

Investment Thesis Report: Medical Coding

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Executive Summary

Medical coding, the intricate process of translating healthcare diagnoses, procedures, services, and equipment into universal medical alphanumeric codes, plays a pivotal role in the vast and ever-changing landscape of the healthcare industry. The sector's complexity is further compounded by continuous healthcare innovation, evolving clinical procedures and services, the introduction of new FDA-approved medical devices and drugs, the global pandemic, and other transformative movements, rendering effective management a critical challenge. Amidst the challenges and complexity, investment opportunities emerge, presenting a compelling investment thesis for exploration. This thesis aims to thoroughly examine the medical coding market, offering insights into industry drivers and investment prospects across key sections:

- **Industry Overview** - This section delves into the historical evolution of ICD and CPT codes, elucidating the distinctions between these coding frameworks. References provide a comprehensive backdrop for understanding the industry's roots.
- **Industry Challenges and New Developments** - An exploration of the challenges faced by the industry, coupled with an analysis of recent regulatory changes introduced by CMS (Centers for Medicare & Medicaid Services), provides a nuanced understanding of the industry's current landscape.
- **Market Size and Trends** - Through an in-depth analysis, this section scrutinizes the market size in terms of dollar expenditure, workforce employment, trends related to insourcing versus outsourcing, and the dynamics of US-based coding employment versus offshoring services.
- **Competitive Landscape** - A classification of industry players into three categories—traditional Revenue Cycle Management (RCM) firms, traditional medical coding outsourcing services, and the emergence of a dozen AI-driven technology disruptors and challengers—provides a comprehensive view of the competitive environment.
- **Investment Opportunities** - This section outlines the five pillars of the investment thesis. It underscores the potential derived from thin operating margins in hospitals, the imperative to cut costs and enhance operational efficiency, challenges associated with the workforce shortage, turnover, and retention, the promise held by machine learning (ML) and natural language processing (NLP) technologies, and the heightened regulatory outlook.
- **Investment Risks** - Acknowledging the multifaceted nature of investments, this section articulates the various risks investors should consider, particularly pertaining to the business challenges associated with scaling a medical coding solution within the US hospital market.

References are provided at the end of each section.

Industry Overview

Medical coding is the transformation of healthcare diagnoses, procedures, medical services, and equipment into universal medical alphanumeric codes. The diagnoses and procedure codes are taken from medical record documentation, such as transcription of physician's notes, laboratory and radiologic results, etc. Medical coding professionals help ensure the codes are applied correctly during the medical billing process, which includes abstracting the information from documentation, assigning the appropriate codes, and creating a claim to be paid by insurance carriers. Adopting standard medical coding is a major part of national eHealth initiatives to standardize coding practices for Electronic Health Records and improve interoperability of healthcare technology platforms.^{1,2,3} Major Electronic Health Record companies include Epic, Cerner (now part of Oracle), MEDITECH, Veradigm (a spinoff from Allscripts), NextGen, Athena Health, and others.⁴ Some EHR software vendors offer integrated medical billing solutions. Electronic processing of tasks, managing claims, payment processing, and revenue generation can all be simplified through integrated medical billing.

The importance of medical coding:

- Medical coding is a standardized set of terminology to document patient illness and medical treatment.
- Medical coding protects patient privacy.
- Standardized coding increases the efficiency and accuracy of medical billing and insurance remission.
- Medical coding can be used for tracking public health and monitoring the incidences of diseases.
- Finally, medical coding can be used for performance analysis and quality improvement.

This section will overview 3 main types of medical codes:

- International Classification of Diseases (ICD)
- Current Procedural Terminology (CPT)
- Healthcare Common Procedure Coding System (HCPCS)

International Classification of Diseases (ICD)

In 1948, the World Health Organization (WHO) took charge of developing a medical coding classification system, which was expanded the following year to include coding for causes of morbidity in addition to mortality. This is widely considered the genesis of today's ICD coding framework.⁵ The ICD-9 was published in 1977 by the Department of Knowledge Management and Sharing of the World Health Organization. ICD-9 was an important transition to increased granularity with 4-digit-level categories and a variety of optional 5-digit subdivisions. It was also pivotal in moving the system out of the WHO once ICD became a part of the public domain. The initial effort on ICD-10 concluded in 1992. ICD-10 is much more granular than ICD-9. WHO maintains the ICD code, which is referred to as a diagnostic tool for epidemiology, health

management, and clinical purposes. Therefore, it is anticipated that the rising prevalence of chronic diseases and the developments in ICD will accelerate the growth of this market.

The United States National Center for Health Statistics (NCHS), the Federal agency responsible for the use of the International Statistical Classification of Diseases and Related Health Problems, issued a 10th revision (ICD-10) in the United States, which developed a clinical modification of the classification for morbidity purposes (ICD-10-CM). The ICD-10 is used to code and classify mortality data from death certificates, having replaced ICD-9 for this purpose as of January 1, 1999. ICD-10-CM is the replacement for ICD-9-CM, volumes 1 and 2, effective October 1, 2015. ⁶

The latest ICD version, ICD-11, went into effect in February 2022 in accordance with a February 2022 update by the WHO. ICD-11, which is totally digital, has a new format that is easy to use and includes multilingual features that lessen the possibility of manual error. It is an enabling clinical classification and terminology database that serves a wide range of uses for recording and reporting health statistics. It has been created using input from over 90 countries and unprecedented participation from healthcare providers.

ICD-11 allows health information to be utilized for multiple applications such as enhancement in patient outcomes; quality analysis; safety; integrated care; strategic planning; population health reporting; and delivery of health care services. ^{7,8,9} The ICD 11 codes are easy to use. They allow embedding the coding tool into local digital records and information technology systems. This increases user compliance, as well as lowers the cost & time for training. Multiple ICD codes and multiple revisions to suit the rapidly evolving health industry are driving the segment growth.

Today, with more than 155,000 codable terms and over 17,000 unique codes for injuries, illnesses, and causes of death, ICD-11 codes serve as the basis for detecting global health trends and statistics. More than 1.6 million clinical occurrences can now be coded using code combinations.

ICD codes are extensively used in a variety of clinical settings. For example,

- Coding traditional medicine conditions - The ability to carry out tasks by oneself and participate in daily life are means by which to describe, in summary, the overall functionality of a person. It can also be used to track the situation in general before and after treatment. ICD includes a set of functioning categories based on the WHO disability assessment scheme (WHODAS2) that allows users to calculate a functioning score.
- Assessing and monitoring the safety, efficacy, and quality of care - Quality of care uses ICD-coded information to describe the situation of the patient, the outcome of treatment, and incidents or near-incidents including mechanisms and involved objects such as the failure of an infusion pump or the accidental wrong dosage of a medicament by the patient in line with the WHO recommendations for patient safety incident reporting and learning systems.
- Morbidity coding and reporting including Primary care - Accurate and precise information on what people fall sick from and are treated for is recorded and reported

with ICD. This includes all levels of health from primary to secondary and tertiary care. This information further serves policy design, planning, and monitoring of all aspects of the health of a population.

- Certification and reporting of Causes of Death - Information on what people die from is recorded on standard forms, analyzed, and reported following ICD standards. The information reliably provides a long-term trend of the health of a population. It also can serve short-term monitoring of epidemiological information, like in an epidemic or pandemic.

Current Procedural Terminology (CPT)

The Current Procedural Terminology (CPT®) codes offer doctors and healthcare professionals a uniform language for coding medical services and procedures to streamline reporting, increase accuracy and improve efficiency. CPT codes are also used for administrative management purposes such as claims processing and developing guidelines for medical care review.

