et al., the researchers in the study identified the key challenges in patient identification matching in the MPI records. The anticipated outcome of the current study is that the identification of challenges associated with the MPI from HIM professionals' perspectives can help organizations reduce patient information errors.

Introduction

According to AHIMA, health information is the data related to a person's medical history, including symptoms, diagnosis, procedures, and outcomes. Health information management (HIM) professionals are the individuals who ensure that a patient's health information and records are complete, accurate, and protected. They are vital to any organization, are trained in the latest applications, and contribute to organizational workflow. The master patient index (MPI) plays a major role in hospital information systems. It helps an organization understand its patient population and its own performance.[1] The Veterans Administration suggests that the MPI offers a complete view of the patient's medical and treatment history and has the ability to uniquely identify patients across the organization.[2] Often, HIM departments are at the center of identifying and mitigating errors, sorting through duplicate records, and separating information that has been entered in the incorrect patient record.[3]

The elements in the MPI include both demographic data and visit-specific information. The demographic information includes data such as the patient's name, birth date, sex, and Social Security number (SSN). The visit information includes items such as admission date, discharge date, encounter type and location, and the primary physician involved in the encounter. The data contained in the MPI will ultimately identify patients, such as for treatment options. Because the MPI is essentially a database

that maintains a unique identifier for each patient seen at the organizational or enterprise level, correctly identifying and linking the data elements in the MPI from visit to visit and between enterprise activities for patients is very important.[4]

The following research questions aim to gain insight about the challenges associated with the MPI in healthcare delivery from HIM professionals' perspectives. The purpose of this content analysis is to understand these challenges from the perspectives of the HIM professionals at the Primary Care Clinic of North Texas. The study aimed to answer the following questions:

- How do HIM professionals at the Primary Care Clinic of North Texas describe their challenges associated with the MPI?
- How do the key challenges in the MPI hinder the organizational workflow?

Literature Review

Research has shown that HIM professionals play an important role in MPI implementation.[5] An exploration and examination of the challenges associated with MPI records from HIM professionals' perspectives provided direct insight into ways to improve patient matching.[6] In addition, as more providers and payers are participating in integrated delivery systems, data may be located at several departments across the system. Hence, the use of patient identity management systems in the MPI has become more complex in recent years. The increased issues that are related to privacy, security, and quality of patient information require HIM professionals to have additional skill sets in data content standardization to ensure data quality from the point of collection through all transactions in which data are transmitted, combined, analyzed, accessed, and applied.[7]

Method

Background and Demographics

The Primary Care Clinic of North Texas offers a variety of services to uninsured adults in the metroplex. The clinic has several different units in addition to the admission unit. These units include the Pap smear and EKG unit, generic drug unit, arthritis and lupus treatment programs, information technology (IT), and the medical record department. The HIM professionals who participated in the interview work in various roles in the medical record department. Job roles ranged from billing specialist to release-of-information specialist. These professionals have been working at the clinic for more than 10 years. Among the five HIM professionals, 100 percent were full-time employees and had the AHIMA credential of Registered Health Information Administrator (RHIA). Most were billing specialists (two) or release-of-information specialists (two); one was the HIM director. In addition, four of the professionals held a baccalaureate degree, and one of the professionals had a master's degree. A complete list of the characteristics of respondents can be found in Table 1.

The clinic has faced unprecedented demographic transitions in the last five years. According to the clinic's 2016 patient demographic data, the majority of the population it serves is ethnic minority (62 percent Hispanic, 22 percent African American, 10 percent Native American, and 6 percent white). A substantial proportion of the population are illegal immigrants from Mexico and Latin America. They are often ineligible for privately funded health services, so the outpatient clinic is their primary care provider. These special challenges have hindered the data collection process. For instance, the patients do not have any identification at registration, and some patients may use another person's SSN or medical record number (MRN). This has led to tremendous work for the HIM professionals in verifying and processing the data.

Prior to the research study, variations occurred in the registration process in several instances depending on how the patients made contact with the clinic. For example, when a patient calls to schedule

an appointment with the Pap smear and EKG unit, a new MRN is generated for the patient, and a clerk in the unit will obtain the rest of the current demographic and insurance policy information needed for a full patient registration profile. However, if the patient calls the generic drug unit, then the staff member in the generic drug unit will ask the patient to confirm additional information, such as SSN and current address, and will compare this information to that of the patient found in the search results. If the name and MRN do not return any results, the staff member at the unit will generate a new MRN. Thus, overlapping records can occur because of the variations in the registration process. Figure 2 shows the registration workflow and how the patient makes contact with the clinic.

