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Identifying Factors Influencing Implementation of Coding and Indexing in Secondary Facilities: Case Study of General Hospital Daura, Katsina State

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ABSTRACT
Coding and indexing are essential components of health information management, ensuring the accurate classification, storage, and retrieval of patient data. However, secondary healthcare facilities often face implementation gaps that compromise data integrity. This study examined the factors influencing the implementation of coding and indexing at General Hospital Daura, Katsina State. Using a descriptive survey research design, data were collected via structured questionnaires administered to health information management personnel and administrative staff. The data were analyzed using descriptive statistics, including frequencies and percentages. The findings revealed that while staff possess moderate foundational knowledge, effective implementation is significantly hindered by a lack of continuous professional training, a severe shortage of physical coding materials (ICD-10 manuals), and limited technological infrastructure. Furthermore, weak administrative commitment and inadequate supervision were identified as key systemic barriers. These factors contribute to delays in record retrieval and inaccurate health statistics. The study concludes that improving coding practices requires a multi-faceted approach involving resource provision and management support. It is recommended that the hospital management invests in digital health record systems, provides updated coding manuals, and establishes mandatory periodic training workshops for personnel to ensure adherence to international classification standards and enhance overall healthcare delivery.

Keywords:
Coding and Indexing,
Health Information Management,
Secondary Healthcare,
General Hospital Daura,
Data Integrity.

INTRODUCTION

Accurate health information is fundamental to effective healthcare delivery, planning, and policy formulation. In modern healthcare systems, patient data must be properly documented, classified, stored, and retrieved to ensure continuity of care, statistical reporting, disease surveillance, and informed decision-making. Medical coding and indexing are core components of health information management that enable systematic organization of clinical data for easy access and analysis. Medical coding refers to the transformation of diagnoses, procedures, and medical services into standardized alphanumeric codes using recognized classification systems such as the International Classification of Diseases (ICD). Indexing, on the other hand, involves organizing and cataloguing patient records and health information in a structured manner to facilitate retrieval. Together, coding and indexing enhance data accuracy, support research, enable health statistics compilation, and improve administrative efficiency.

In secondary healthcare facilities, such as general hospitals, coding and indexing play a critical role in patient record management. These facilities often serve as referral centers and manage diverse medical cases. Therefore, efficient documentation systems are necessary to ensure proper record tracking, reporting of morbidity and mortality data, and effective service delivery.

Despite the recognized importance of coding and indexing, many secondary health facilities in developing regions face challenges in their implementation. These challenges may include inadequate training of health records personnel, insufficient resources, lack of updated coding manuals, weak institutional support, and limited adoption of digital health information systems.

General Hospital Daura in Katsina State operates as a secondary healthcare facility serving a large population within and beyond Daura metropolis. Like many similar institutions, it is expected to maintain standardized health records practices. However, anecdotal observations

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suggest that the implementation of coding and indexing systems may be affected by various operational, administrative, and human resource factors. This study therefore seeks to identify and analyze the factors influencing the implementation of coding and indexing in General Hospital Daura.

The efficiency of any healthcare delivery system depends significantly on the quality of its health information management, specifically through the systematic application of coding and indexing. Ideally, every secondary healthcare facility should utilize standardized classification systems, such as the ICD-10, to ensure that patient records are accurately categorized for swift retrieval, reliable health statistics, and informed clinical decision-making.

However, observation and preliminary reports suggest that at General Hospital Daura, the implementation of these core HIM functions is suboptimal. There appears to be a persistent disconnect between the presence of trained health information personnel and the actual technical execution of coding and indexing tasks. This gap manifests in the form of fragmented patient data, significant delays in medical record retrieval, and the generation of inconsistent health reports which compromise the facility's ability to contribute to national health databases.

Despite the critical nature of these processes, several underlying factors seem to impede their effective implementation. These include a visible shortage of essential coding manuals and materials, a lack of modern ICT infrastructure, and limited opportunities for continuous professional development for staff. Furthermore, a perceived lack of administrative prioritization and supervisory oversight has further demotivated personnel, leading to a decline in documentation standards.