The CPT terminology is the most widely accepted medical nomenclature used across the country to report medical, surgical, radiology, laboratory, anesthesiology, genomic sequencing, evaluation and management (E/M) services under public and private health insurance programs. The development and management of the CPT code set rely on a rigorous, transparent, and open process led by the CPT® Editorial Panel. Created more than 50 years ago, this AMA-convened process ensures clinically valid codes are issued, updated, and maintained on a regular basis to accurately reflect current clinical practice and innovation in medicine.

Designated by the U.S. Department of Health and Human Services under the Health Insurance Portability and Accountability Act (HIPAA) as a national coding set for physician and other healthcare professional services and procedures, CPT's evidence-based codes accurately encompass the full range of healthcare services.

All CPT codes are five digits and can be either numeric or alphanumeric, depending on the category. CPT code descriptors are clinically focused and utilize common standards so that a diverse set of users can have common understanding across the clinical healthcare paradigm.

There are various types of CPT codes:

- Category I: These codes have descriptors that correspond to a procedure or service. Codes range from 00100–99499 and are generally ordered into sub-categories based on procedure/service type and anatomy.
- Category II: These alphanumeric tracking codes are supplemental codes used for performance measurement. Using them is optional and not required for correct coding.
- Category III: These are temporary alphanumeric codes for new and developing technology, procedures, and services. They were created for data collection, assessment, and in some instances, payment of new services and procedures that currently do not meet the criteria for a Category I code.

While both ICD and CPT codes are used in medical billing and the broader healthcare landscape to identify medical procedures, diagnoses, and services, there exist vital differences between the two.

Figure 1 – Differences between ICD and CPT coding framework

	ICD	CPT
Issuing Organization	World Health Organization	American Medical Association
Domain	Public domain, free to use	Copyrighted by AMA and a licensing fee is applied
Purpose	ICD codes are used to identify medical diagnoses and necessities. ICD codes are categorized based on body systems or conditions.	CPT codes are used to identify medical procedures and services and are primarily used for billing and reimbursements. CPT codes are categorized based on medical treatment and procedures administered.
Format	The ICD code format consists of alphanumeric characters representing specific diseases, injuries, and medical conditions. The fourth, fifth, and sixth characters represent the etiology, anatomic site, and severity of the condition, respectively.	Category I codes range from 00100–99499 and are generally ordered based on the procedure/service type and anatomy
Examples	The ICD-10 code for Type 2 diabetes mellitus is E11.9. The "E" indicates that this is an external cause code, while the "11" indicates that this is a code for endocrine, nutritional, and metabolic diseases. The ".9" indicates that the code is unspecified. The more digits after the decimal point, the more specified the condition is.	Evaluation and Management - 99202–99499 Anesthesia - 00100–01999 Surgery - 10021–69990 Radiology Procedures - 70010–79999 Pathology and Laboratory Procedures - 80047–89398 Medicine Services and Procedures - 90281–99607

Healthcare Common Procedure Coding System (HCPCS)

HCPCS is a collection of standardized codes that represent medical procedures, supplies, products, and services. The codes are used to facilitate the processing of health insurance claims by Medicare and other insurers.

HCPCS is divided into two subsystems, Level I and Level II.

- Level I is comprised of Current Procedural Terminology® codes (HCPT). HCPT codes consist of five numeric digits. For more information about HCPT, see the HCPT source synopsis.

- Level II HCPCS codes identify products, supplies, and services not included in CPT. Level II codes consist of a letter followed by four numeric digits. Current Dental Terminology codes are included in the Level II codes as HCDDT. For more information about HCDDT, see the HCDDT source synopsis.

Revenue Cycle Management (RCM)

Revenue cycle management (RCM) is the financial process, utilizing medical billing software, that healthcare facilities use to track patient care episodes from registration and appointment scheduling to the final payment of a balance.

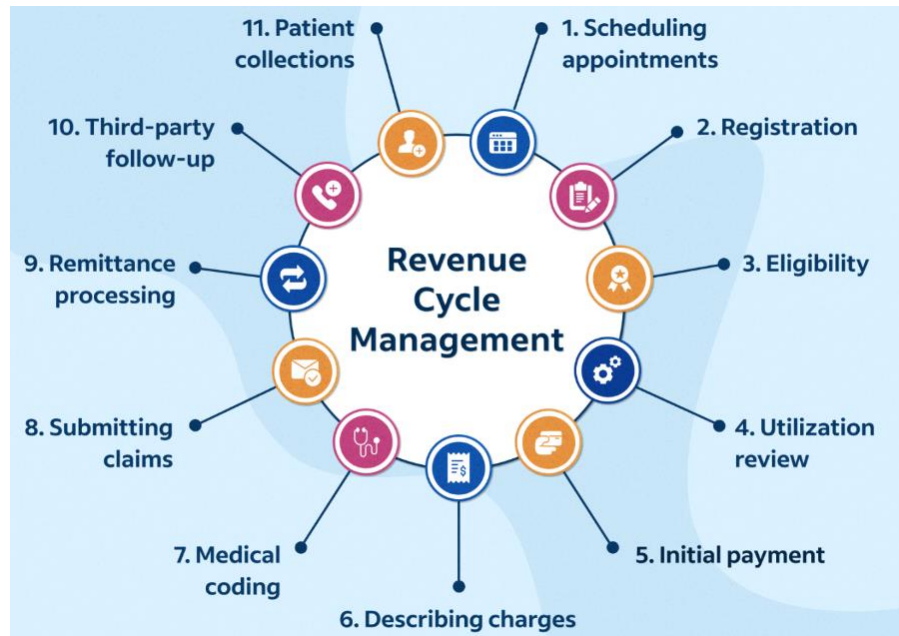
RCM unifies the business and clinical sides of healthcare by coupling administrative data, such as a patient's name, insurance provider, and other personal information, with the treatment a patient receives and their healthcare data.

Communicating with health insurance companies is a key component of RCM. When a patient schedules an appointment, the physician's office or the hospital staff typically checks the patient's reported insurance coverage before the visit. After an insured patient receives treatment for a given condition and supplies any applicable copayment, a healthcare provider or coder categorizes the nature of the treatment according to ICD-11 codes. The hospital or care facility then sends the care summary with ICD and CPT codes to the patient's insurance company to see what portion of the care will be covered by insurance, with the patient billed for the remainder.

Today, revenue cycle management can be done on a technology platform. Typically, an RCM platform allows the providers to manage and integrate all patient billing functions in one place. It greatly enhances the providers' productivity, improves medical coding accuracy and billing efficiency, reduces claim denials, and increases revenue collection. Some important RCM functions include:

- Patient registration
- Insurance verification
- Determination of eligibility
- Capturing and coding medical charges
- Claim submission and tracking
- Claim denial management
- Patient payment
- Many more

Figure 2: An illustration of RMC functions



Medical coding is an integral part of the revenue cycle management process. The efficient and accurate coding is the foundation and cornerstone for improving revenue collection and reducing claim denials.

Medical coding workflows in a hospital setting may vary from organization to organization, but generally speaking, the workflows follow a similar pattern.

1. During the patient registration process, the patient's demographic data and insurance information are verified by the registration desk.
2. The provider sees the patient and documents the encounter in the Electronic Health Record system about the patient's chief complaints, initial diagnoses, medications prescribed, or follow-up procedures that are needed.
3. The completion of the encounter documentation triggers the coding workflow.
4. Medical coders review the documentation and select specific ICD-11 codes to assign to the encounter based on the clinical description of the diagnoses.
5. The Electronic Health Record system will automatically generate the claims to bill to insurers.

