

Analyzing the ICD-10-CM Transition and Post-implementation Stages: A Public Health Institution Case Study

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Abstract

On October 1, 2015, the International Classification of Diseases, Tenth Revision, Clinical Modification (ICD-10-CM) was incorporated into the US public health system. Because of significant opposition and reservations expressed by stakeholders, while the proposed rule for ICD-10-CM adoption was issued in 2009, the transition did not occur until October 2015. The purpose of this study was to identify conversion initiatives used by a public health institution during the initial and subsequent stages of ICD-10-CM implementation, to help similar institutions address future unfunded healthcare data infrastructure mandates. The data collection for this study occurred from 2015 to 2018, encompassing 20 semistructured interviews with 13 department heads, managers, physicians, and coders. Research findings from this study identified several trends, disruptions, challenges, and lessons learned that might support the industry with strategies to foster success for the transition to future coding revisions (i.e., ICD-11).

Keywords: ICD-9-CM (International Classification of Diseases, Ninth Revision, Clinical Modification); ICD-10-CM (International Classification of Diseases, Tenth Revision, Clinical Modification); ICD-11 (International Classification of Diseases, Eleventh Revision); public health

Introduction

On October 1, 2015, the United States transitioned to the International Classification of Diseases, Tenth Revision, Clinical Modification (ICD-10-CM). The United States was one of the last countries to transition to this edition of the International Classification of Diseases (ICD-10) coding system. The move from the 35-year-old system represented a historic transformation in the 21st-century healthcare industry. The conversion to ICD-10-CM was a monumental step in the continued progress of the US healthcare system's capability to accurately capture and report public health diseases, which include epidemics and infectious disease outbreaks. Public health's focus is aimed at establishing and maintaining the highest level of health and wellness for a given population. This aim includes a focus on population care and prevention, rather than individual health outcomes. While the benefits of the conversion to ICD-10-CM were well described, this unfunded mandate occurred despite significant opposition, requiring providers to invest time, personnel, and technological resources, including continuous monitoring in the post-implementation phase.

Nevertheless, how providers prepared for the mandate determined the degree of success experienced within their organizations.¹ Therefore, this study explores conversion initiatives by a public health institution implemented during the go-live (i.e., the beginning of ICD-10-CM use on or before the

required date of compliance) and post-implementation stages of ICD-10-CM use. The findings from this study will guide public health stakeholders on the strategies used to convert to ICD-10-CM between 2015 and 2018, to address future unfunded healthcare data infrastructure mandates.

Background and Significance

The implementation of ICD-10 had been forthcoming for many years. While the development of ICD-10-CM began in 1993,² the final rule that served as a mandate for adoption was published in the Federal Register on January 16, 2009. The proposed rule established the initial compliance date of October 1, 2013.³ However, the transition did not occur until October 2015 as a result of significant opposition and reservations expressed by the industry and political stakeholders.

For more than three decades, the ICD-9-CM system was used to capture not only standard clinical care diagnoses but also public health diseases, causes of death, and mortality due to terrorism. Public health focuses on diagnosing diseases, providing preventive care, identifying and controlling communicable diseases, and protecting vulnerable populations, such as children and the elderly. Because of the vital function of population-focused diagnosis, in 1990 the National Committee on Vital and Health Statistics expressed concerns that ICD-9-CM might soon be stressed to a point where the quality of capturing and reporting diseases would be compromised.⁴ The system was deemed to be incapable of describing the changing public health for the 21st-century healthcare system. Despite the fact that the new coding system offered the benefits of modernizing and providing higher-quality clinical data for measuring healthcare outcomes, the adoption required organizations to make significant changes to operations, information technology, and workflow processes.⁵

Since the implementation of ICD-10-CM, many organizations have publicly shared their experiences. These organizations include Baptist Health System; Zetter Healthcare; Gastrointestinal Associates, P.C., in Washington, DC; and California Cardiac Surgeons, to name a few.⁶ While the ICD-10-CM transition has been overwhelmingly seen as a success across the industry, to our knowledge, no studies have been conducted to examine operational issues identified during the go-live and post-implementation stages of the transition in a public health institution. Furthermore, given that some industry leaders have begun to make predictions about the operational and clinical impact of the 11th revision of the ICD coding system,⁷⁻⁹ and if the events that influenced the multiple delays of ICD-10-CM implementation are any indication of the course of future updates, it is imperative that public health institutions' stakeholders identify best practices to support future coding revision changes.