If these challenges remain unaddressed, the hospital will continue to face difficulties in tracking disease trends, managing hospital resources effectively, and providing the data integrity required for evidence-based medicine. There is, therefore, an urgent need to identify and analyze the specific factors influencing the implementation of coding and indexing at General Hospital Daura to provide a roadmap for administrative and technical improvement.

This chapter reviews relevant literature on the factors influencing the implementation of coding and indexing in healthcare facilities. It covers conceptual, theoretical, and empirical perspectives, as well as the identified gaps in existing studies. The review is aimed at providing a foundation for understanding the key issues affecting coding and indexing practices, particularly in secondary healthcare institutions.

Concept of Health Information Management

Health Information Management (HIM) involves the systematic handling of health data to ensure its quality, accuracy, accessibility, and security. It plays a vital role in supporting patient care, health planning, research, and policy formulation (World Health Organization, 2016).

A major component of HIM is coding and indexing, which involves converting clinical diagnoses and procedures into standardized codes using classification systems such as the International Classification of Diseases (ICD). These coded records enable efficient data storage, retrieval, analysis, and reporting (Ojo & Popoola, 2015).

Effective health information management depends on proper coordination of personnel, availability of tools, adherence to standards, and institutional support. Where these elements are lacking, the quality and usefulness of health data may be compromised (AbouZahr & Boerma, 2005).

Concept of Coding and Indexing

Coding refers to the process of translating medical diagnoses, procedures, and services into alphanumeric codes using standardized classification systems. Indexing, on the other hand, involves organizing these coded records to allow easy retrieval and reference.

These processes are essential for hospital administration, disease surveillance, billing, and statistical reporting. Accurate coding and indexing ensure reliable data for decision-making and healthcare planning (World Health Organization, 2016).

However, coding and indexing require skilled personnel, proper training, and access to updated classification tools. Errors in coding can lead to inaccurate data, which may negatively affect patient care and health system performance (Ojo & Popoola, 2015).

Technology Acceptance Theory

Technology Acceptance Theory (TAT), developed by Davis (1989), explains how individuals come to accept and use new technologies. The theory identifies two key determinants: perceived usefulness and perceived ease of use.

In healthcare settings, the adoption of electronic coding systems depends on whether health workers believe that such systems will improve their performance and whether they are easy to use. Positive perception encourages acceptance and consistent usage (Venkatesh et al., 2003). However, lack of training, poor technical support, and low computer literacy can limit user acceptance and reduce the effectiveness of technology implementation (Holden & Karsh, 2010).

This theory is relevant to this study as it explains why some health workers may resist or accept coding technologies in secondary healthcare facilities.

Several studies have examined factors influencing health information management practices, including coding and indexing, particularly in developing countries.

Training and professional competence have been identified as critical factors affecting coding accuracy. Ojo and Popoola (2015) reported that inadequate training of health information personnel leads to errors and inconsistencies in coding practices.

Availability of resources is another important factor. The World Health Organization (2016) noted that lack of updated coding manuals and technological tools contributes to poor data quality and inefficiencies in health information systems.

Technological infrastructure also plays a significant role. Adedeji et al. (2018) found that healthcare facilities using electronic health record systems perform better in data storage, retrieval, and reporting compared to those relying on manual systems.

Administrative support has been shown to influence compliance with coding standards. According to Adeleke et al. (2014), strong management commitment enhances supervision, monitoring, and adherence to established procedures.

Funding is another major challenge in many Nigerian healthcare facilities. Limited financial resources restrict the availability of equipment, training opportunities, and system maintenance (Adedeji et al., 2018).

In addition, poor supervision and lack of monitoring systems have been linked to low data quality and inefficiency in coding practices (AbouZahr & Boerma, 2005).

Despite these findings, most studies focus broadly on health information management and do not specifically address coding and indexing implementation in secondary healthcare facilities.

Gap in Literature

Although previous studies have examined various aspects of health information management, there is limited research focusing specifically on factors influencing coding and indexing implementation in secondary healthcare facilities in Northern Nigeria.

MATERIALS AND METHODS

Research Design

The study adopted a **descriptive survey research design**. This design was considered appropriate because it allows the researcher to collect data from a specific population in order to describe existing conditions, practices, and relationships among variables.

The descriptive approach enabled the researcher to examine the current state of coding and indexing practices in General Hospital Daura and identify the factors influencing their implementation without manipulating any variables.