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1. [*CMS and ICD-10*](#)

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3. [*eHI Releases Tools Promoting the Use of ICD-10-CM Z Codes for Social Determinants of Health Data*](#)
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7. [*ICD-11: A catalyst for advancing patient safety surveillance globally - PMC \(nih.gov\)*](#)
8. [*Preliminary study of patient safety and quality use cases for ICD-11 MMS*](#)
9. [*A World Health Organization field trial assessing a proposed ICD-11 framework for classifying patient safety events*](#)

Industry Challenges and New Regulatory Development

The medical coding and billing industry faces many challenges.

- **Patient privacy** – Medical coders work with sensitive patient information, and it is essential that they adhere to strict privacy regulations such as HIPAA. Failure to comply with these regulations can result in significant penalties.
- **Changing business** – Medical coding is a complex and dynamic process that requires constant updating and adaptation to the changing clinical standards, guidelines, and regulations. For example, the International Classification of Diseases (ICD) coding system undergoes periodic revisions to reflect the latest medical knowledge and practice. The latest version, ICD-11, was released on 25 May 2019 and will be implemented in 2024. Coders need to keep up with these changes and learn new codes and rules, which can be challenging and time-consuming.
- **Error-prone and manual labor work** - Medical coding relies heavily on human judgment and interpretation, which can introduce errors and inconsistencies. For example, different coders may assign different codes to the same clinical scenario, or coders may miss or misinterpret some relevant information in the medical record. Human error can lead to inaccurate or incomplete coding, which can affect reimbursement, compliance, and quality of care.
- **Coding Fraud and Abuse** - Healthcare providers can violate the False Claims Act by knowingly submitting claims for payment to Government insurers with incorrect billing codes, diagnostic codes, units of service, dates of service, or service providers. One common form of coding fraud that often serves as a basis for qui tam whistleblower

lawsuits is “upcoding,” which is applying a higher billing code to professional services than is warranted, in order to fraudulently maximize reimbursement.

- **Managing 3rd Parties** – Many healthcare providers outsource their medical coding and billing functions to 3rd party organizations, some of which are companies residing overseas in India, the Philippines, and other countries. Working with the outsourced vendors and providing appropriate oversight is a significant challenge.

There are also new developments in the regulatory space that are affecting medical coding.

CMS-HCC Version 28¹

Risk Adjustment Factor (RAF) scores are part of the model used by CMS to estimate the associated cost of Medicare Advantage beneficiaries. The RAF score determines the amount paid by CMS to the health plan or at-risk provider group per beneficiary during the corresponding payment year. Medicare Advantage Organizations (MAOs) are paid at a higher rate for patients who have multiple conditions and conditions with greater levels of severity, as their anticipated costs of care will be higher. CMS made significant changes to the structure of the Hierarchical Condition Categories (HCC) model in Version 28 (V28), which will impact RAF scores for a large percentage of Medicare Advantage beneficiaries. These changes include:

- How the V28 HCC codes are named and numbered
- An expanded number of HCCs
- Changes to ICD-10-CM code to HCC mappings
- Changes to the HCC coefficient values
- Removal of 2,294 diagnosis codes that no longer map to a payment HCC
- Addition of 268 diagnosis codes that did not map to a payment CMS-HCC in V24

The new HCCs are designed to capture more complete and accurate data about the health status of patients with chronic conditions. This will help health plans and medical practices better understand their patients’ health needs and provide them with the care they need to manage their conditions effectively. It will also require health plans and medical practices to update their coding practices and risk adjustment strategies, which will require a significant investment of time and resources.

CMS acknowledged that the changes in the proposed rule could change beneficiary risk scores with or without a change in the patient’s health status. CMS used updated fee-for-service data years (including 2018 diagnoses and 2019 expenditures) to calibrate the V28 model. They stated the proposed model “results in more appropriate relative weights for the HCCs in the model because they reflect more recent utilization, coding, and expenditure patterns in FFS Medicare.” There needs to be continued benchmarking of current member health statuses and analysis of how these changes will impact their organization. Investing in technologies that allow for the accurate and efficient coding of large volumes of clinical documents will be key in how MAOs and other stakeholders can effectively manage their risk adjustment program.

The overall impact of the proposed changes on beneficiary RAF scores will depend on several factors, however, RAF scores, in general, will likely decline. According to CMS, the proposed changes are expected to decrease risk-adjusted payments to MA plans by an average of 3.56% in 2024. This translates to an estimated \$11.4 billion decrease in payments to MA plans.

To mitigate the potential financial impact of the new HCC model changes, medical practices and health plans should consider investing in staff training and education to ensure that their coding practices are current and compliant with the new requirements. Additionally, practices should consider working with certified medical coders and auditors to perform internal reviews and identify areas for improvement.

A recent risk adjustment case study by AAPC Services found that providers and coders are not well versed in ICD-10-CM guidelines for combination coding or coding unspecified versus higher-specified codes. The case study showed a 14% error rate. Considering that every HCC has an estimated value of \$2,500, that is a loss of about \$527,500 for the large physician health organizations and hospital systems in the study.

Model Calibration Data – the previous CMS-HCC model (v24) was calibrated using diagnoses from 2014 to predict 2015 expenditures. The updated model (v28) was calibrated using 2018 diagnoses to predict 2019 expenditures. Additionally, the updated risk score model was calibrated using ICD-10 diagnosis codes, whereas the current model used the ICD-9 diagnoses available at the time. The denominator year for the proposed model will be updated to 2020 (2019 diagnoses for a 2020 cohort of beneficiaries).

HCC Reclassification – CMS made a number of alterations to the HCCs included in the updated risk score model. As part of this update, CMS modified the list of diagnosis codes that map to HCCs under the new model, including the removal of a significant number of diagnosis codes that are used to map to HCCs under the current model. The specific ICD-10 codes that were removed from being risk adjustable were, in part, based on CMS observing patterns of discretionary coding that resulted in differences between the MA and Medicare FFS populations. Among other changes, CMS constrained certain HCCs to be equal to each other so that they carry the same weight in the new model. For example, all Diabetes HCCs now carry the same weight under the proposed model.

New ICD-10-CM Codes

The new updates to the ICD-10-CM code system for the fiscal year 2024 include 395 new billable codes in areas such as external causes of morbidity, social determinants of health (SDOH), and osteoporosis. ²

Most interestingly, several social determinants of health (SdoH) codes were added including 8 of the 30 new codes in Chapter 21 - Factors Influencing Health Status and Contact with Health Services (Z00-Z99), which capture details related to child upbringing.

New CPT Codes

There are new CPT codes that took effect on January 1, 2023. ³

Evaluation and Management (E/M) CPT codes

- A substantial portion of the update contains changes to E/M codes. The documentation and coding requirements for E/M visits were recently updated by CMS to ease administrative burdens and streamline coding processes. The changes will expand to observation care, inpatient, emergency, and nursing facilities, as well as home and residence services.

AI and virtual technology CPT codes

- Along with those changes the AMA is reacting to ever evolving world of innovative health care by adding an appendix with a special taxonomy for AI applications. The taxonomy in question provides specific guidance and classification of AI medical services which are put into three categories: assistive, augmentative, or autonomous. The AMA hopes to establish a strong foundation and clear description of the AI applications as well as the technical specifications and performance.

Abdominal hernia repair CPT codes

- Finally, fifteen new CPT codes were added for anterior abdominal hernia repair services (49591-49623). The new codes address the difference in reporting for hybrid abdominal hernia repairs which can be done partially open and with a laparoscope. They also address the use of a robot to perform the surgery.