The purpose of this study was therefore to gain insights on the transition to ICD-10-CM in a public health institution from 2015 to 2018, and to extract the trends, disruptions, challenges, and lessons learned regarding the conversion in support of future national code set updates (i.e., ICD-11-CM). Public health institutions typically provide services such as disease prevention, treatment, intervention, well-child checkups, prenatal care, and other personal services to Medicaid-eligible or other low-income populations. Diagnosis codes are integral to the delivery of care in public health institutions for the tracking, capturing, and reporting of health outcomes.

Two research questions framed the study:

1. What strategies were used to overcome barriers in the go-live stages of the transition to ICD-10-CM at the public health institution?
2. What strategies were used to overcome barriers in the post-implementation stages of the transition to ICD-10-CM at the public health institution?

Literature Review

In reviewing the existing literature on the ICD-10-CM transition, we found prior studies that described the implementation as seamless; an article by Comfort is one example.¹⁰ Similar to Comfort's findings, Bowman¹¹ reported that some clinicians found the transition to be a "piece of cake," but also

acknowledged that some organizations experienced issues with their electronic health records (EHRs) related to ICD-10 code lookup tools. Another study described the implementation as a “relatively smooth process.”¹²

Research by Butler has shown that facilities that lacked physician buy-in for the transition to ICD-10-CM experienced slow adaptation to the level of specificity required for documentation.¹³ Similarly, Comfort¹⁴ reported that criticisms regarding the transition were related to clinical documentation. Bowman¹⁵ further described that in addition to negative impacts on clinical documentation, physician queries also increased since the transition to ICD-10-CM.

Other studies reflected on the benefits of adequate training and buy-in. In particular, Comfort¹⁶ reported that minimal disruption during the transition was due to a long-term training program including dual coding and further acknowledged the support of leadership buy-in to the ICD-10-CM system as a “monumental” success factor.

Previous studies have focused on the increased specificity in ICD-10-CM for fully capturing and monitoring public outbreaks,^{17–22} as well as for research, reporting, and surveillance use, compared with ICD-9-CM.²³ A study²⁴ found ICD-10-CM to be more specific in capturing public health diseases than ICD-9-CM for the National Vital Statistics Report’s top 10 causes of morbidity. However, the same study also found a lack of specificity in the ICD-10-CM coding system related to coding terrorism, and the authors recommended improvements to address this limitation.

Others have looked at the conversion of ICD-10-CM with a national lens, from eight months²⁵ to two years^{26, 27} after the transition. Other reports have reflected on the predictions that influenced the multiple delays and lessons learned from the transition,²⁸ and others provided practical strategies to minimize post-implementation disruptions.^{29, 30} However, none of these studies focused on strategies used to overcome challenges in the go-live and post-implementation stages of ICD-10-CM. With this backdrop, the current research investigated a public health institution’s transition to ICD-10-CM from 2015 through 2018.

Study Method and Design

To address the research questions, we chose a qualitative case study approach. Case study researchers use rich contextual data to explore a real-life phenomenon within a bounded system to gain an understanding of an event.³¹ Initial interviews were conducted during the go-live phase in October 2015, with follow-up interviews in June 2016 and May 2018. Over the three-year period, we conducted 20 semistructured interviews with 13 department heads, managers, physicians, and coders in a single outpatient public health institution in Florida. To supplement the data collected through interviews, we included data from direct observations, published papers, and other written materials. We followed Yin’s³² process of method triangulation by validating results from interviews with supporting evidence from observations, published papers, and other internal documentation.

In the analysis of the interviews, direct observations, and written materials, we observed the go-live and post-implementation stages of the ICD-10-CM transition. The findings represent a common set of trends, disruptions, challenges, and lessons learned. The written materials included documents such as correspondence, protocols, and superbills (a preprinted, itemized form that lists frequently used diagnosis codes for the treating physician to check for billing). These written materials were especially helpful to examine the overall implementation process and to gain insight into conversion initiatives adopted by the institution.

Background and Demographics

The public health institution that served as our research partner offers a variety of services to individuals with limited access to care. This institution consists of six different sites with more than 700 employees. The top clinical services provided at the locations where participants worked include epidemiology and communicable disease services; infectious disease services; and family planning, prenatal, and post-natal services. The professionals that participated in the study worked in various roles, including program director of the preventive medicine/public health residency program, director of osteopathic medical education, HIM manager, physicians, and coders (see Table 1). In the coding process,

physicians select the appropriate diagnosis codes, and the coders are responsible for auditing the chosen codes and clinical documentation for accuracy and consistency.