Area of the Study

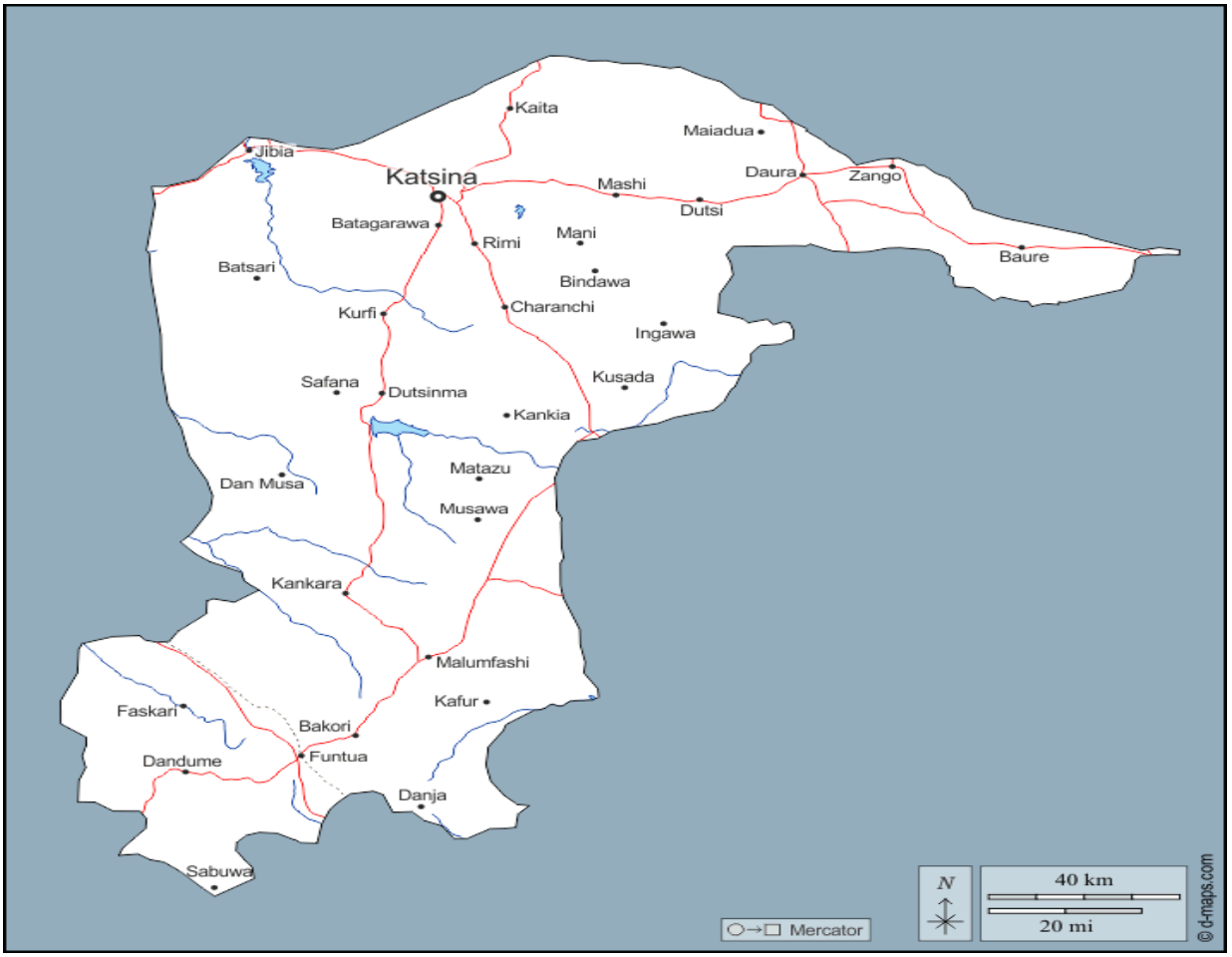
The study was conducted at General Hospital Daura located in Daura Local Government Area of Katsina State, Nigeria. Daura is one of the major towns in Katsina State and is situated in the northern part of Nigeria. The town lies approximately between latitude 13°02′N and longitude 8°19′E. Daura Local Government Area shares boundaries with other local government areas within Katsina State and also lies close to the international border with the Republic of Niger.