Additionally, the clinic has no designated individual who manages the MPI, and each unit has access to the MPI system. The current procedures that are used by these five HIM professionals are as follows: (1) the HIM professionals first use the full last and first name along with the date of birth to search, (2) if a patient is found in the search results, the HIM professionals will use the existing record for the patient, and (3) if the name and date of birth search does not return any results, the HIM professionals will generate a new MRN for the patient. Finally, those five HIM professionals will contact the different units to obtain and compare the rest of the demographic information needed for a full patient profile. As a result, the HIM professionals tasked with ensuring that the patient information is complete, accurate, and timely have become overwhelmed by the challenge. Therefore, the five HIM professionals in the medical record department make corrections to the records only when discrepancies are found by the different units.

Data Collection

In 2016, the Primary Care Clinic of North Texas conducted an informal study in an effort to gather more information about the challenges associated with the MPI in healthcare delivery from the HIM professionals' perspectives. The interview protocol consisted of semistructured, open-ended questions developed by the organization. It was administered through in-depth interviews with five HIM professionals employed at the healthcare clinic. The researchers decided that the purposeful sampling was the most suitable design for the study because the sample size was small, with only five credentialed HIM professionals working at the clinic at the time. Thus, purposeful sampling, in which participants are chosen on the basis of their knowledge and experience of the MPI system, was used in this study. The researchers hoped that identifying the challenges associated with the MPI from the HIM professionals' perspectives would help the organization recognize additional resources and training opportunities needed for the HIM professionals to achieve appropriate patient data matching across the continuum of care.

According to Patton (1990),[8] no specific guidelines exist for sample size in qualitative studies, and the sample size depends on what researchers want to know, the purpose of the inquiry, and what can be done with the available time and resources. In addition, Groenwald (2004) suggested 2 to 10 participants as sufficient.[9] The study team used this judgment to determine a data saturation point of five participants, as the interview process and analysis unfolded. In addition, because the purpose of the study was to examine the challenges associated with the MPI from the HIM professionals' perspectives, the study had no control or comparison group. Therefore, the results of this study are not intended to be generalized to all healthcare facilities.

Measurements

The researchers used the qualitative content analysis research method for the study because the purpose was to understand the MPI challenges from the HIM professionals' perspectives at the Primary Care Clinic of North Texas. When a researcher wishes to understand one's experience, beliefs, values, and intangibles, qualitative research would be an appropriate method of study.[10] Also, Corbin and Strauss (2008) suggest that content analysis is an appropriate method to provide a structured way of analyzing data that are typically open-ended and relatively unstructured.[11]

Using the data collected through the in-depth interviews, the clinical nursing director, a content analysis research expert, guided the content analysis. The clinical nursing director, along with the study team, analyzed the responses and defined the codes that surfaced in response to one particular question asked on the questionnaire: "How do you describe the challenges associated with data standardization in the MPI records?" A complete list of the interview questions can be found in Table 2. The study team

developed a code book using open coding. According to Corbin and Strauss (2008),[12] open coding allows for exploration of the ideas and meaning that are contained in raw data. This higher level of coding enables researchers to identify any connections that may exist between codes.

The first step that each study team member followed in the open coding involved identifying themes within subsamples. Secondly, the study team read several interviews, and each team member looked at the major themes that emerged in each interview question that had not been captured. Finally, the study team began to complete the codes for each interview question. For example, a team member noticed how a participant discussed his challenges in using certain features in the MPI due to a lack of proper training. At first the study team was not certain if the participant's description fit under the code "key challenges in the MPI records," which the study team defined as the following: "Participants refer to their challenges associated with accurate patient matching." As a result, the study team looked for themes across other participants' interviews and saw that various participants discussed having challenges with accurate patient matching in the MPI. In addition, the team members reviewed each of the five HIM professionals' responses and looked for and grouped distinct concepts and patterns specific to the categories related to the types of the challenges associated with the MPI. Challenging associated with accurate patient matching was a consistent theme across participant interviews. Finally, the team members used the information gained through the process of identifying and comparing participant interviews to capture the challenges that are associated with the MPI from the HIM professionals' perspectives. The codes were then connected to the identified descriptions in the code book and placed into a word-processing document separated by respondent. In addition, examples of direct quotes were included with the codes.