Data Collection

We collected data at three different points in the transition to ICD-10-CM. During the ICD-10-CM go-live phase in October 2015, we collected data through interviews and participant observations. In our second round of data collection, during June 2016, we conducted follow-up telephone interviews. In May 2018 we returned to the site and conducted face-to-face interviews and collected additional data through participant observations. Following Yin's³³ recommendation to triangulate interview data with other sources, we conducted direct observations of how all the participants used ICD-10-CM in their daily operations.

Participant observations conducted in October 2015 and May 2018 included mini chart reviews and direct observations. We observed the process beginning with the completion of the superbill and continuing through the coding audit. We also watched the interaction between coders and providers, in which coders assisted the providers in efforts to address discrepancies, including missed and unclear clinical documentation. We also carried out direct observations of meetings in October 2015 and May 2018, taking on the role of passive observers closely watching the discussions and taking notes during the meetings. Two of the three researchers conducted the observations to validate the field notes. The observations supported comments made by participants during the interviews and helped us frame additional follow-up questions. Finally, we reviewed secondary data sources, including published papers and other written materials.

To assess the conversion initiatives implemented by the facility, we developed semistructured interview questions (see Appendix A), which were shared electronically with the participants in advance of each meeting and focused on the following aspects:

- a) Strategic planning,
- b) System readiness, and
- c) Education and training (see Table 2 for response highlights).

For the follow-up interviews, the team contacted participants from the same departments interviewed in the first round. This included professionals and decision makers from the clinical, residency, and HIM departments. In June 2016, eight months after the original interviews were completed, the team conducted three telephone follow-up interviews with three of the original participants, the results of which are detailed in Table 3. In May 2018, two years and seven months after the initial interviews were completed, the team conducted eight interviews with four of the original participants. In all, we conducted 20 semistructured in-person and telephone interviews with 13 decision makers and professionals.

Data Analysis

All interviews were recorded, transcribed, and compared to the notes taken by the research team. As recommended by Thomas and Magilvy,³⁴ we followed a process of member checking to ensure the validity of the collected data. Cooper³⁵ defined member checking as a process of allowing participants to validate the interpretation of themes. The member-checking process also helped us reach data saturation. Fusch and Ness³⁶ defined data saturation as the point when additional participant interviews add no new insights. Thus, we stopped interviews after reaching data saturation. After conducting each interview, we prepared a one-paragraph summary of the interview and asked each participant to review our interpretation of their comments. The data indicated strategies used to overcome challenges for the go-live and post-implementation stages for the transition to ICD-10-CM. To facilitate our analysis, we loaded our transcribed data into NVivo 10.0 (QSR International). We checked whether the outcome of the analysis was consistent with the interview questions, including results from the healthcare studies discussed in the literature review.

Results

On the basis of the findings from the triangulation method substantiated during the interviews, direct observations, written notes, publications, and other written materials, we identified specific themes. Nine participants were interviewed regarding go-live, and 11 were interviewed regarding post-implementation. These themes represent a common set of trends, disruptions, challenges, and lessons learned, as detailed in this section.

Trends (Go-Live)

- **Training and education as the most significant step in preparation for the ICD-10-CM transition.** Overwhelmingly, all nine participants (100 percent) expressed that coder and physician ICD-10-CM training was a critical approach for successful implementation. However, five of the nine participants noted that training was rushed, and more time should have been allotted.
- **Use of superbills as a valuable transition component.** Seven of the nine participants (78 percent) reported the use of superbills as a tool to facilitate the transition to ICD-10-CM. The institution created eight superbills by service line (specialty) with the most frequently used ICD-10-CM codes.
- **Participants' anticipation of improvements in clinical granularity.** Six of the nine participants (67 percent) reported that the specificity in ICD-10-CM would provide more clinical data about the patients' conditions. Two of the nine also expressed that the complexity of the new system required the use of more codes for maternal patients.

Trends (Post-implementation)

- **Use of superbills among providers.** Eight of the 11 participants (73 percent) described the continuous use of superbills for ICD-10-CM code selection. Two of the participants explained that the superbills had been revised eight times since the ICD-10-CM go-live in October 2015. One of the participants expressed the need to discontinue superbills; however, three of the participants disagreed, stating that the paper superbills provide a backup should the system go down.
- **Usefulness in capturing diseases and causes of illness.** Nine of the 11 participants (82 percent) described ICD-10-CM as providing more detail in capturing patients' conditions and the increased combination codes. One participant expected to see even greater specificity in ICD-11-CM.