General Hospital Daura serves as a secondary healthcare facility providing medical services to residents of Daura and surrounding communities. The hospital receives referrals from primary healthcare centers and provides various services including outpatient care, inpatient treatment, laboratory services, pharmacy services, and health records management.

The hospital also operates a health information management unit responsible for documentation, coding, indexing, storage, and retrieval of patient records. Due to its strategic role in healthcare delivery within the region, General Hospital Daura provides a suitable setting for examining the factors influencing the implementation of coding and indexing in secondary healthcare facilities.

Map of Katsina State Showing Daura Local Government Area

Source: Adapted from National Population Commission (2020).



Population of the Study

The population of the study comprised all personnel directly or indirectly involved in health records management at General Hospital Daura. This includes:

- Health Information Management (HIM) officers
- Medical records clerks
- Coding personnel
- Administrative staff supervising the records unit

The total population was limited to staff working within the hospital at the time of the study.

Sample Size and Sampling Technique

Due to the manageable size of the target population, the study adopted a **census sampling technique**, where all eligible health records personnel and relevant administrative staff were included in the study.

Where the population size was large, a simple random sampling technique would have been applied to ensure equal chance of participation. However, since the population was relatively small and accessible, the census approach ensured comprehensive data collection.

Instrument for Data Collection

The primary instrument used for data collection was a **structured questionnaire** designed by the researcher. The questionnaire consisted of both closed-ended and open-ended questions to gather quantitative and qualitative data.

The instrument was divided into sections:

- **Section A:** Demographic information (e.g., age, gender, qualification, years of experience).
- **Section B:** Knowledge and competence in coding and indexing.
- **Section C:** Availability of resources and tools.
- **Section D:** Training and professional development.

- **Section E:** Administrative and institutional support factors.

The questionnaire used a Likert scale format (e.g., Strongly Agree, Agree, Disagree, Strongly Disagree) to measure respondents' perceptions.

In addition to questionnaires, informal interviews and observation were used to supplement data where necessary.

Validity of the Instrument

To ensure validity, the questionnaire was reviewed by experts in Health Information Management and research methodology. Their suggestions were incorporated to improve clarity, relevance, and alignment with the research objectives.

Content validity was ensured by designing questions that adequately covered all variables related to factors influencing coding and indexing implementation.

Reliability of the Instrument

Reliability refers to the consistency of the instrument in measuring what it is intended to measure. A pilot test was conducted using a small group of health records personnel in a similar secondary healthcare facility outside the study area.

The feedback obtained helped refine ambiguous questions and improve clarity. The instrument was adjusted accordingly to ensure consistency and reliability.

Method of Data Collection

Permission was obtained from the hospital management before administering the questionnaires. The researcher personally distributed copies of the questionnaire to respondents within the health records unit and administrative offices.

Respondents were given adequate time to complete the questionnaire to ensure thoughtful and accurate responses. Completed questionnaires were collected immediately after completion to minimize loss.

Method of Data Analysis

Data collected from respondents were analyzed using both descriptive and inferential statistical methods.

Descriptive statistics such as frequency counts, percentages, tables, and charts were used to summarize demographic characteristics of respondents and responses to the research questions.

The **percentage (%)** was calculated using the following formula:

Percentage = \frac{Frequency}{Total\ Number\ of\ Responses} \times 100

Where:

- **Frequency (F)** = Number of responses in a category
- **Total Number of Responses (N)** = Total number of respondents
- **100** = Constant used to convert the value into percentage.

This method was used to determine the proportion of respondents who selected each response option.

In addition, **inferential statistics** were used to test the research hypotheses. The **Chi-square (χ^2) statistical test** was applied to determine whether there was a significant relationship between variables such as staff training, availability of resources, administrative support, and implementation of coding and indexing.

The Chi-square formula is expressed as:

\chi^2 = \sum \frac {(O - E)^2}{E}

Where:

- χ^2 = Chi-square value
- **O** = Observed frequency
- **E** = Expected frequency
- **Σ** = Summation of all values.

The calculated Chi-square value was compared with the table value at an appropriate **level of significance (0.05)** to determine whether to accept or reject the research hypotheses.