To ensure consistency in the labeling of text with each code, the study team coded several pages of an interview at a time, followed by a discussion of when and how specific codes had been applied. Codes applied by the study team with no variations were considered to have 100 percent agreement among the study team members. After the study team determined the codes that were more easily and consistently identifiable (e.g., challenges of changing demographic data, challenges of multiple demographic data points, challenges in identifying key fields), the members of the team then redefined the codes that were being applied less consistently. For example, the Key Challenges in Data Standardization code proved to be problematic. This code was used to capture a participant's description of his or her own challenges associated with accurate patient matching. After careful deliberation, the study team decided that the Key Challenges in Data Standardization code would be used for the more specific idea of "key challenges with accurate patient matching" rather than for general challenges. Similarly, the study team discussed and redefined the other codes. The final goal of the data analysis in the current study was to use the new definitions of the codes until all the team members had 100 percent agreement. The final step of the data analysis was to check the reliability at the beginning of the process and at least one time during the data analysis process to make sure that coding remained consistent.

Results

The five themes that emerged from the responses about the challenges associated with the MPI among HIM professionals, guided by the conceptual model as shown in Figure 1, were as follows:

1. key challenges in data standardization,
2. key challenges in the information the patient provides (demographic data),
3. key challenges in multiple demographic data points,
4. key challenges in key identifying fields, and
5. key challenges in the MPI that hinder the organizational workflow.

These themes provided the clinic managers, including the HIM director, with a foundational framework to develop a holistic strategic plan of action to address problems in the MPI record processes proactively. The holistic strategic plan included these actions: (1) focus on better collection of data on errors, (2) standardize the approaches to patient identification across all points of registration in the

healthcare system, and (3) encourage patients and families to actively participate in the identification and data integrity processes.

Furthermore, in order to measure interrater reliability for the coders, the researchers first calculated reliability as the number of agreements divided by the total number of agreements and disagreements.[13, 14] The interrater reliability results revealed 100 percent congruence in thematic identification. According to Miles and Huberman (1994),[15] reliability of 90 percent or better is necessary for maximum consistency of coding. The researcher of the study and the clinical nursing director then met to review their findings. Identified themes showed high concurrence between the investigators. Themes were compared to look for trends. Thematic saturation was reached at five participants. Participant' reports of perceptions and use of MPI records were captured, and quantifiable results in the form of tallies were available for some variables.

Representative comments and a narrative behind each theme are presented in the following sections. Sample data-driven codes can be found in Appendix 1.

Theme 1: Key Challenges in Data Standardization

The analysis of the data in this theme suggests that a lack of standardized procedures to enter data in the MPI system have resulted in an inaccurate and incomplete MPI. A high percentage (80 percent) of participants indicated that problem exists because of a lack of standardized procedures. In contrast, one participant (20 percent) indicated that the problem exists because of lack of training on the MPI system. For example, one participant stated: "One of my concerns is the increased volume of the patient records in the MPI records. And I have a hard time figuring out which record is an authenticated patient record with the same last names due to lack of standardized procedures." Another participant stated: "I have found that the training section . . . did not help me to become familiar with the system."

Theme 2: Key Challenges in Changing Demographic Data

Data results indicated that all five participants (100 percent) believed there was a lack of consistency in the data collection to handle constantly changing patient demographic information. For instance, people commonly change their name, address, and phone number and occasionally change their gender. The current data collection policy did not address this issue. Here are some responses from the interview:

> "At my current role, I feel that there is a lack of consistency in the data collection to handle constantly changing patient demographic information."—Respondent No. 4

> "I feel we need to reengineer the data enter process in the MPI."—Respondent No. 5

Theme 3: Key Challenges in Multiple Demographic Data Points

The data in this theme suggested that the MPI records did not have enough matching data points, and patient matching based on limited data creates a risk of overlaid records. An overlaid record occurs when two different patients are associated with the same record. In addition, data results indicated that four of the five participants (80 percent) believed an overlaid record in the MPI was discovered when physicians and nurses were performing treatment. Some responses from the interview include the following:

> "One of the difficulties that I have found in the MPI system is that the records did not have enough matching data points and patient matching was based on limited data." —Respondent No. 1

> "I have seen so many overlaid records where [instances when] two different patients are associated with the same record [overlaid record]."—Respondent No. 3

> "I feel that we could have spent more time on monitoring and conducting regular audits on MPI system data instead of deleting preexisting overlaid records." —Respondent No. 4

Theme 4: Key Challenges in Key Identifying Fields

Data results from this theme provided information on the key identifying fields in the MPI, such as SSN and MRN. These key identifying fields have been set to have default values or no information in fields. For example, for a patient who does not have a SSN, a default value such as 999-99-9999 is entered in the data field in the MPI.