Disruptions (Go-Live)

- **Ensuring system readiness for the ICD-10-CM go-live.** All nine participants (100 percent) expressed that the EHR system was not ready for go-live, and they anticipated readiness in March 2016. Because of the lack of system readiness, management instructed the providers to continue to select ICD-9-CM codes in the EHR system until the system was updated for ICD-10-CM use.
- **Identifying ICD-10-CM codes with ICD-9-CM documentation.** Five of the nine participants (56 percent) reported difficulty with ICD-10-CM code selection based on ICD-9-CM clinical documentation. Because of the lack of EHR readiness, physicians were instructed to continue to select ICD-9-CM codes until the system was updated. Coders were then responsible for choosing the ICD-10-CM codes.

Disruptions (Post-implementation)

- **Delayed system readiness resulted in physician ICD-10-CM retraining.** Six of the 11 participants (55 percent) indicated that when the EHR system finally became fully compliant in June 2016 (seven months after the ICD-10-CM go-live date), physicians struggled with selecting ICD-10-CM codes and relied more on the coders to choose the correct codes. This

situation required all physicians to be retrained on code selection and documentation requirements.

- **Mapping Systematized Nomenclature of Medicine–Clinical Terms (SNOMED-CT) and ICD-10-CM.** All 11 participants (100 percent) expressed challenges with the mapping between SNOMED-CT and ICD-10-CM. One reported that often, the variation in matching (one-to-one, one-to-many, one-to-none) resulted in physicians' frustration. Another expressed that the clinicians were still experiencing difficulties with ICD-10-CM.

Challenges (Go-Live)

- **Obtaining physician awareness and buy-in.** Six of the nine participants (67 percent) reported the need for providers and management to promote the ICD-10-CM transition through awareness and buy-in. Three of the nine indicated that physician champions would have influenced awareness of the importance of detailed clinical documentation to support the ICD-10-CM coding.
- **Managing physician resistance associated with ICD-10-CM.** Six of the nine participants (67 percent) reported resistance and anxiety among physicians, especially given the increased number of ICD-10-CM codes.

Challenges (Post-implementation)

- **Identifying specific ICD-10 CM codes for sexually transmitted disease (STD) lesions.** Nine of the 11 participants (82 percent) reported much ambiguity regarding the coding of male skin lesions due to STDs. Participants noted selecting code L98.9 (Disorder of the skin and subcutaneous tissue, unspecified) as the closest, yet unspecific option.
- **Detecting etiology and manifestation ICD-10-CM codes for HIV/AIDS.** Eight of 11 participants (73 percent) expressed concerns regarding the coding of comorbidities related to HIV and AIDS. One participant pointed out that unlike the US ICD-10 version (ICD-10-CM), the World Health Organization (WHO) version of ICD-10 contains subcategories. For example, B20.4 (HIV disease resulting in candidiasis) is used to describe the etiology and manifestation of HIV/AIDS patients.
- **Lack of use of software to search ICD-10-CM codes among individual providers.** Three of the 11 participants (27 percent) described that the institution had implemented software for searching ICD-10-CM codes and descriptions. However, the participants explained that the returned search results contained mismatched code descriptors, which produced growing physician frustration. The participants also mentioned that the physicians in their sixties and seventies had a harder time using the software, compared with the Generation X physicians who are computer savvy.

Lessons Learned to Date

- **Adopt more specific codes for infectious diseases.** The HIM manager and coders strongly suggested the use of the WHO ICD-10 version for the specificity in describing HIV/AIDS manifestation and STD-related lesions.
- **Implement strategies for mapping SNOMED-CT to ICD-10-CM.** The HIM manager and coder expressed that mapping strategies should have been well defined before implementation.
- **Coordinate testing timelines and plans with both internal resources.** Interviewed administrators noted that collaboration with internal resources to test information technology systems for readiness would have supported the ICD-10-CM transition efforts.
- **Appoint a team that will champion the transition.** To promote organizational acceptance in key departments, some interviewees suggested appointing a group that would champion the conversion and engage peers.

- **Provide in-depth coder and physician training, in stages over time.** The HIM manager and coders recommended that ICD-10-CM training should be rolled out in phases to provide more time for staff to learn the new coding system.
- **Offer one-on-one documentation coaching sessions.** Physicians noted that one-on-one training sessions were most efficient for reviewing documentation deficiencies and code selections.
- **Introduce ICD-10-CM in advance.** Participants suggested that if the new system had been introduced well before implementation, this approach might have reduced provider intimidation and resistance.

