MEDICAL CODING IN HEALTHCARE: A COMPREHENSIVE OVERVIEW

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Abstract: Acting as a link between healthcare providers, insurers, and regulatory bodies, medical coding is an essential part of the healthcare ecosystem. An overview of medical coding is given in this abstract, with particular attention to its goals and the revolutionary potential of artificial intelligence (AI), as well as the process of medical coding, certification programs, the significance of accurate medical coding, and career and entrepreneurial opportunities in the field.

The medical coding method has changed significantly since AI was introduced. Machine learning algorithms, among other AI technologies, have simplified and improved the accuracy of coding processes. Large volumes of healthcare data are analyzed by automated coding systems, which effectively convert narrative information into accurate codes. This speeds up the coding process and lowers the possibility of mistakes, which raises the standard overall.

INTRODUCTION:

Medical coding is the transformation of healthcare diagnosis, procedures, medical services, and equipment into universal medical alphanumeric codes. Medical coding is certainly one of the most important aspects of medical billing. A medical biller and coder is responsible for creating and processing medical claims for health care facilities. Their goal is to notify insurance companies of monetary reimbursements for the medical services that health care staff provides.

The process of applying universal alphanumeric codes to healthcare services—that is, medical diagnoses, procedures, services, and equipment—is known as medical coding. A medical coder uses a patient's medical record, which includes records like doctor's notes, lab results, and service lists, to assign diagnosis and procedure codes. Medical coding is the process of extracting medical information from the available records, allocating the appropriate codes for diagnosis and procedures, and making it possible to create a claim that can be sent to insurance companies. The medical record paperwork, which includes transcriptions of doctor's notes, lab and radiologic data, etc., is where the diagnoses and procedure codes are found. Professionals in medical coding assist in making sure the codes are applied accurately during the process of medical billing, which includes abstracting the information from documentation, assigning the appropriate codes, and creating a claim to be paid by insurance carriers to patients.

PURPOSE OF MEDICAL CODING:

- Promotes consistent communication between regulatory agencies, insurers, and healthcare providers.
- By providing standardized data, it supports medical research and public health analysis.
- Facilitates correct invoicing and compensation for medical services.

PROCESS OF MEDICAL CODING:

Any project's words are coded using a procedure called "auto coding." If a term isn't written "auto-coded," the project's medical coder will have to code it "manually." The two coding processes—manual and automatic—are briefly explained below:

- **Auto Coding:** If a term entered by the researcher on the data collecting tool precisely matches a term listed in the medical lexicon, the term is automatically coded.
- **Manual Coding:** When it comes to terms that don't correspond with the right level of hierarchy in the medical vocabulary, auto coding falls short. The medical coder assigned to the project must manually code each of these phrases. The medical coder will find the appropriate match for the term from among the terms within the assigned dictionary and will manually assign the code.

1) **Pre-sales Requirements Analysis-** With the client's approval, we begin the process of evaluating the current process architecture and outlining the possible advantages of outsourcing. Currently, we enable requirements analysis studies that address the processes that need to be supported, file types and formats that are utilized, reports that need to be generated, turnaround times, and service levels.

2) **Receiving Client Files-**The client sends us patient charts and related information as scanned copies that are uploaded into our secure FTP site.

3) **Downloading and Allocating Files-** After downloading the data, our medical coding team assigns them to the proper coders and pre-coders for processing.

4) **Pre-coding-** Upon downloading the files allocated to them, the Pre-coders capture key information such as Name of the Physician, Place of Service, price modifiers etc.

5) **Coding-** The coding activity is split into two critical areas-Procedural and Diagnostic Coding. Our Certified Coders (CPC) facilitates this process in line with CPT Assistant, HCPCS Level II, ICD-10-CM, and LMRP guidelines. Later, the Coding team evaluates the documents to verify that the diagnosis is compatible with the assigned procedure code.

6) **Upload of Completed Files-** Files with the successfully completed coding work are uploaded to our secure FTP site.

7) **Quality Evaluation-** The client receives the files uploaded onto our FTP site and evaluates data quality and consistency.

8) **Feedback from Client-** In order to guarantee that we provide dependable and accurate medical coding services, we assess the client's input regarding data quality and help make the required enhancements and modifications.

Prior to assigning a dictionary to a project/study, it is essential to check the following points as a prerequisite:

- Latest validated version available in the coding tool at the start of the project
- Policy / requirement about use of the same version of dictionary available in the tool for entire project in spite of availability of the newer version
- upgraded version prospectively as and when available during the life of the project
- upgraded version retrospectively as and when available during the life cycle of a project.