The results indicated that all five participants (100 percent) have experienced duplicate patient record discrepancies in the MPI due to a blank entry or a default entry in one of the key identifying fields, with the majority being in the MRN and SSN fields. Here is a response from the interview:

> "Sometimes, I could not enter the patient's [MRN] in the MPI because the field has a default value that did not let me enter it."—Respondent No. 2

Theme 5: Key Challenges in the MPI That Hinder the Organizational Workflow

Data results from this theme indicated that all five participants (100 percent) believed that the key challenges were in data standardization, changing demographic data, multiple demographic data points, and key identifying fields. A high percentage (80 percentage) of participants indicated that the problems of overlaid records and a lack of consistency in the collection of constantly changing patient demographic information have slowed their work productivities. Some of the responses from the interview included the following:

> "One of my concerns is the increased volume of the duplicate patient records in the MPI records system has slowed my workflow."—Respondent No. 3

> "Lack of a standardized direction on how to enter the record in the MPI system has slowed my workflow."—Respondent No. 1

Discussion

Data and information collected from the in-depth interviews indicate that improvement in standardization of the MPI data is much needed to improve not only the workflow but also the accuracy and completeness of the data process. Several key challenges that the participants reported, including data standardization, changing demographic data, multiple demographic data points, and key identifying fields, are consistent with previous research.[16] The five themes can be summarized as follows:

- The first key challenge that the participants indicated was that a lack of standardized procedures to enter data in the MPI system has caused inaccurate and incomplete MPI records.
- The second key challenge was the changing demographic data in the MPI; the organization did not have a consistent data collection method to handle constantly changing patient demographic data.
- Additionally, the participants identified that the MPI records did not have enough matching data points and that patient matching was based on limited data, resulting in overlaid records in the MPI.
- Finally, the participants strongly agreed that the challenges in key identifying fields in the MPI, such as SSN and MRN, have hindered the organization's ability to accurately match patient records. All these key challenges in the MPI have slowed the organizational workflow.

These findings demonstrate that data standardization with constantly changing patient demographic information is the organization's biggest challenge. In addition, the results of the study provided the organization leaders a foundational framework to develop a comprehensive strategic plan of action to address the challenges proactively.

Limitations

The purpose of the study was to examine the challenges associated with the MPI from HIM professionals' perspectives; thus, there was no control group or comparison. Consequently, the participants interviewed represented only a primary healthcare facility located in Dallas, Texas, primarily serving uninsured adults in an outpatient clinic setting, which may not be representative of other settings, such as acute care or large outpatient clinics. In addition, although purposeful sampling is justified by Groenwald's (2004) suggestions,[17] the conclusions that are drawn from a small sample of purposefully selected HIM professionals within this primary healthcare center should be considered within the context of these limitations. Other limitations may include aspects of the interview process, including the interview length and the limited number of questions, which may have not have been as comprehensive as possible. Therefore, the results of this study are not intended to be generalized to all healthcare facilities.

Conclusion

Overall, this study demonstrates that duplicate patient record discrepancies are often due to a lack of data standardization within the organization. Moreover, because of ever-increasing changes in the information the patient provides at the time of registration, such as name, addresses, phone numbers, and gender, the current data collection policy was unable to meet the needs of current patient populations. Because of the complex nature of record matching and the decreased capture of an accurate, valid SSN, the MRN is becoming ever more important to appropriately identify duplicate records. Clinical managers need to work together to reengineer and standardize the MPI record process by developing an extensive, organization-wide MPI record cleaning project, focusing especially on areas in which duplicate patient record discrepancies are often due to a blank entry or a default entry in one of the key identifying fields.

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Notes

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Table 1

Characteristics of Respondents (*n* = 5)

Characteristics	Number	Percentage
Years of employment		
Less than 1 year	0	0
1–3 years	0	0
4–6 years	0	0
7–10 years	0	0
11–15 years	5	100
16–25 years	0	0
More than 25 years	0	0
Employment status		
Full time	5	100
Part time	0	0
Contract	0	0
AHIMA credentials		
RHIA	5	100
RHIT	0	0
Other	0	0
Job roles		
Health information management director	1	20
Billing specialist	2	40
Release-of-information specialist	2	40
Highest level of education		
Doctorate	0	0
Master's	1	20
Baccalaureate	4	80
Associate	0	0

Table 2

Master Patient Index Record Interview Questions

| |
|---|
| • How familiar are you with the master patient index (MPI) records? |
| • How do you describe the challenges associated with data standardization in the MPI records? |
| • How concerned are you about the frequently changing demographic data in the MPI records? |
| • How do you describe the challenges associated with multiple demographic data points in the MPI records? |
| • How do you describe the challenges associated with key identifying fields in the MPI records? |
| • How do you describe the key challenges in the MPI records that affect the organizational workflow? |
| • Can you think of any way the MPI record system could improve your workflow (e.g., patient care, data analysis, record tracking)? |
| • Is there anything about the MPI records that you think I should know? |

Figure 1

The "Why Patient Matching Is a Challenge" Model

Source: Just, B. H., D. Marc, M. Munns, and R. Sandefer. "Why Patient Matching Is a Challenge: Research on Master Patient Index (MPI) Data Discrepancies in Key Identifying Fields." *Perspectives in Health Information Management* 13 (2016).