There are many other CPT code additions, changes, and deletions for 2024. ⁴

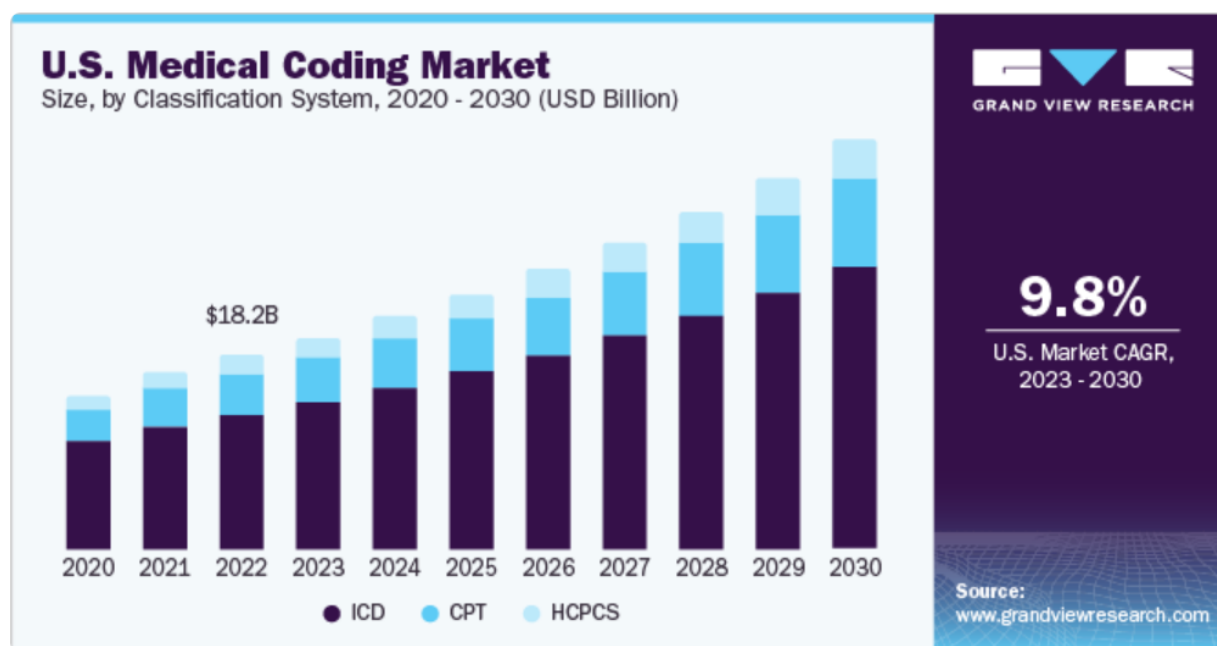
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1. [*CMS Medicare Advantage Announcement*](#)
2. [*Need-to-know highlights from the 2024 ICD-10-CM code updates*](#)
3. [*CPT Code Changes for 2023*](#)
4. [*CPT Coding Updates 2024 – What to Know*](#)

Market Size and Trends

Medical Coding is currently a multi-billion-dollar industry and rapidly growing. The U.S. medical coding market size was valued at USD 18.2 billion in 2022 and is expected to grow at a compound annual growth rate (CAGR) of 9.85% from 2023 to 2030. Errors in billings, insurance fraud, and misinterpretations of medical documents result in large financial losses. Increasing losses due to ineffective medical billing and revenue cycle management is increasing the demand for revenue cycle management innovative solutions including medical coding software and services. This in turn is estimated to drive the market growth potential. High adoption of digital technologies such as electronic health records, revenue cycle management software, mhealth applications, telehealth, and increasing efforts towards digitalization of healthcare in the U.S. is positively driving the market growth. The majority of the medical coding is done through outsourcing owing to benefits such as reduced operating costs, minimized claim denials, and scalability. The majority of healthcare organizations are outsourcing their coding needs to Asian countries such as India, China, and Vietnam, among others.

Figure 4: US Medical Coding Market by 2030. ¹



Notable insights from the above chart:

- 9.8% CAGR, 2023-2030

- ICD-11 outperforms the growth of CPT and HCPCS. The current version of ICD-11 contains around 17,000 unique codes and more than 120,000 codable terms. This code set has become 100% digital, which drives more adoption of ICD-11.
- The hospital market is the fastest-growing sector.
- Growth drivers:
 - *Errors in billings, insurance fraud, and misinterpretations of medical documents result in large financial losses.*
 - *Increased adoption of EHR, Telehealth, and revenue cycle management software.*
 - *The addition of COVID codes.*

Other top market trends:

- Frequent revision of classification systems and increasing adoption of coding & billing procedures in hospital revenue cycle management procedures is expected to generate huge opportunities for medical coders during the forecast period, thereby fueling the growth of the global market.
- On the basis of the classification system, the market is segmented into ICD, CPT, and HCPCS. As of 2022, the ICD segment held the largest share of 69.4% in 2022. The current version of ICD-11 contains around 17,000 unique codes and more than 120,000 codable terms. This has turned entirely digital now. This is expected to significantly increase the demand for trained coders.
- On the basis of medical specialty, the market can be segmented into oncology, cardiology, anesthesia, radiology, pathology, pain management, emergency services, urgent care, and others. The growth can be attributed to increasing insurance coverage for various disease areas, which is resulting in high demand for medical coding services in the majority of specialties.
- The US medical coding market is segmented into in-house and outsourced. The outsourced segment held a major market share of 68.4% in 2022. The trend of outsourcing medical coding services is expected to continue over the forecast period. Easy availability of skilled coders in Asia Pacific, which provide coding services at competitive prices, is expected to further increase the preference for outsourcing medical coding services. Outsourcing helps in cost reduction, time-saving, and workflow efficiency. Thus, healthcare providers can focus on quality patient care and patient engagement. According to a survey by RCI, 80% of hospitals outsource medical coding. Growth in onshoring and offshoring of revenue cycle management including medical coding are positively impacting the market growth. It is worth noting that the use of outsourced medical coding comes with its unique challenges.
- In addition, administrative expenses in healthcare are rising. In order to cut administrative costs, healthcare providers are using outsourcing services for medical coding and revenue cycle management. This in turn is fueling the expansion of the medical coding outsourcing market.