CODE SETS USED DURING THE PROCESS:

Coders use the following code sets during this process.

1. **ICD-10 : International Classification Of Diseases, Tenth Revision**

   In order to describe a patient's injury or illness, as well as social determinants of health and other patient characteristics, diagnosis codes are essential. For billing purposes, the sector collects diagnosis codes using the International Statistical Classification of Diseases and Related Health Problems, Tenth Revision (ICD-10).

   While ICD-10-PCS (procedure coding system) codes are specific to hospital inpatient services, ICD-10-CM (clinical modification) codes categorize diagnoses in all healthcare settings. ICD codes include information on a patient's health, including the location and degree of an injury or illness and

whether the visit is part of an initial or follow-up appointment. Just the ICD-10-CM code set contains more than 70,000 distinct identifiers. The ICD coding system is maintained by the World Health Organization (WHO) and is utilized globally in various formats

2. CPT: Current Procedural Terminology.

Most medical operations carried out in a doctor's office are recorded using Current Procedure Terminology, or CPT, codes. The American Medical Association is responsible for publishing and maintaining this code set (AMA). The AMA has copyright protection for these codes, which are updated yearly.

Three groups comprise the five-digit numerical codes known as CPT codes. There are six ranges within the first category, which is the most frequently utilized. Evaluation and Management, Anesthesia, Surgery, Radiology, Pathology and Laboratory, and Medicine are the six main medical specialties that these ranges relate to..

Performance measurement and, occasionally, the outcomes of laboratory or radiological tests fall under the second group of CPT codes. Usually, a hyphen is used to append these five-digit alphanumeric codes to the end of a Category I CPT code.

Category II codes are not permitted to be used in lieu of Category I codes; instead, they are optional. The AMA expects that Category II codes will lessen the administrative burden on physician offices by giving them access to an increasing amount of precise information, particularly regarding the performance of healthcare facilities and professionals, which makes these codes helpful for other doctors and other health professionals.

The developing medical technology category falls under the third set of CPT codes.

The first two categories will occupy the most of your time as a coder, though the former will definitely be more prevalent.

Additionally, addenda to CPT codes improve the code's specificity and correctness. The American Medical Association (AMA) has created a collection of CPT modifiers because many medical procedures need more specific information than the standard Category I CPT code provides. These codes are appended to the end of the Category I CPT code and are either two-digit numeric or alphanumeric codes. Important further information is added to the procedure code using CPT modifiers. For example, the side of the body on which an operation is performed is described by a CPT modifier.

3. HCPCS: Healthcare Common Procedure Coding System

The codes that make up the Healthcare Common Procedure Coding System (HCPCS), which is colloquially called "hick picks," are derived from CPT codes. HCPCS codes are generally used to identify services, treatments, and equipment that are not covered by CPT codes. They were created by the CMS, the same body that created CPT, and are kept up to date by the AMA. This covers things like prosthetic limbs, durable medical equipment, ambulance transports, and specific medications.

In addition, HCPCS is the official code set for Medicaid, Medicare, chemotherapeutic medications, and outpatient hospital treatment. One of the most crucial codes a medical coder can utilize is HCPCS since it is associated with both Medicaid and Medicare.

There are two levels in the HCPCS coding system. These levels start at the same place as the CPT codes we previously discussed.

A collection of alphanumeric codes known as Level II is separated into 17 sections, each of which is focused on a particular field of expertise, such as medical and laboratory or rehabilitation services.

Each HCPCS code should have a corresponding diagnostic code that supports the medical process, much like CPT codes do. The onus is on the coders to ensure that the outpatient procedure mentioned in the physician's report, which is usually represented by an ICD code, makes sense in relation to the given diagnosis.

4. CHARGE CAPTURE CODES:

Coders link clinical items, patient care services, and physician order inputs to a charge master code. An assortment of standard rates for goods and services that a provider organization provides is called a charge master.

Procedure descriptions, time reference codes, departments participating in the medical treatment, and billable goods and supplies are examples of charge capture codes.

Hospitals must post their chargemasters and the costs of 300 shoppable services on their websites in accordance with the CMS Hospital Price Transparency guideline.

Revenue cycle management executives utilize these prices to bargain with payers for higher claims reimbursement rates in a process known as charge capture. Providers bill patients for the remaining amount after coders submit the codes and associated charges to payers.

5. PROFESSIONAL AND FACILITY CODES:

When applicable, medical coders also translate the medical record into professional and facility codes. Professional codes capture physician and other clinical services delivered and connect the services with a code for billing. These codes stem from the documentation in a patient's medical record.

