HOW TO SUCCESSFULLY CONVERT TO ICD-10-CM/PCS? THE EXPERIENCE OF HOSPITALS IN TAIWAN

Chia-Ke Lee

Department of Administration, Cheng Ching General Hospital, Taiwan
Feng Chia University Ph.D. Program in Business, Feng Chia University
lyc6115@gmail.com

Abstract

This study was a trial project for the introduction of ICD-10-CM/PCS commissioned by governmental medical and healthcare departments. The subjects of the study were employees in hospitals, including doctors, nurses, medical technicians, and administrators. Primarily, this study constructed the procedures and models for converting ICD-9-CM to the ICD-10-CM/PCS disease classification system. Quality control methods were used to jointly evaluate the problems and obstacles based on the four items of people, objects, facilities, and methodology, in order to find the optimal solution to gradually establish the ICD-10-CM/PCS information system, as well as to propose the resource integration and accommodation measures needed to introduce the system.

Keywords: International classification of disease version 10, International classification of disease version 9, Quality Control Circle, Coding

Introduction

The National Health Insurance program of Taiwan currently uses the 2001 edition of the International Classification of Diseases, Ninth Revision, Clinical Modification (ICD-9-CM) as the basis for disease encoding for insurance reporting. ICD-9-CM was developed by the United States in 1979 based on ICD-9 (WHO, 2013). Even though revisions continue to be updated with the times, continued advancement in medical technology has been limited by its encoding structure, making it unable to fully and accurately reflect new diseases, medical technologies, or treatments.

Since the WHO promulgated ICD-10 in 1994, it has gradually been applied by various countries (Finn Gjertsen et al., 2013) in areas such as classifications of cause of death or clinical disease diagnostic codes. In addition, treatment codes are developed based on clinical usage needs in different countries. Examples include the United States' International Statistical Classification of Disease and Related Health Problems,

149

Tenth Revision, Clinical Modification/ International Statistical Classification of Disease and Related Health Problems, Tenth Revision, Procedure Coding System (ICD- 10-CM/PCS); Australia's ICD-10-AM/ACH; and Canada's ICD-10-CA (Jan DiSantostefano, 2009; Carolyn De Coster et al., 2006; Walker et al., 2012). In order to connect with international trends in health and medical care, and to benefit data comparisons across countries, Taiwan began to promote the introduction of ICD-10 in 2001. Starting in 2009, the cause of death statistics published by the Ministry of Health and Welfare applied ICD-10. Starting in 2012, the International Classification of Functioning, Disability, and Health (ICF) applied ICD-10 for disease codes. The National Health Insurance Administration began a five-year plan for the implementation of ICD-10-CM/PCS in 2010, announcing that starting in 2015 ICD-10-CM/PCS would be comprehensively used for declarations (Ministry of Health and Welfare, 2013).

When corporations introduce new technology for mandatory use, at the start of the introduction employees will be concerned about increasing their workload to some extent. This is particularly true for users with less computer literacy, because they often need to spend time to learn it; thus, they are also more likely to have work anxiety. If such anxiety cannot be suitably relieved, or if they cannot get help from group members, they may have poor learning effects that in turn block the functioning of new technology (Hsu et al., 2006). Conversions from classification of disease type ICD-9-CM to ICD-10-CM/PCS implicate interdepartmental business in hospitals. In terms of personnel, it involves medical clinics, patient history departments, disease classification departments, insurance declaration departments, and information departments. In terms of procedure, support from the information system is required throughout the medical care and administrative management procedures for smooth data production and management,

from the selection of the front-end inpatient disease codes and treatment codes, to the back-end classification of disease types and health insurance declaration work. Thus, whether the conversion and introduction of a classification system of disease types is successful is based on the executive decisions of the hospital leadership, as well as the understanding, adherence, and implementation ability of hospital employees, especially doctors.