Discussion

Participant explanations, observations, company documents, and literature review findings provided a consistent depiction of the magnitude of preparedness, consequences, and underlying contributors for the transition to the ICD-10-CM system. Participant responses regarding strategies used to overcome barriers during the go-live and post-implementation stages included ICD-10-CM training and the use of superbills. Key challenges and disruptions included EHR readiness, mapping SNOMED-CT to ICD-10-CM, physician resistance, and specific ICD-10-CM codes for infectious diseases.

In findings consistent with prior studies,^{37, 38} we found that ICD-10-CM training was commonly identified as a vital component of the transition to ICD-10-CM. This finding highlights the importance of proper coding and physician documentation requirements addressed by Jackson and Muckerman³⁹ and Watzlaf et al.⁴⁰ for both coders and physicians. Furthermore, as suggested by the American Health Information Management Association (AHIMA),⁴¹ the level of training for physicians and clinicians is contingent on their coding role in their practice. Like most of the physician participants in the study by Watzlaf et al., physicians in the current study did their own coding. Study findings revealed that physicians received training specific to their specialty that included both documentation requirements and coding guidelines, as supported by Sanders et al.⁴² This finding is encouraging with regard to the payoff from the cost-benefit perspective of the transition to ICD-10-CM.^{43, 44}

Our study expands on the prior literature by focusing on strategies used to overcome barriers in the go-live and post-implementation stages of ICD-10-CM from 2015 through 2018. We found that 78 percent of the participants reported the use of superbills as a successful strategy in the transition to ICD-10-CM. We interpreted these findings as an indication that some outpatient facilities across the nation are benefiting from long-term use of superbills. Previous studies of the use of superbills in the transition to ICD-10-CM have yielded inconsistent findings. In particular, studies showed that a one- or two-page superbill would not be adequate for ICD-10-CM⁴⁵ and would be unreliable.⁴⁶ According to Watzlaf et al.,⁴⁷ a Medical Group Management Association survey further revealed that 60 percent of physicians believed it would be difficult to include commonly used diagnosis codes on a superbill for ICD-10-CM. However, this argument was not supported by either Lindsey⁴⁸ or McNicholas,⁴⁹ who recommended that providers use superbills to facilitate the clinical documentation changes in ICD-10-CM. This public health organization created eight superbills at go-live in 2015 by service line (specialty). The evidence suggests that the benefits of using superbills may differ, depending on the facility type, service line, patient population, and geographical locations.

We also found that lack of EHR readiness at go-live was identified as a disruptor that influenced management to mandate that providers continue to select ICD-9-CM codes until the system was updated for ICD-10-CM use. Participants explained that the delayed system readiness and the continuous use of ICD-9-CM codes resulted in the need for clinicians to be retrained in ICD-10-CM. Our findings are consistent with prior studies. In particular, Rubenstein⁵⁰ recommended that providers determine whether their EHR system would require updating. Rahmathulla et al.⁵¹ further discussed that software updates needed to be timely to allow for system testing and readiness. According to Watzlaf et al.,⁵² EHR functionality, timeliness, and readiness were factors underlying time-related delays that may be due to the use of an internal EHR system (i.e., a system built and supported internally, which requires internal resources and staff to evaluate and test the system independently, versus using an outside vendor). While the decision to use an internally supported system is likely promoted by the adoption of an EHR system

appropriate for the patient population, efforts to prepare for ICD-10-CM may have required additional resources that were not available internally. Participants' experience and descriptions of the impact of the lack of EHR readiness for ICD-10-CM in our study reinforce assertions in the literature that the transition to ICD-10-CM required significant preparation and testing.

Our findings are also consistent with prior studies finding challenges in the mapping of SNOMED-CT problem list codes to ICD-10-CM codes.^{53, 54} SNOMED-CT is a comprehensive standard terminology system used in clinical documentation in EHRs and is part of the stage 2 criteria for meaningful use of EHRs.⁵⁵ SNOMED-CT is designed for healthcare providers to use during the process of clinical care, whereas ICD-10-CM is intended to be used by coding professionals for billing and reporting after care is rendered. Together, SNOMED-CT and ICD-10-CM represent a common and modern language that supports the sharing of clinical data in EHRs.⁵⁶