Figure 5: The breakdown between Outsource and In-House Medical Coding ¹

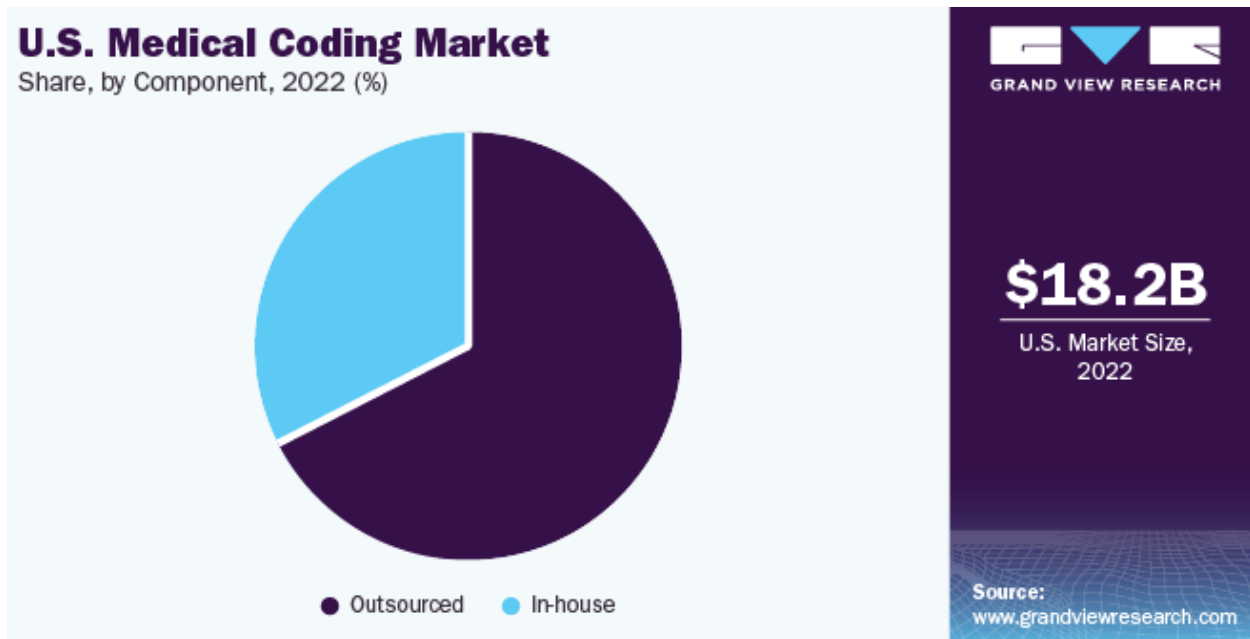
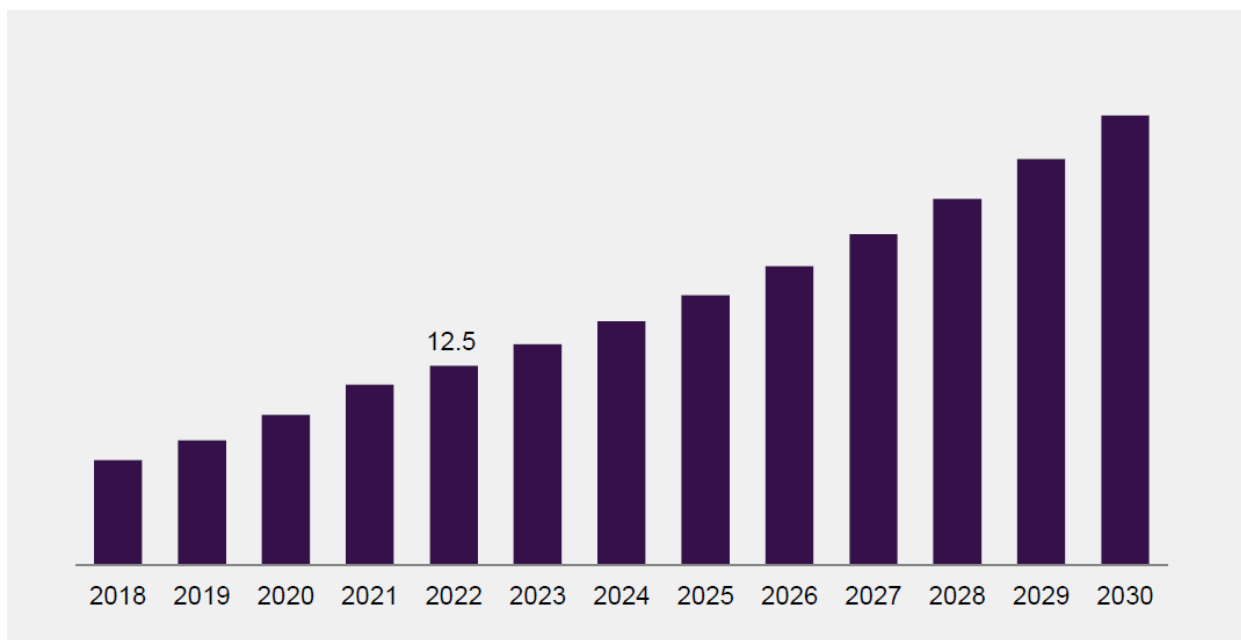


Figure 6: The growth of outsourced medical coding market (USD: Billions) by 2030



Source: U.S. FDA, WHO, Industry Journals, Investor Presentations Primary Interviews, Grand View Research

1. [U.S. Medical Coding Market Size And Share Report, 2030 \(grandviewresearch.com\)](https://www.grandviewresearch.com/industry-analysis/u-s-medical-coding-market)

Medical Coder Workforce and Employment

According to Zippia¹, there are close to 135,000 medical coders and billers, 90% being female, that are employed in the United States at the end of 2021. Here is the demographic breakdown. For this study, the medical coders and billers are combined.