Patient safety has always been an issue emphasized by hospitals and clinics, and the elevation of healthcare quality also represents a guarantee for patient care. Quality control circle activities are tools most commonly used by the medical industry to elevate healthcare quality. The healthcare system applies the quality control circle to elevate healthcare environment safety and increase healthcare quality. A quality control circle is a work procedure formed by lower level employees that gives the employees autonomous power. Listening to their views allows existing conditions to be improved. Lower level employees have the most understanding of the problems in the procedures, and the assistance of methods and images can be used to discover and resolve problems, as well as promote bottom-up management to improve healthcare quality at hospitals.

The main purpose of this study was to use the quality control circle method to explore hospital employee learning attitudes about the introduction of ICD-10, as well as the influence produced by the introduction of the new information system.

Information on the case hospital

The case hospital in this study places great emphasis on total quality management. It uses diverse quality management methods, including an indicator monitoring system, quality control circle activities, a case proposition system, and three-level auditing of

150

standard operating procedures. Starting in 1998, it has promoted hospital-wide quality control circle activities. These have now been in place for 15 years, and in each term there have been at least 19 circles for quality management. In the period of promoting the quality control circle, the case hospital received numerous gold, silver, and bronze awards from the Corporate Synergy Development Center, the Taiwan Joint Commission on Hospital Accreditation, and the Association of Pioneer Quality Control Research. In addition, the case hospital has been invited to various academic associations to share its quality control experiences. The case hospital has closely worked with health authorities and has arranged various healthcare plans for government health departments. Examples include the trial project for salary by person at the National Health Insurance Bureau, the regional integration model, the family doctor integrated care project, the project for elevating the quality of cancer treatment at National Health Insurance Bureau hospitals, and the Cultural Affairs Council of the Executive Yuan's project for community development. These examples show that the case hospital has abundant experience in promoting and executing projects.

Strategies for the case hospital in introducing the ICD-10 system

1. Support from senior leadership and top-down promotion of policy

Changes in work will affect work content and change work rules and result in changes in work techniques and methods, thus making it important for employees to adjust their accustomed habits in dealing with issues (Robbins, 1993). The case hospital made announcements in hospital-wide meetings, ordered hospital employees to actively participate, and publically announced the promotion of measures.

2. High degree of accommodation for hospital policy, and good communication and coordination between departments

The administrative and medical department personnel had a high degree of accommodation for hospital policy, the integrated work was easy to promote, and the existing hospital commissions conducted horizontal coordination, in which regular meetings for promotion and educational training were conducted in parallel.

3. The information system could add and modify program functions based on user needs

The information office of the case hospital is responsible for information issues, especially in regards to the Hospital Information System (HIS) and the Electronic Medical Record System (EMR). The software engineers in the relevant systems had an average of more than 10 years of experience, and their understanding of the practical needs and programming in health insurance declarations, disease classification, and inpatient order systems were interconnected, fast, and mobile, and they conformed to clinical and management needs.

4. Structural micro-adjustments were made on existing operating procedures to reduce the impact on clinical medical services

The clinical medical personnel input disease codes online for the inpatient medical order system and followed the hints, alerts, or control functions of the information system, which helped the personnel become familiar with the encoding concepts, frameworks, and systems. In addition, in each quarter the attending physicians, resident doctors, and nurse practitioners participated in a diagnosis related groups (DRGs) case encoding discussion meeting, which was held by the medical affairs department. The

151

participants shared cases to discuss the encoding concepts, thus giving them an overall understanding for the structure of disease codes and the relationships among patient history content, disease codes, and health insurance declarations. Therefore, they had an easier time understanding the conversion of the encoding system (ICD-9 to ICD-10). After the actual implementation, they could continue to collect clinical needs, conduct administrative work and plan to accommodate the information system, in preparation for parallel developments in different departments.

Implementation subjects at the case hospital

The research subjects in this study were employees of the case hospital, including the president, the medical affairs director, case history reviewers, disease classification personnel, information personnel, attending physicians, resident doctors, and nurse practitioners.

Implementation procedures at the case Hospital

In order to achieve the smooth conversion of the classification of disease types from ICD-9-CM to ICD-10-CM/PCS, this study was divided into four parts for training. Changes made to the departments were based on the problems that could be encountered in the people, objects, equipment, and methods, as well as the planned direction of implementation. Table 1., at the end of this article, describes the directions for accommodation by the departments at the case hospital.