On the other hand, hospitals use facility codes to account for the cost and overhead of providing healthcare services. These codes capture the charges for medical equipment, supplies, medication, nursing staff, and other technical care components.

Hospitals can include professional codes on claims when a provider employed by the hospital performs clinical services. However, if a non-hospital provider uses the hospital's space and supplies, the facility cannot include a professional code.

Integrating professional and facility coding into one platform may help facilitate the process for hospitals. Leveraging technology, such as computer-assisted coding (CAC) solutions, can help speed up the medical coding process and increase coding accuracy and efficiency.

National Medical Professional and Outpatient Coding Certifications:

1. **American Academy of Professional Coders (AAPC)**

The AAPC is the nation's largest training and credentialing organization for the business side of healthcare. Our certified members in medical coding, medical billing, medical auditing, compliance, and practice management represent the highest level of expertise in the industry. The AAPC currently has over 155,000 members. All AAPC exams are proctored 3-4 times per year by an AAPC local chapter. The exams are 5 hours and 40 minutes. The test consists of 150 multiple choice questions and a passing grade of 70% is required. To maintain certification, coders must obtain thirty-two CEU credits (sixteen per year) reported every other year.

- Certified Professional Coder (CPC)
- Certified Professional Coder Apprentice (CPC-A)
- Certified Professional Coder Hospital (CPC-H)

The AAPC also has various other certifications for healthcare auditors, compliance officers, inpatient coding and specialty specific coding.

2. **American Health Information Management Association (AHIMA)**

The American Health Information Management Association (AHIMA) is the premier association of health information management (HIM) professionals worldwide. Serving fiftytwo affiliated component state associations and more than 101,000 health information professionals, it is recognized as the leading source of "HIM knowledge," a respected authority for rigorous professional education and training.

All AHIMA exams are proctored in key large cities throughout the year. In order to pass, the examinee must obtain a scaled score for the CCS-P examination of 300 out of 400. To maintain certification, the coder is required to obtain twenty CEUs each year, including two mandatory annual coding self-reviews.

- Certified Coding Specialist-Physician (CCS-P)

3. The Medical Management Institute (MMI)

The Medical Management Institute (MMI) is the educational leader in medical billing, coding, auditing, management and ICD-10 training. MMI has more than twenty-five years of experience in the Revenue Cycle Arena and an alumni base of nearly 250,000 alumni. MMI's certifications prepare you to become certified as a physician office-based medical coder, medical biller, medical manager, or medical auditor. Graduates of approved training programs go on to attain their RMC, RMB, RMM & RMA credentials.

All MMI certifications are administered online. The coder has twenty-four hours to take the test once they start. The test consists of 150 multiple choice questions and a grade of 76% is required to pass the test. Once certified, members must maintain twelve CEU credits annually and are required to take a fifty question test each year that covers the CPT, ICD10 and HCPCS changes for the calendar year that the test is being administered.

MMI certifications include:
 - Registered Medical Coder (RMC)
 - Registered Medical Auditor (RMA)
 - Registered Medical Biller (RMB)
 - Registered Medical Manager (RMM)

Effect of Artificial Intelligence (AI) On Medical Coding:

The medical coding and billing industry is prone to time-consuming manual processes, a high risk of human error, and a lack of scalability and efficiency. In traditional medical billing and coding, healthcare providers input data. With more than 70,000 codes today, it becomes difficult for coders to process charts with the speed that the healthcare system demands. This causes errors and makes the entire process inefficient. These errors further lead to the denial of claims and the inability to manage the ever-increasing workload. This is precisely where Artificial Intelligence (AI) marks its presence. AI has been instrumental in revolutionizing the healthcare industry. AI medical coding companies are at the forefront of this revolution, leveraging cutting-edge algorithms and machine learning techniques to automate and streamline the coding process. The benefits of AI in medical coding are numerous. Firstly, AI coding tools can reduce the error rate of medical coding, ensuring accurate and consistent documentation. Secondly, AI coding tools can reduce the time and cost of medical coding, enabling healthcare providers to allocate resources more efficiently. Thirdly, AI coding tools can improve patient outcomes by identifying trends and patterns in medical data, enabling early detection and intervention.

AI has transformed medical coding by automating the coding process, minimizing errors, and improving efficiency. AI-powered coding tools use natural language processing (NLP) and machine learning algorithms to analyze medical records, identify relevant codes, and assign them automatically. AI coding tools can also learn from past coding decisions, improving their accuracy over time. Furthermore, AI coding tools can work faster than human coders, processing vast amounts of data in seconds, reducing the time and cost of medical coding.