Figure 8 – Education background of medical coders

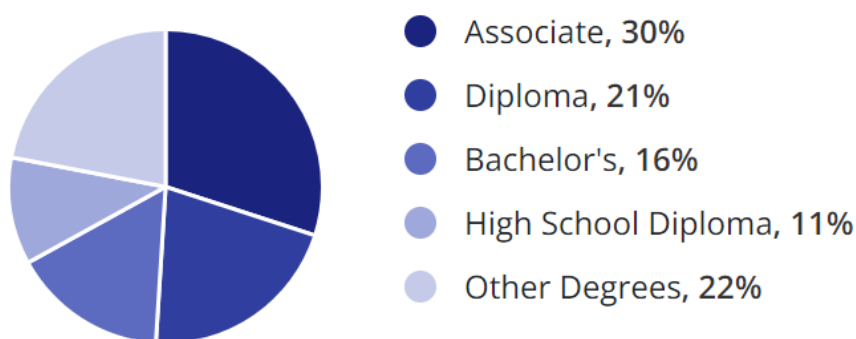


Figure 9 – Common ethnicities for medical coders

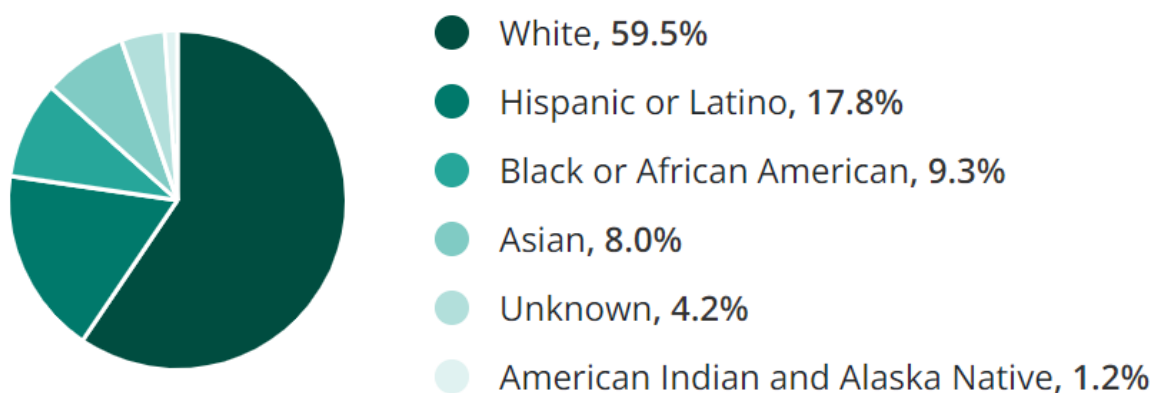


Figure 10 – Company size medical coders work for

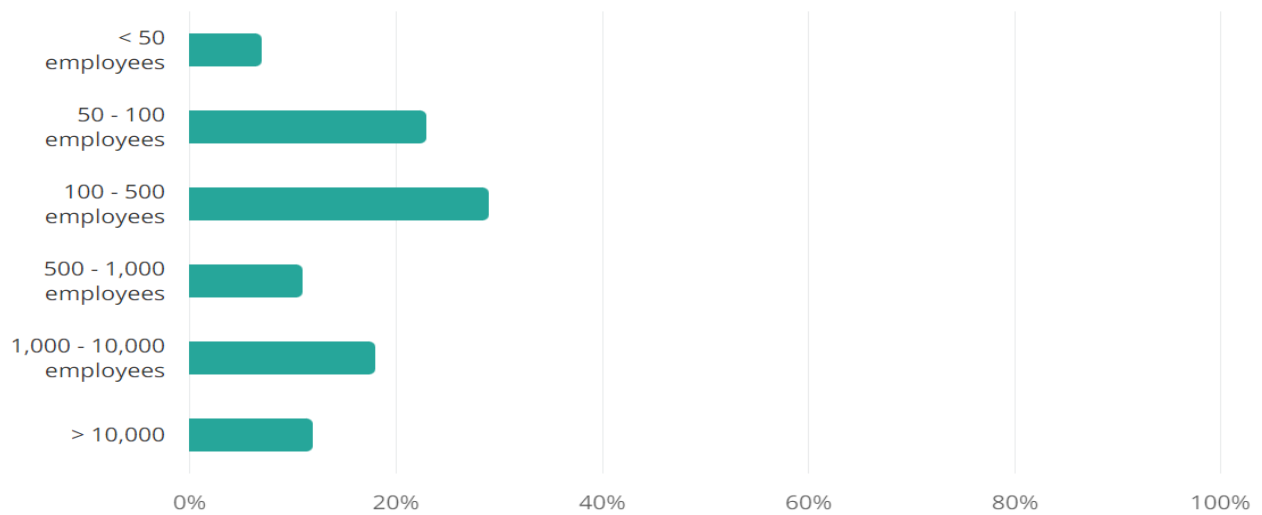


Figure 11 – Unemployment rate for medical coders

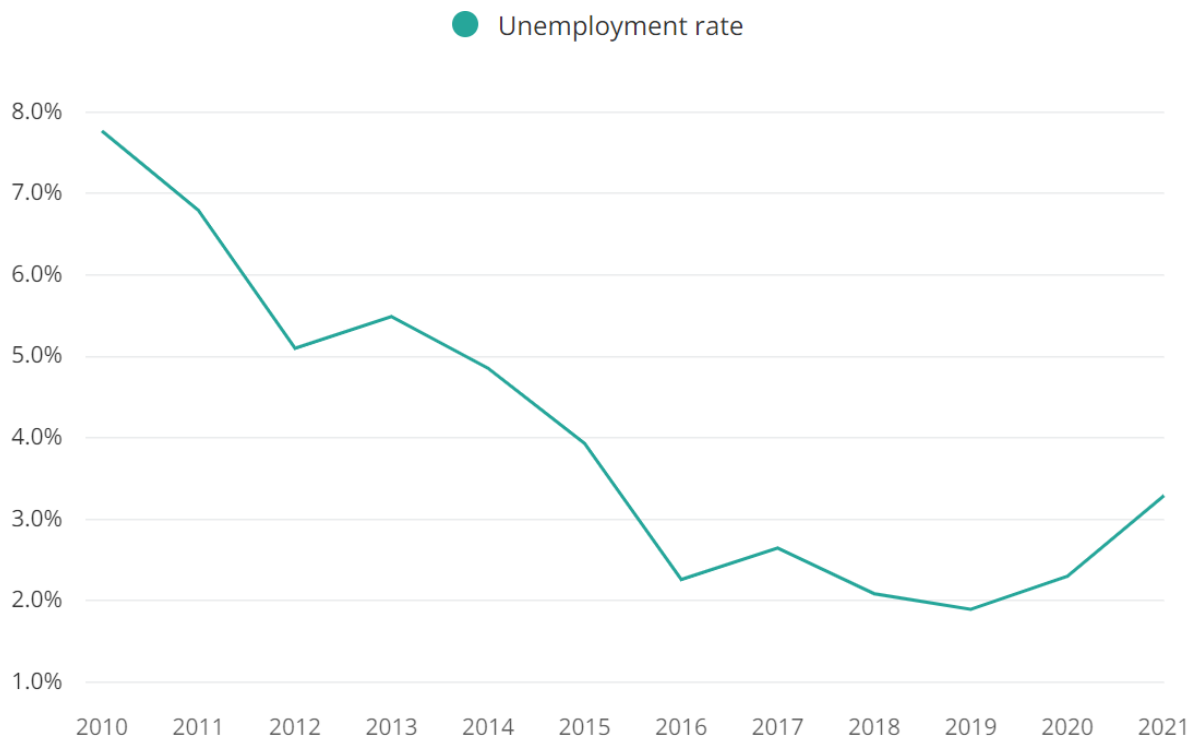
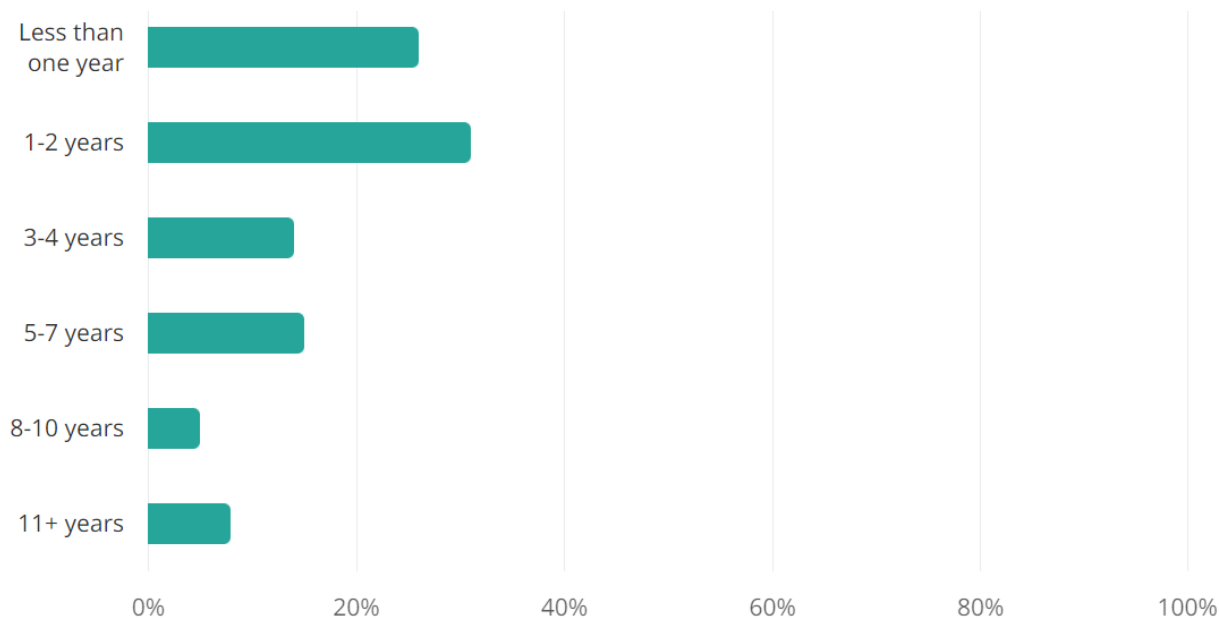


Figure 12 – Employment tenure of medical coders



The demographic data echoes some of the business challenges that are summarized in the industry overview.

- Medical coding unemployment is much lower than in other industry sectors, indicating the high-demand nature of the market.
- High turnover in the medical coding workforce brings significant challenges to employers in terms of employee training and retention. High turnover may also reveal a root cause of why the error rate is high in the medical coding process.

The Bureau of Labor Statistics forecasts that jobs for medical billers and coders will increase by about 9% between 2020 and 2030, adding about 37,000 jobs in that time. This is in line with average job growth. ² The hourly and average annual salary for coders and billers will vary by state, region, and city, with an industry mean of \$22.68 an hour.