Dimensions affected by reform

1. Education and training by personnel

Educational and training courses were given at the hospital, and eligible lecturers in the departments focused on the hospital's disease classification group, insurance group,

and medical fee collection section to conduct a regular weekly education and training course for two months. Next, ICD-10-CM/PCS promotional education and training was implemented for the attending physicians, nurses, and nurse practitioners (NP). Furthermore, for the departments of preliminary introduction, which were obstetrics and gynecology, orthopedics, neurosurgery, and neurology, based on their different characteristics, ICD-10-CM/PCS patient case history writing education and training courses were conducted. Other than education and training in the hospital, disease classification, case history review, and insurance submission personnel engaged in the ICD-10-CM/ PCS external education and training course for one year. The course was held by the Taiwan Medical and Health Information management Association, the Taiwan Case History Management Association, and the Central Taiwan Disease Classification Reading Group. In addition, the hospital sent disease classification, case history review and insurance submission personnel for certification tests. In order to promote the continued familiarity of employees with ICD-10-CM/PCS business, the hospital continued its quarterly DRGs case encoding discussion meetings and continued arranging for education and training relating to ICD-10-CM/PCS cases and relevant issues.

The disease classification personnel focused on the departments of neurology, neurosurgery, orthopedics, and obstetrics and gynecology, for ICD-10-CM/PCS encoding work of discharged cases in two months, and conduct case cross-review. Questions are submitted to the disease classification consensus meeting for discussion. The disease classification consensus is used as the teaching cases. The hospital's trained case history reviewers participated in case history ICD-10-CM/PCS encoding to create a trial compilation of two months of case histories (from orthopedics, neurology, neurosurgery, and obstetrics and gynecology), which was then reviewed by disease classification personnel

152

who gave feedback to the personnel trained by the hospital after the review.

The case hospital established a section on the hospital website with the completed ICD-10-CM/PCS teaching case materials, which was regularly updated to provide a real-time learning channel for personnel in the hospital. In addition, the hospital purchased ICD-10-CM/PCS reference books to be used by medical personnel at any time.

2. Case history modification and design

The disease classification personnel focused on neurology, neurosurgery, orthopedics, and obstetrics and gynecology departments to conduct discharge case history ICD-10-CM/PCS encoding and find issues that tended to be overlooked when writing patient case histories. The group produced ICD-10-CM/PCS patient case history writing/encoding issues worthy of note. At the same time, in the hospital information system, the surgical record system added columns titled Operative-Approach and Device, in order to provide automatic correlated code search functions. Hospital administrative procedures were used to update surgical record formats, and hospital rules were modified to implement personnel work regulations.

3. Modification and design of the information system

For the information system, they referred to the ICD-10-CM/PCS data promulgated by the National Health Insurance Bureau, which was converted to the hospital's HIS disease classification system, to establish the ICD-10-CM/PCS basic data maintenance file, which included multiple search screens and a single maintenance screen. In addition, ICD-10-CM/PCS encoding hints, control, and reporting functions were added for the hospital's HIS disease classification system, which included the following:

(1) List of diseases that have not been classified.

(2) Dis the 20th "discharge disease classification main file maintenance _diagnostic code/treatment code column 20", input column: diagnostic code, treatment code, and cause of death codes can only be saved when there is data, no column shall be left blank.

(3) Dis-> the 20th (discharge disease classification main file maintenance ICD-10-CM/PCS) case diagnosis and treatment content downloaded to a Microsoft Excel document, to allow statistical and review work by disease classification personnel.

(4) Addition of gender and invalid code hints and controlled information needs, as well as completion of the addition of ICD-9-CM and ICD-10-CM/PCS correspondence search system for the inpatient doctor order DRG system.