Medical billing and coding are the two areas embracing AI intervention. In the foreseeable future, AI is expected to become a partner to medical coders and billers in the:

- **Streamlining the medical coding process:** Medical coders struggle to assign accurate codes. AI tools like MediCodio are helping coders process charts within timelines, reducing spillovers, and providing superbills to medical billers on time. This contributes to process efficiency.

- **Reduced errors leading to reduced denials**: Wrong codes are responsible for the largest claim denials by payers. This causes huge financial losses to the healthcare provider. AI reads charts and suggests the exact codes that lead to complete reimbursement and minimized losses.

- **Reduce fraudulent billing:** With the increased workload on coders and billers, cases of fraudulent billing are rising. AI can be used to analyze claims data and identify patterns of fraudulent activity, thereby saving millions of dollars.

- **Automating the billing process:** With further innovations, AI can also be used to automate the billing process, meaning the AI-powered billing software can automatically generate and send bills to patients and insurance companies.

- **Reducing OpEx:** Running a medical coding and billing department means huge operating expenses w.r.t. infrastructure and training teams on the ever-changing codes and process. AI enables you to do more without increasing workforce and infrastructure requirements

The Importance of Accurate Medical Coding:

Accurate medical coding is crucial for several reasons. To begin with, it ensures that healthcare providers receive appropriate reimbursement for their services, reducing the claim denials. By maintaining coding accuracy, healthcare professionals can clearly identify health trends, patterns, and outcomes, which helps in ensuring patient safety. By assigning accurate medical codes, medical coders help identify conditions that aid in preventing complications in the future. Additionally, accurate coding aids healthcare organisations in determining the true cost of a patient's condition. Furthermore, medical coding is essential for complying with regulatory requirements, such as the Health Insurance Portability and Accountability Act (HIPAA) and the Affordable Care Act (ACA).

Careers and entrepreneurial opportunities in Medical Coding:

Medical coding jobs offer a great career with opportunities to advance to managerial and leadership roles in the revenue cycle function. While both medical billing and medical coding positions provide good pay, opportunities in medical coding are more lucrative because of specialized skills and certification requirements. The market for talent is highly competitive, and many organizations offer flexible working schedules and remote working options.

Medical billers and coders run revenue cycle processes that move the money in the business of healthcare. Of late, medical coding also drives the measurement of quality in healthcare and is the force behind value-based reimbursements. Medical billers and coders must be accurate, responsive, and organized to address each claim and leave no stone unturned. They must prepare for the future changes expected in the industry, such as ICD-11 implementation.

Medical billers and coders can get help from thousands of online resources that can help them prepare for a successful career. CPC certification from AAPC and CCS certifications from AHIMA can be excellent places to begin your certification journey.

SOME EXAMPLES OF MEDICAL CODES:

- **ICD-10-CM Codes**
1) *A00-B99* -Certain infectious and parasitic diseases
2) *C00-D49* -Neoplasms
3) *D50-D89* -Diseases of the blood and blood-forming organs and certain disorders involving the immune mechanism
4) *E00-E89* -Endocrine, nutritional and metabolic diseases
5) *F01-F99*- Mental, Behavioural and Neurodevelopmental disorders
6) *G00-G99* -Diseases of the nervous system
7) *H00-H59* -Diseases of the eye and adnexa
8) *H60-H95* -Diseases of the ear and mastoid process
9) *I00-I99* -Diseases of the circulatory system
10) *J00-J99* -Diseases of the respiratory system.

- *CPT CODES*
1) *00100-01999* -Anaesthesia
2) *10004-69990* -Surgery
3) *70010-79999* -Radiology Procedures
4) *80047-89398* -Pathology and Laboratory Procedures

5)　*90281-99607*　-Medicine Services and Procedures

6)　*99091-99499*　-Evaluation and Management

7)　*0001F-9007F*　-Category II Codes

8)　*0002M-0019M*　-Multianalyte Assay

9)　*0042T-0810T*　-Category III Codes

10)　*0001U-0419U*　-Proprietary Laboratory Analyses

CONCLUSION:

　Medical coding plays a pivotal role in healthcare operations, ensuring accurate financial transactions and providing valuable data for healthcare analysis. The incorporation of AI in this process signifies a transformative shift, offering increased efficiency and accuracy, while also posing challenges that demand careful navigation in the pursuit of optimal healthcare outcomes. Medical coding involves the translation of medical diagnoses and procedures into industry-standard codes. These industry-standard codes serve as the common language between providers and payers. The process is essential for the healthcare payers to understand the disease or ailment the patient has and the procedures taken by the medical practitioner.

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