Medical Coding Offshore

Medical coding offshore has been a trend in the past. American Health Information Management Association published a study 9 years ago regarding this: The Good, Bad, and Reality of Offshore Coding: Some Turn to Distant Shores to Fill US Coding Demands. The move to ICD-10 carries a projected 20-40% increase in coding labor requirements, with peak hiring occurring in the second and third quarters of 2013, along with the first quarter of 2014. Virtually every US outsourcing coding company both large and small built their own overseas coding center or partnered with an existing center to meet productivity demand. India has been the hub of most offshore clinical coding. However, the Philippines, Central America, and the

United Arab Emirates (UAE) are also rapidly building coding teams, enhancing technology, and vying for US partnerships. The race to secure certified coders or ancillary health professionals who can be trained in clinical coding is on. Now cities within India, such as Hyderabad and Visakhapatnam, compete for certified coders. However, given the backlash of poor coding quality, communication, and other business challenges, there has been a significant pullback from using overseas coders. AHMIA has discontinued its medical coding certification in a dozen countries.^{3, 4, 5}

Generally speaking, these are the concerns raised by the industry about overseas coding:

- Quality control
- Language barrier
- Time zone difference
- Patient privacy and security
- Cultural difference
- Claim denial
- Overall productivity

Some research shows that offshore medical coders average 10 more denied claims per week than domestic coders.⁶ These denied claims then need to be reworked and the coder needs to be retrained on the errors. All of this takes time and reduces the cost benefits of offshore medical coding options.

Another risk of using offshore medical coders is upcoding. Upcoding is fraudulent medical billing in which a bill sent for a health service is more expensive than it should have been based on the service that was performed. An upcoded bill can be sent to any payer—whether a private health insurer, Medicaid, Medicare, or the patient. It not only increases the cost for the hospital or health system, but also damage the reputation of the institution.

There is no official count as to how many overseas coders still exist today. A February 2018 article in The Boston Globe cites a survey by a "health information professional association" that reported 25 out of 400 hospitals surveyed were offshoring their coding.⁷

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1. [Medical Biller Coder Demographics and Statistics \[2023\]: Number Of Medical Biller Coders In The US \(zipppia.com\)](#)
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Competitive Landscape

RCM Vendors

Firm Name	HQ State	Public/Private	EST. Revenue	Vertical Comments
3M Company	MN	Public	\$34.22B	3M has a strong foundation as a medical coding leader and innovator. Their AI and natural language understanding (NLU) technology is guided by more than 35 years of industry expertise. They provide comprehensive coding, compliance, and outsourcing services.
Accuity Healthcare	NJ	Private	\$107M	Accuity is a firm that focuses on tech-enabled, physician-led clinical documentation review services for hospitals, leading to higher-quality clinical documentation and accurate, compliant coding.
AGS Health	Washington D.C.	Private	\$150M	AGS provides both RCM solution and medical coding services.
Dolbey Systems Inc.	OH	Private	\$13.5M	Dictation and Revenue Cycle
Finthrive	TX	Private	N/A	Developed an end-to-end revenue cycle management platform designed for health systems, hospitals, ambulatory surgery centers, and physicians. The company's platform provides a one-stop solution using end-to-end, integrated pre-and post-adjudication workflow tools that offer revenue cycle management, point of sale collection, charge integrity solutions, health care recovery and collections and billing management.
Iodine Software	TX	Private	\$43M	Investment from Advent International, one of the largest and most experienced global private equity investors. Advent acquired a significant stake in Iodine in a transaction that values the business at over \$1 billion. Bain Capital Ventures and Silversmith Capital Partners, which invested in the Company in 2018, will remain shareholders

Nuance	MA	Public	\$1.4B	Acquired by Microsoft. Nuance Medical Coding and Compliance Solutions offers web-based, enterprise-wide products and services designed to improve coder productivity and maintain the highest levels of accuracy and compliance. Nuance ranked #1 in 2022 by BlackRock for its leadership in end-to-end coding for the tenth consecutive year.
Optum	MN	Public	\$226B	Optum Revenue Cycle Management is a division of the Optum conglomerate.
R1 RCM	UT	Public (NASDAQ: RCM)	\$2.2B	Revenue cycle management company servicing hospitals, health systems, and physician groups across the United States
WayStar	KY	Private	\$220M	Waystar was founded in 2017 by the merger of two RCM leaders, Navicure and ZirMed. The company helps healthcare organizations simplify healthcare payments across the complete revenue cycle. Its RCM solution automates manual work, empowering you to gain insight into processes and performance and ultimately collect more revenue.
TruBridge	GA	Private	\$340M	TruBridge is a healthcare services company based in Mobile, Alabama, that provides a variety of revenue cycle management products and services to healthcare organizations of all sizes.

Medical Coding Outsourcing

Firm Name	HQ State	Public/Private	EST. Revenue	Vertical Comments
3M Company	MN	Public	\$34.22B	3M has a strong foundation as a medical coding leader and innovator. Their (AI) and natural language understanding (NLU) technology is guided by more than 35 years of industry expertise. They provide comprehensive coding, compliance, and outsource services.
Aviacode Inc.	India	N/A	\$165M	Owned by GeBBS company. India based. It provides both RCM solutions and risk-adjusted medical coding services.
Change Healthcare	TN	NA	\$3.48B	Acquired by Optum.
Guidehouse	Washington D.C.	Private		Guidehouse was founded in 2018 when PwC sold off its public sector consulting arm to private equity firm Veritas Capital. Guidehouse offers consulting services in different areas, including financial management, business intelligence, and more. The firm provides comprehensive RCM outsourcing, extended business office solutions, and revenue cycle consulting.
KODE Health	MI	Private	> \$10M	KODE connects healthcare providers to the largest community of medical coding professionals. Its gig economy workplace provides high-quality US-based certified medical coders to meet any coding need that arises in a hospital or a health system, providing a flexible and valuable solution to a variable problem and need.

Maxim Healthcare Staffing	MD	Private	\$55M	Maxim Health Services, Inc. operates as a subsidiary of Maxim Healthcare Services, established in 1988. It provides coding & auditing solutions and health information services to healthcare providers. The company also provides auditing & review services, online medical coding support, and education & training services.
Medical Record Associates	MA	Private	\$13M	Acquired by GeBBS
Oracle Billing, Coding and Consulting	UT	Public	\$49B	Oracle Billing, Coding, and Consulting is a full-service consulting company that provides home health post-acute consulting services for care providers.
Precyse Solutions LLC	PA	Private	\$36M	The Company offers medical transcription, clinical coding, oncology data management, HIM consulting, interim management, and departmental outsourcing services.
Trizetto	CO	N/A	\$55M	TriZetto Provider Solutions aims to simplify the business of healthcare. By combining intuitive products and customer-focused services with in-depth industry knowledge, they provide complete revenue cycle management services. TriZetto is owned by Cognizant, an Indian Consulting firm.