4. Satisfaction measurement

Focusing on the four clinical departments of neurology, neurosurgery, orthopedics, and obstetrics and gynecology, the attending physicians received a survey on their satisfaction with the project implementation, in areas such as the benefit of ICD-10-CM /PCS education and training, the addition of an ICD-10-CM/PCS search function to the physician order system, correspondence files of ICD-9-CM and ICD-10-CM/PCS, and the addition of an ICD-10-CM/PCS column on the surgical record form. The results indicated a satisfaction level of 83~90%. See Table 2. and Figure1. at the end of this article).

Discussion and Conclusion

1. Selection of theme

This study primarily explored the effect of introducing the new ICD-10 system on the

153

case hospital. When selecting the scope of the theme, the case hospital selected its neurology, neurosurgery, orthopedics, and obstetrics and gynecology departments as the priority for introduction, since these four departments had more patients and the doctors were more accommodating. In order to reduce the impact brought by changes of the new information system, the case hospital gradually introduced the new system. The successful experiences of the four departments would inspire greater confidence about future planning for the comprehensive introduction to other departments.

2. Setting targets

The disease classification personnel not only conducted trials for ICD-10-CM/PCS encoding of inpatient cases but also attempted to compile cases in other departments for two months, in order to help understand the improvements needed for encoding, the information system, and patient case history writing. The case hospital promoted the issues in trial compilation cases, including collecting the needs for clinical medicine with regard to the information system, and issues in writing patient case histories at medical meetings or departmental meetings, and added them into patient case history writing norms.

3. Clarification of issues

Clarification is conducted in the four items of people, objects, equipment, and methods, allowing for the holistic evaluation of the dimensions that need to be considered in the introduction process. This study will continue to collect problems or needs in subsequent executions based on the four dimensions of the quality control circle.

4. Establishment of plans

In order to conform to the operational habits of the clinical medical personnel,

when establishing the plans, their suggestions were first solicited, which allowed the clinical personnel to have a high degree of acceptance. Some information functions were not fully replaced or tested during the trial period because the ICD-10 system was not fully implemented. In the future, the case hospital can focus on existing obstacles to improvement.

5. Implementation of optimal measures

Adding new functions in the information system provided great help to the introduction process in collecting the usage opinions of the clinical medical personnel for functional improvement.

The case hospital has developed the model and procedures for converting the classification of disease types from ICD- 9-CM to ICD-10-CM/PCS. Even though the departments of introduction are only neurology, neurosurgery, orthopedics, and obstetrics and gynecology, it has completed the basic framework needed for comprehension conversion at the case hospital in the future, including education and training, information systems, patient case history writing, and disease classification, which will help the parallel progression in other departments in the hospital. As the hospital introduced ICD-10 and new learning frameworks, the case hospital used quality control circle (QCC) tools to interact with the hospital context, and obstacles became helpful in promoting the hospital's reform of case history encoding. The hospital used quality control circles and learning-based organizations to introduce activities to manipulate the dimensions, including communication mechanisms, education training, professional teams, and knowledge sharing and transfer. The new medical information system was also used to support the employees and smoothly convert them from the ICD-9 to the ICD-10 disease classification system. This study

expressed the dynamic evolution of the reform process and could be a reference for other hospitals that intend to introduce the ICD-10 disease classification system.

References

Coster, C.D., Quan, H., Finlayson, A., Gao, M., Halfon, P., Humphries, K.H., Johansen, H., Lix, L.M., Luthi, J.C., Ma, J., Romano, P.S., Roos, L., Sundararajan, V., Tu, J.V., Webster, G., Ghali, W.A. (2006). Identifying priorities in methodological research using ICD-9-CM and ICD-10 administrative data: report from an international consortium.*BMC Health Services Research* 6(77), 1-6.

DiSantostefano, J.(2009).International Classification of Diseases 10th Revision (ICD-10). The *Journal for Nurse Practitioners* 5(1), J,56–57.

Gjertsena, F., Bruzzoneb, S., Vollratha, M.E., Paceb, M., Ekebergc, Ø.(2013). Comparing ICD-9 and ICD-10: The impact on intentional and unintentional injury mortality statistics in Italy and Norway. *Injury, Int. J. Care Injured* 44 ,132–138.