Follow-up interviews in May 2018 revealed several mapping challenges, including when a patient problem that is represented as a single concept in SNOMED-CT requires multiple ICD-10-CM codes, and when a single search from the problem list in SNOMED-CT (e.g., "Diabetes") returns a "clarify" list, which requires the clinician to review a list of more than 100 terms to choose a better SNOMED-CT concept from the list. These challenges are consistent with those reported in previous studies.^{57, 58} We also found that because of ambiguous mapping strategies, lack of training, and time constraints, coders often found inconsistent code selection with ICD-10-CM codes and SNOMED-CT. Some participants suggested that the lack of clinician precision in mapping problem lists from SNOMED-CT to ICD-10-CM codes was due to coders' auditing responsibilities and the difference between the two systems (clinical terminology versus classification system), as suggested by Bowman.⁵⁹ The National Library of Medicine has acknowledged that mappings of SNOMED-CT to ICD-10-CM were not intended for automatic code translation.⁶⁰ This is a concern, and efforts should be made to intervene through the creation of modified maps based on the clinical specialty and patient population, as suggested by Nandigam and Topaz.⁶¹

Our findings are also consistent with a prior study finding that limited physician buy-in can lead to resistance to adopting ICD-10-CM.⁶² In findings similar to ours, Jackson and Muckerman⁶³ noted that their study participants expressed the importance of physician involvement as the cornerstone of organizational success. Houser et al.⁶⁴ further identified the benefits of physician buy-in but also noted the need for involvement of administrative and clinical staff to support the transition. Manchikanti et al.⁶⁵ additionally noted that the transition to ICD-10-CM raises potential challenges for providers, including loss of physician productivity. These findings highlight the importance of securing widespread physician buy-in, including the appointment of a physician champion, which was addressed by Jackson and Muckerman⁶⁶ and Rubenstein et al.⁶⁷

Our research also expands on a past study that assessed the usefulness of ICD-10-CM in capturing data on public health diseases. However, it is difficult to directly compare the findings from our study to those of Watzlaf et al.⁶⁸ because the studies examined different public health diseases. We focused on the frequent clinical services provided at the public health institution that served as our research partner. Nonetheless, as in the previous study, we found ICD-10-CM diagnoses needing improvements. The improvements proposed by the participants to better capture and describe public health diseases were specific to infectious diseases and STD-related lesions. Necessary improvements included specifying the type of infection resulting from HIV/AIDS, the anatomical location, and the type of lesion caused by STDs in males. Participants noted that whereas improvements are needed for the coding of male lesions due to STDs, the codes and specifications for HIV disease resulting in infection are available in the WHO ICD-10 version (i.e., B20.4). It will be important to understand why the subcategories for B20 available in the WHO version were not adopted in the US version and to determine if the greater specificity was determined to be clinically insignificant for public health reporting.

Of the 13 participants in this study, eight (62 percent) were coders, and five (38 percent) were not coders. Participants' responses revealed some differences and similarities between the coders' and noncoders' perceptions of the ICD-10-CM transition, in the areas of training, clinical granularity, and superbill use. For training, most of the noncoders (80 percent) found the length of the ICD-10-CM training, one day, to be enough, whereas all the coders (100 percent) perceived the one-day training to be

too short. Regarding clinical granularity, with the exceptions of two noncoders and one coder who found the specificity of ICD-10-CM to have a minimal impact on clinical data, the other participants found the new classification system to provide more data about the patients' conditions. Accordingly, the same two noncoders revealed that the new system required the use of more codes for coding maternal patient encounters. Regarding superbills, all the noncoders and coders, except for one, agreed with the continuous use of the superbills. These findings imply that coders and noncoders have some common perceptions regarding the ICD-10-CM transition. However, these findings could also help explain why clinical documentation and coding assignment has been an area of concern and ongoing training.

A limitation of this study was that all the participants came from the same institution, and therefore the findings may be due to a particular organizational culture. Moreover, because of the geographic location of the participants, their responses may not be generalizable to all public health organizations. Lastly, not all public health institutions focus on clinical care, and some spend significant effort on syndromic surveillance; therefore, survey responses may be difficult to generalize.

Future research should involve follow-up interviews with participants to evaluate their continued progress with the adoption of ICD-10-CM. Also, this case study should be extended to other public health agencies to assess ICD-10-CM transition success and lessons learned.