Figure 2

Variations in the Patient Registration Workflow
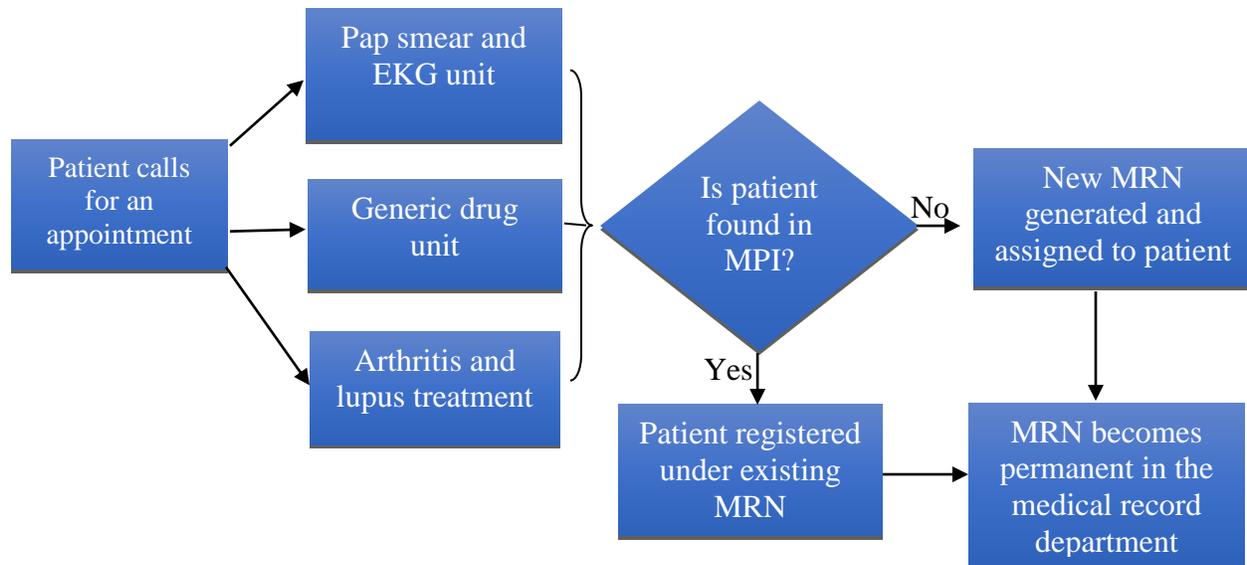
Abbreviations: MPI, master patient index; MRN, medical record number.

Appendix 1

Sample Data-driven Codes

Codebook	Descriptions	Examples
Key Challenges in Data Standardization	Participants refer to their challenges associated with accurate patient matching.	''I have access to the MPI records system training in-house; however, I have found that the training section on the methods of matching patient records did not help me to become familiar with the system.'' —Respondent No. 1
Key Challenges in Changing Demographic Data	Participants refer to their challenges with a lack of consistency in the data collection.	"At my current role, I feel that there is a lack of consistency in the data collection to handle constantly changing patient demographic information." —Respondents No. 4
Key Challenges in Multiple Demographic Data Points	Participants refer to their challenges with a risk of overlaid records.	"I have seen the records did not have enough matching data points and patient matching was based on limited data." —Respondents No. 1
Key Challenges in Identifying Key Fields	Participants refer to their challenges in identifying key fields such as Social Security number and medical record number due to having default values or no information in the fields. Patients who do not provide their true identities result in default values entered in the MPI.	"Sometimes, I could not enter the patient's medical record number in the MPI because the field has a default value that did not let me enter it." —Respondent No. 2
Key Challenges in the MPI That Hinder the Organizational Workflow	Participants refer to their concerns with how the current key challenges in the MPI records affect the organizational workflow.	"One of my concerns is the increased volume of the duplicate patient records in the MPI records system has slowed my workflow." — Respondent No. 3 "Lack of a standardized direction on how to enter the record in the MPI system has slowed my workflow." —Respondent No. 1