RESULTS AND DISCUSSION

Response Rate

A total of 40 questionnaires were distributed to health records personnel and relevant administrative staff of General Hospital Daura. Out of these, 36 were correctly completed and returned, representing a response rate of

90%. The high response rate was considered adequate for meaningful analysis.

Demographic Characteristics of Respondents

Table 1: Distribution by Gender

Gender	Frequency	Percentage (%)
Male	22	61.1
Female	14	38.9
Total	**36**	**100**

The table 1: shows that the majority of respondents (61.1%) were male, while 38.9% were female.

Table 2: Educational Qualification

Qualification	Frequency	Percentage (%)
Diploma in Health Information Management	18	50
Higher National Diploma (HND)	10	27.8
Bachelor's Degree	6	16.7
Others	2	5.5
Total	**36**	**100**

The majority of respondents held a Diploma in Health Information Management, indicating moderate professional training among staff.

Table 3; Years of Experience

Years of Experience	Frequency	Percentage (%)
1–5 years	12	33.3
6–10 years	15	41.7
Above 10 years	9	25
Total	**36**	**100**

Most respondents had between 6–10 years of experience, suggesting reasonable exposure to hospital record management practices.

Analysis Based on Research Questions

Research Question 1:

What is the level of knowledge and skill of health records staff regarding coding and indexing?

Response	Frequency	Percentage (%)
High Level	10	27.8
Moderate Level	16	44.4
Low Level	10	27.8
Total	**36**	**100**

The findings show that 44.4% of respondents rated their knowledge as moderate, while 27.8% rated it as low. This suggests that although some staff possess adequate knowledge, there is still a need for improved capacity building.

Research Question 2:

Are adequate resources available to support effective coding and indexing?

Response	Frequency	Percentage (%)
Adequate	8	22.2
Inadequate	20	55.6
Very Inadequate	8	22.2
Total	**36**	**100**

A majority (77.8%) indicated that resources were either inadequate or very inadequate. This shows that lack of necessary tools significantly affects implementation.

Research Question 3:

Does training influence implementation of coding and indexing?

Response	Frequency	Percentage (%)
Strongly Agree	18	50
Agree	12	33.3
Disagree	4	11.1
Strongly Disagree	2	5.6
Total	**36**	**100**

The data reveal that 83.3% of respondents agreed that training significantly influences effective implementation, indicating the importance of continuous professional development.

Research Question 4:

What institutional factors affect coding and indexing practices?

Respondents identified the following major institutional challenges:

- Lack of regular supervision
- Weak policy enforcement
- Limited management attention to records unit
- Inadequate funding allocation

These responses suggest that administrative commitment plays a crucial role in successful implementation.

Hypothesis 1:

There is no significant relationship between staff training and effective implementation of coding and indexing.

Based on the responses where the majority agreed that training improves implementation, the hypothesis was rejected. This indicates that staff training significantly influences effective coding and indexing practices.

Hypothesis 2:

There is no significant relationship between availability of resources and quality of coding and indexing.

Given that most respondents reported inadequate resources affecting performance, this hypothesis was also rejected. Availability of resources has a significant impact on implementation quality.

Hypothesis 3:

Administrative support does not significantly influence implementation.

Findings showed that poor supervision and weak policy enforcement hinder effective coding and indexing. Therefore, this hypothesis was rejected. Administrative support significantly affects implementation.

Discussion of Findings

The findings indicate that implementation of coding and indexing at General Hospital Daura is influenced by several interconnected factors.

First, staff knowledge is moderate but not sufficient to ensure optimal coding accuracy. This suggests the need for structured and continuous training programs.

Second, inadequate resources such as outdated manuals, limited ICT infrastructure, and insufficient funding significantly hinder effective practice. Facilities operating under resource constraints struggle to maintain standardized classification systems.

Third, administrative and institutional support plays a critical role. Without strong management commitment, monitoring mechanisms, and clear policies, coding and indexing practices may remain inconsistent.

These findings align with broader observations in health information management literature, which emphasize the importance of human capacity, material resources, and institutional support in ensuring effective implementation.