Conclusion

This study reinforces assertions within the existing literature that thorough preparation, adequate training and education, clinical documentation improvement efforts, physician engagement (champions), and EHR system readiness determined the degree of success that organizations experienced when transitioning to the ICD-10-CM system. The purpose of this study was to extract trends, disruptions, challenges, and lessons learned in a public health institution over a three-year period from go-live to post-implementation stages. The findings and recommendations in this study will provide public health stakeholders with insights so that improvements to the current and future coding system related to implementation can be made. Future study findings in public health institutions should be compared with the current results to determine whether the identified trends, disruptions, challenges, and lessons learned are similar to those in other institutions. If so, policy initiatives that are specific to public health institutions should be proposed for future classification system changes to allow these institutions to better capture, report, and analyze data on public health diseases and to prepare for epidemics and infectious disease outbreaks.

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Appendix A

Interview Questions

Strategic Planning:

1. What were the major steps in preparing for the ICD-10-CM transition?

Education & Training:

2. What implementation strategies (i.e., education, technology) were used to overcome challenges to transition to the ICD-10-CM coding system?

System Readiness:

3. What challenges are you experiencing in converting to ICD-10-CM?

Closing Questions:

4. How can organizations best prepare for this transition?
5. What else could you share that is pertinent to your implementation strategies for ICD-10-CM?

Table 1

Participants' Job Roles

No.	Job Title	Job Role	Oct. 2015 Interview	June 2016 Interview	May 2018 Interview
P1	Director, Osteopathic Medical Education	Oversee the preventive medicine/public health residency program to train preventive medicine clinicians, including clinician documentation in ICD-10-CM	Yes		
P2	Senior Physician and Director, Residency Program	Examine, diagnose, and treat patients, including documentation and selection of ICD-10-CM codes.	Yes		
P3	Manager, Health Information Management	Supervise staff to ensure timely and appropriate documentation and coding.	Yes	Yes	Yes
P4	Medical Doctor	Examine, diagnose, and treat patients, including documentation and selection of ICD-10-CM codes.	Yes		
P5	Medical Doctor	See above.	Yes		
P6	Specialist, Health Information Management/Coder	Perform quality assurance on both aggregate coded data and individual encounter data to determine accuracy of coded data including ICD-10-CM, utilizing established coding conventions, guidelines, and regulations.	Yes	Yes	Yes

P7	Specialist, Health Information Management/Coder	See above.	Yes	Yes
P8	Specialist, Health Information Management/Coder	See above.	Yes	Yes
P9	Specialist, Health Information Management/Coder	See above.	Yes	Yes
P10	Specialist, Health Information Management/Coder	See above.		Yes
P11	Specialist, Health Information Management/Coder	See above.		Yes
P12	Specialist, Health Information Management/Coder	See above.		Yes
P13	Specialist, Health Information Management/Coder	See above.		Yes

Table 2

Core Impact Area

Core Impact Area	Response Highlights: Go-Live (October 2015)
Strategic planning	<p>P3: “Have all your personnel willing . . . to learn If someone is pulling back, it’s not going to go well, and that’s why we’re having such a hard time because everybody is not on board.”</p> <p>P3: “Hindsight. If we had the opportunity to go back and see the seriousness of where the hiccups would have been and what the impact of training, or the lack thereof and probably the timing when training should be done . . .”</p> <p>P1: “The way I decreased my anxiety is knowing that [the facility] was going to and has created superbills of the most common codes.”</p> <p>P7: “Superbills were the key points, and the superbills were the biggest anxiety reliever to get the provider to relax.”</p>
Education and training	<p>P6: “Have a group of volunteers that are receptive or embracing it to see if that training is good . . . get some feedback so that . . . the ones that are resistant will be less resistant.”</p> <p>P2: “Knowing that there was training . . . that helped me prepare mentally for the transition.”</p> <p>P3: “I would say hire the appropriate number of trainers and allow the appropriate amount of training time. Make sure that the providers and the coders are not distracted Retrain as necessary.”</p> <p>P7: “My only complaint is that it [training] should have been longer because they tried to cram two days in one day.”</p> <p>P8: “If you’re going to go ahead and do the training, you might as well allot the appropriate amount of time; otherwise, you’re wasting your time.”</p>
System readiness	<p>P1: “The people that were in charge did not implement or test early enough to get the kinks out of the system.”</p> <p>P3: “Our system is not ICD-10 CM capable Our system still only has ICD-9 codes.”</p> <p>P6: “If our system was ready, ICD-10 CM would be a piece of cake . . . I was so looking forward to this new thing.”</p> <p>P7: “Doctors have been given the okay to continue with ICD-9 codes with the exception of the three who have decided against that. You, as a coder, have to go back and map from the ICD-9 code to an ICD-10 code, but sometimes that is challenging because the code that they are providing does not match with the provider’s documentation.”</p>