Hsu, W.K., Huang, S., Chen, R.F.(2006).The Learning Attitude of Business Users toward a Newly Implemented IT --An Empirical Study on ERP System Users. *Bulletin of Educational Psychology* 38(1), 19-36.

National Health Insurance Administration(2013). ICD-10-CM/PCS. Available at: http://www.nhi.gov.tw/ webdata/web-data.aspx?menu=23&menu_id=957&webdata_id=3986&WD_ID=957(accessed 18 July 2013).

Robbins, S. P. (1993). Organizational Behavior: Concept, Controversies, and Applications (6th ed.). Englewood Cliffs, N. J.: Prentice-Hill.

Walker, R.L., Hennessy, D.A., Johansen, H., Sambell, C., Lix, L., Quan, H.(2012). Implementation of ICD-10 in Canada: how has it impacted coded hospital discharge data? *BMC Health Services Research* 12(149), 1-9.

World Health Organization(2013). Family of International Classifications.

155

Table 1. Plans, countermeasures, feasible countermeasures

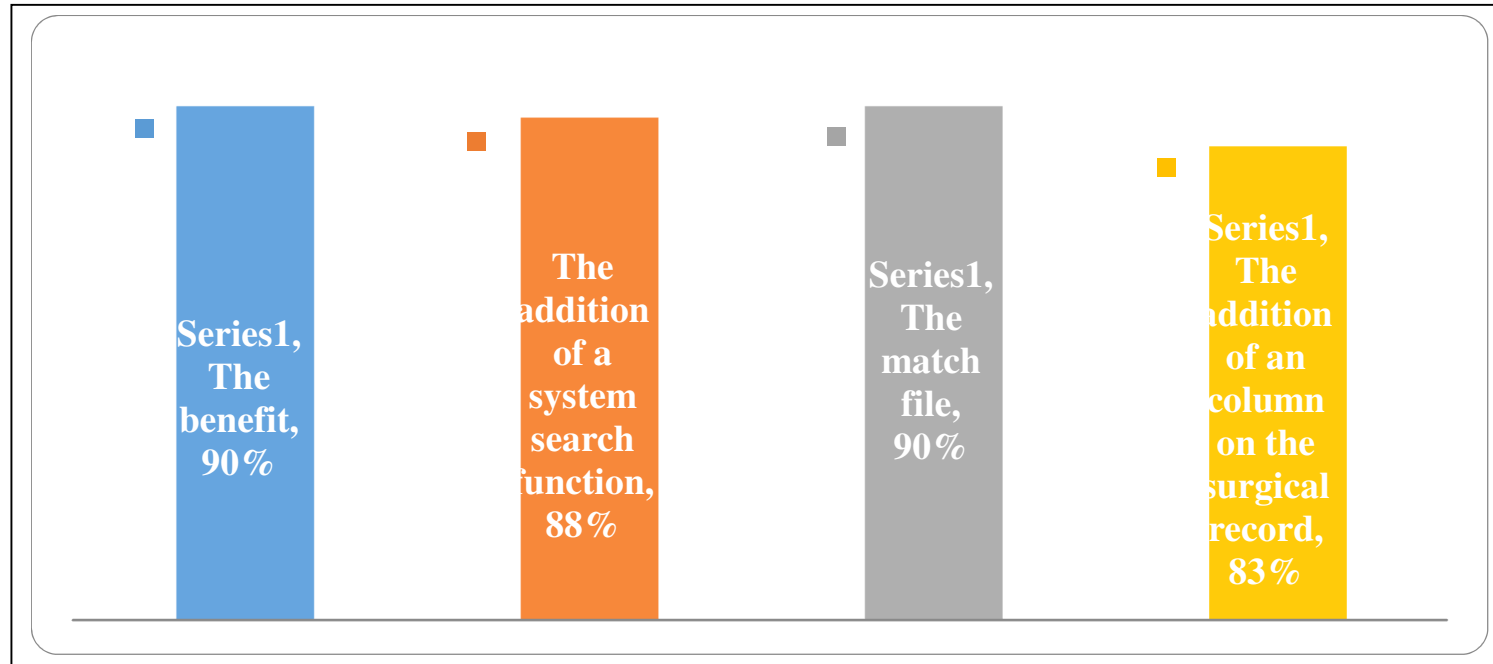| Item	Focus	Plan	Determination of obstacles	Method of overcoming obstacles
Person	Education and training courses at the hospital	Education and training courses within departments that focus on disease classification, insurance, and medical fees	Only one senior teacher in the hospital	Disease classification personnel attend symposia
		Education and training courses for clinical personnel in the entire hospital for ICD-10-CM/PCS promotion	Clinical personnel are busy and the attendance rate may be low	Use electronic bulletin boards to announce matters
		Collection of ICD-10-CM/PCS cases and production of encoding teaching plans	The hospital has not conducted ICD-10 encoding, and there is no data for making teaching plans	Refer to symposium data from academic associations outside the hospital, first conduct in-hospital case encoding and then incorporate hospital cases
	Participation in education and training courses outside the hospital	Participation in symposia held by academic associations	Expenditures from leaves and costs	Leave days and funding offered by the hospital
	Training non-disease classification personnel in the hospital	Participation in ICD-10CM/PCS encoding work	Disease classification certification can't be easy received	Encourage colleagues to practice encoding by themselves during non-work hours
Object	1.PurchasingICD-10-CM/PCS books 2.Download electronic search tools	Application to the hospital for the purchase of ICD-10-CM/PCS reference books	High unit prices of books	Fill out the hospital's annual suggested book purchase sheet, and note the purchase reasons