CONCLUSION

This study examined the factors influencing the implementation of coding and indexing in secondary healthcare facilities using General Hospital Daura, Katsina State as a case study. The study was guided by objectives which included assessing the level of knowledge and competence of health records personnel, examining the availability of resources for coding and indexing, determining the influence of training and professional development, identifying administrative and institutional factors affecting implementation, and proposing strategies for improvement.

The findings of the study revealed that health records personnel in General Hospital Daura possess moderate knowledge and competence in coding and indexing practices, although some gaps in technical skills still exist. The study also found that availability of resources such as updated coding manuals, computers, and adequate workspace is insufficient, which negatively affects effective implementation of coding and indexing in the hospital.

Furthermore, the study established that training and professional development significantly influence the efficiency and accuracy of coding and indexing practices. Staff who receive regular training tend to perform better in classification and documentation of patient information. In addition, the study found that administrative and institutional support such as supervision, policy enforcement, and management commitment play a crucial role in ensuring effective implementation. Based on these findings, the study concludes that successful implementation of coding and indexing in General Hospital Daura depends on adequate training of health information personnel, availability of necessary resources, and strong administrative support. Addressing these factors will improve the quality of health information management, enhance record retrieval efficiency, and support better healthcare planning and decision-making in secondary healthcare facilities. Overall, the study concludes that enhancing coding and indexing implementation will improve health data quality, facilitate efficient record retrieval, and strengthen healthcare planning and

Ethical Considerations

The study adhered to ethical standards in research. The following measures were taken:

- Permission was obtained from the hospital authority before conducting the study.

Participation was voluntary..

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Appendix

Questionnaire on Factors Influencing Implementation of Coding and Indexing in General Hospital Daura, Katsina State

Section A: Demographic Information

1. **Gender:** ☐ Male ☐ Female
2. **Age:** ☐ 20–29 ☐ 30–39 ☐ 40–49 ☐ 50 and above
3. **Educational Qualification:** ☐ Diploma in Health Information Management ☐ HND ☐ Bachelor's Degree ☐ Others (Specify: _____)
4. **Years of Experience:** ☐ 1–5 ☐ 6–10 ☐ Above 10

Section B: Knowledge and Competence in Coding and Indexing

5. I have adequate knowledge of medical coding and indexing.
   ☐ Strongly Agree ☐ Agree ☐ Disagree ☐ Strongly Disagree
6. I am competent in accurately coding and indexing patient records.
   ☐ Strongly Agree ☐ Agree ☐ Disagree ☐ Strongly Disagree
7. I am confident in using classification systems like ICD for coding.
   ☐ Strongly Agree ☐ Agree ☐ Disagree ☐ Strongly Disagree

Section C: Availability of Resources

8. The hospital provides adequate coding manuals and classification materials.
   ☐ Strongly Agree ☐ Agree ☐ Disagree ☐ Strongly Disagree
9. Computers, software, and ICT infrastructure for coding and indexing are sufficient.
   ☐ Strongly Agree ☐ Agree ☐ Disagree ☐ Strongly Disagree
10. There is adequate office space and storage facilities for record management.
    ☐ Strongly Agree ☐ Agree ☐ Disagree ☐ Strongly Disagree

Section D: Training and Professional Development

11. I receive regular training on coding and indexing practices.
    ☐ Strongly Agree ☐ Agree ☐ Disagree ☐ Strongly Disagree
12. Training programs improve my coding and indexing skills.
    ☐ Strongly Agree ☐ Agree ☐ Disagree ☐ Strongly Disagree
13. The hospital encourages attendance at workshops and professional conferences.
    ☐ Strongly Agree ☐ Agree ☐ Disagree ☐ Strongly Disagree

Section E: Administrative and Institutional Support

14. Hospital management provides supervision and guidance for coding and indexing.
    ☐ Strongly Agree ☐ Agree ☐ Disagree ☐ Strongly Disagree
15. Policies and procedures for coding and indexing are clearly communicated and enforced.
    ☐ Strongly Agree ☐ Agree ☐ Disagree ☐ Strongly Disagree
16. Administrative support (e.g., funding, resource allocation) is adequate for effective coding and indexing.
    ☐ Strongly Agree ☐ Agree ☐ Disagree ☐ Strongly Disagree

Section F: Challenges and Suggestions

17. What challenges do you face in coding and indexing? (Please specify)

What suggestions do you have to improve coding and indexing in the hospital?