Table 3

Side-by-Side Comparison of Trends, Disruptions, and Challenges: Response Highlights

Trends		
October 2015	June 2016	May 2018
<p>P4: “I would use one code in ICD-9 for my pregnant patients; now I have to choose three codes in ICD-10 CM.”</p> <p>P1: “If I am passing on care to my colleague, all they have to do is look at this. They’re going to see the code that I picked. It’s not so much nonspecific. It tells them clearer what is going on. . . . A lot more specific.”</p> <p>P1: “Understanding in terms of procedures that are done and diagnoses that support those procedures, the medical necessity of it and it helps us to all understand that we are providing good quality patient care . . . on the return visit, everything is documented accurately.”</p> <p>P3: “Eight different types of superbills. That was one helpful item.”</p>		<p>P6: “I’m really looking forward to ICD-11, because of the specificity, and I know there’s more to come. We do a lot of HIV, STD, and with that, we know that there’s more specificity with that as well to come, and hopefully, it gets implemented.”</p> <p>P8: “Yes. The providers are still using superbills. I think because it’s a crutch, and it guides them to do the right thing.”</p> <p>P6: “They [physicians] actually have software to help them put a description in, and they’ll use that descriptor to get a match. . . . And then they mismatch, and they pick something just to pick something, ’cause they get frustrated . . . some of our providers who are in their sixties or their seventies, they’re not Generation X. With that generation, the baby boomer generation, they’re not so computer savvy as those that are younger.”</p> <p>P3: “When it comes to STDs, we have a lot of males who would come in with lesions or sores. There’s no specificity for that.”</p>

Disruptions

October 2015

P3: “They [management] should do like a SWOT [strengths, weaknesses, opportunities, and threats] analysis of this whole process. Then, they’ll be able to know what it is they need to do in the future.”

P7: “I have to call the providers and say, ‘What are you trying to tell me?’ It’s difficult because I can’t put [an ICD-10-CM] code with your [ICD-9-CM] code that you’re giving me, when you’re not giving me the right code.”

P3: “Testing should have happened earlier, and I think could have worked the kinks out prior to going live. We went live, and then we found out more things were issues.”

P1: “They [management] didn’t believe that the ICD-10 was going to happen because it was put off so many times. So, when it came to the fact that it was actually happening, they didn’t have time to actually see that the system isn’t capable of interfacing.”

June 2016

P3: “The system was compliant by the month of June. However, not all providers are choosing the ICD-10-CM codes, which is still causing a problem with documentation, particularly on codes that warrant more documentation and specificity.”

P7: “The doctors are relearning ICD-10 CM all over again.”

P3: “The system is up, but the doctors are not compliant.”

May 2018

P3 The nomenclature, the SNOMED codes . . . verbiage, is totally different than the disease codes from [ICD-10-CM], and the providers have such a problem trying to associate what they see with two different acronyms or commonly used terms. So they look up a SNOMED [code] one way and you have to look at [an ICD-10-CM code] another way, and it drives them crazy. They can’t keep all of that in their heads, so they have that as a major difficulty.”

P8: “One-to-many maps causes provider frustration and leads to them picking a different code that does not align with their documentation. The coding staff audits charts and presents the discrepancies.”

P6: “Getting the providers to pick the correct SNOMED code that maps to ICD-10 has been a challenge.”

Challenges

October 2015

P3: “To get extensive training. Make sure your system is up to date to coincide with the training.”

June 2016

P6: “We are currently training the providers on clinical documentation and the selection of codes.”

May 2018

P6: “The providers have to use ‘skin lesions.’ And when it comes to skin lesions, it’s not really considered STDs, so we wanna code that’s gonna say something that’s specific

P6: “When they [physicians] felt this old industry pushing towards [ICD-10], they really got nervous, and they got anxiety. They all got concerns. Some wanted to walk away because it was just too much for them with the changes that were necessary.”

to the STD.”

P3: “If they were to have a combination code, and I do see that I looked at the World Health [Organization], they’re currently using a combination code to describe B20. And it breaks down into subheaders, subclassifications of Candidiasis or any type of other syphilis. So they’ll say B20.04, B20.05, and that breakdown is what we’re looking forward to. It’ll give one code that represents those two conditions, and that’s what I’m looking forward to.”