	ICD-10-CM/PCS search system for the doctor order system	Use of an information need sheet to establish a search function	The outside search program may not be able to be converted to in-hospital HIS	The information office uses external plug-ins and provide links
	Modification of case history writing standards	Production of the issues of notes for making ICD-10-CM/PCS case history writing/encoding	The hospital has not yet used ICD-10 encoding, and it is not known what the data should show	Ask disease classification personnel to help with evaluating the corresponding case history content necessary for ICD-10 encoding
		Case writing standards that specify the content that needs to be written	Needs to be passed by the case history committee	Explain the rationale and necessity of the amendments to the case history committee
		Addition of columns on the surgical record form that correspond to ICD-10-CM/PCS encoding	Requires consent from surgical attending physicians and needs to be passed by the case history committee	Explain the rationale and necessity of the amendments to the attending physicians and case history committee
Equipment	Construction of ICD-9-CM and ICD-10-CM/PCS correspondence search and selection functions	Addition of ICD-9-CM and ICD-10-CM/PCS correspondence search system to the hospital order system	Information office has many forms on information needs and requires scheduling	Information office personnel assist in priority scheduling, and give temporary wages for overtime
Method	Constructing health insurance declaration formatting and disease classification formatting	Constructing health insurance declaration formatting and disease classification formatting that conform to ICD-10CM/PCS	Information office has many forms on information needs and requires scheduling	Accommodate the National Health Insurance Bureau's announcement that media formats would be changed to XML in July 2012, and incorporate information programming priority scheduling

Table 2. Tangible achievements of members

Evaluation item		Self-scoring standards										Before event		After event	
		1	2	3	4	5	6	7	8	9	10	Total	Mean	Total	Mean
A	Realization of team spirit	Uninterested		Self		Negotiation		Cooperation		Leadership		89	5.24	134	7.88
B	Elevation of service quality	Negative		Decent		Progression		Partial		Comprehensive		84	4.94	143	8.41
C	Usage of improvement methods	Learning		Production		Understanding		Familiar		Instruction		72	4.24	118	6.94
D	Active participation	Ignore		Hesitation		Supervision		Responsible		Enthusiasm		83	4.88	129	7.58
E	Explanatory ability	Does not understand		Cognition		Judgment		Clarification		Decisive		75	4.41	124	7.29

Notes: 1. There were 17 people in the circle, and they used various evaluation items for self-evaluation.
2. The highest number of points per person per item was 10 points and the lowest was 1 point, with a total of 170 points.

Figure 1. Satisfaction survey for doctor usage