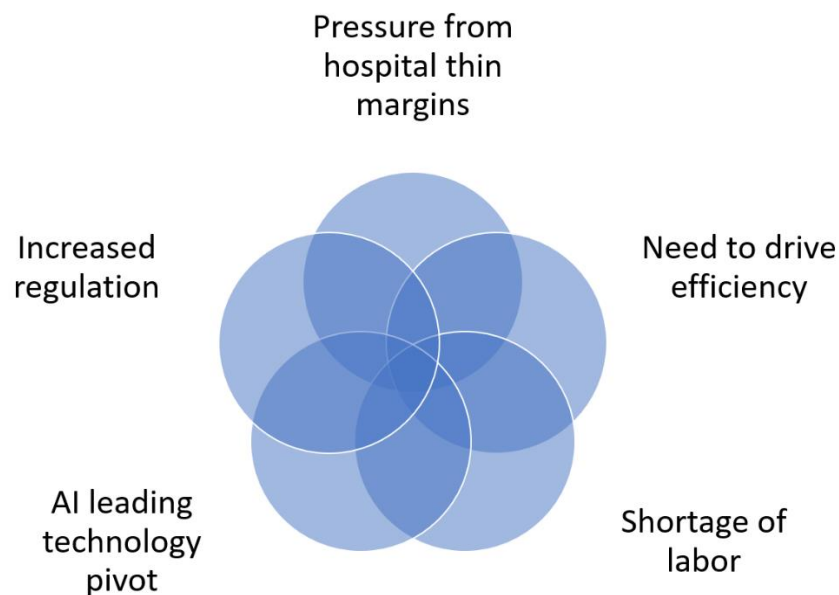
New Challengers and Disruptors

Firm Name	HQ State	Public/Private	EST. Revenue	Vertical Comments
BUDDY.AI	NY	Private	< \$5M	BUDDI.AI is the leading provider of clinical and revenue cycle automation solutions for healthcare. Our platform leverages artificial intelligence and deep learning to drive better clinical and financial outcomes for providers, payers, patients, and everyone in-between.
CodaMetrix	MA	Private	< \$10M	CodaMetrix is reducing the cost of care with its AI-based autonomous medical coding platform, which bolsters both quality and efficiency. Funded by First Cressey Ventures, SignalFire, Martin Ventures, and Yale Medicine. The solution was born at Mass General Hospital. It focuses on mid-cycle of the charge capture, coding, and submission.
Fathom Health	CA	Private	\$11M	Fathom operates a medical coding automation platform. The platform uses deep learning to read, structure, and understand electronic health records. It was founded in 2015 and is based in San Francisco, California. Raised \$60M in total.
Maverick Medical AI	Israel	Private	< \$10M	Maverick Medical AI streamlines medical coding for healthcare organizations by automating the process with its personalized autonomous solution, resulting in decreased operational expenses, reduced denials, and increased direct-to-bill percentage. The Company closed a \$5M seed round in 2022. The round was led by venture capital funds Lionbird and Firsttime Ventures.

Nym Health	Israel	Private	\$62M	Nym transforms revenue cycle management by fully automating the medical coding process. The engine deciphers clinical language in patient charts and accurately assigns medical codes in seconds and with no human intervention. Nym is funded by ADDITION, Bessemer Venture, Dynamic Loop Capital, GI, and Tiger Global. Total funding \$47M.
Synaptec Health	CA	Private	< \$10M	Synaptec Health's proprietary AI-driven solution goes beyond human capabilities to deliver unprecedented accuracy in medical coding. Synaptec Health's AI-powered solution ensures 100% of encounters are coded accurately, including complex cases and all E/M, CPT, ICD10, modifier, and MIPS codes.
Suki	CA	Private	\$25M	Suki is well funded by Venrock, FirstRound, Flare Capital, Breyer Capital, March Capital and Phillips Venture. It is a Gen-AI enabled platform aiming to ease the administrative burdens of clinicians. This includes a new solution in medical coding.
XpertDox	AL	Private	<\$5M	XpertCoding is an AI-powered medical coding solution that leverages advanced AI, natural language processing (NLP), and machine learning algorithms to automatically code medical claims within 24 hours. By streamlining the coding process, XpertCoding enables faster claims submissions with unparalleled accuracy, resulting in maximized financial gains for clients.

Investment Thesis

There are five major business drivers that will lead significant innovation and investment opportunities in the medical coding space.



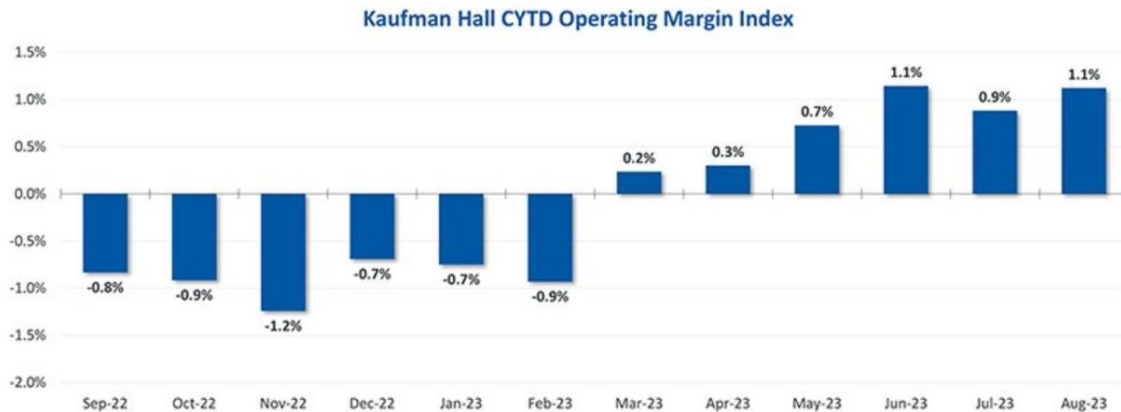
Pressure from thin hospital margins

Hospitals managed to snap an 11-month streak of negative operating margins in December 2023, though the turnaround is little consolation to a sector that weathered “the worst financial year since the start of the pandemic,” Kaufman Hall wrote in its 2023 National Hospital Flash Report.¹

Hospitals had entered 2022 in the midst of an omicron surge that pushed the advisory firm’s industrywide operating margin index measure down to -3.4% and -3.5% in January and February, respectively.

Returning volumes and gradual easing of the “competitive” labor market helped hospitals recover over the course of the year, Kaufman Hall wrote, culminating in December as the hospitals finally broke into the black with a 0.2% operating margin index.

Still, “prolonged” expense increases and nearly a full year of operational losses left “approximately half” of the country’s hospitals to end 2022 with a negative margin, per the report.



Need to drive hospital efficiency

Chief Healthcare Executive conducted survey and concluded how CEOs can ensure their health systems survive and thrive in the current climate². Several CEO priorities were identified.

1. Optimize existing operations and key processes to create efficiency.
2. Focus on engaging employees and clinicians to drive retention and satisfaction.
3. Be brutally honest about what technology adds value to your organization.
4. Build strength and brand in your organization's core services by emphasizing competency and reputation of those delivering the care.

Clearly, efficiency drives hospital operating margins. Cost savings have more direct impact to hospital operating margin than an increased patient volume.

Medical coding industry is notoriously known for extensive and repetitive manual work. There is a huge room for technology-driven efficiency improvement, which can bring a positive impact to the hospital bottom line.

Shortage of Skilled Labor

Today, medical coding depends on trained and certified coding specialists. In the current US healthcare industry, a medical coding job is being touted as one of the best employment options. As per the industry reports, if you are a certified coder, you can earn up to \$7,000 more than a non-certified coder. However, certification isn't the only requisite for a good package. Providers are looking for the right mix of skills in a coder, with top-notch coding skills being just the tip of the iceberg.

- Coders are required to follow the specified rules and guidelines, communicate and work in coordination with various disciplines, and have necessary data analytics skills.
- They will have to have the required credentials because that is what signifies a coder's dedication to the profession.
- If a coder has coding credentials, he or she will be required to continue maintaining their education credits and remain up to date with changes in the industry.

- Right education and some formal training into anatomy, physiology and other aspects will also be required if coders wish to get paid really well.

The Healthcare Financial Management Association conducted a survey on hospital workforce. 50% of CFO expressed their worries about not being able to hire skilled workers for revenue cycle and medical billing.³ Another survey found that 73% of medical practices list staffing as their biggest pandemic challenge and is the #1 concern for provider CEOs. Yet, over the next decade, it's expected that there will be more than 27,000 vacant positions annually, a figure that includes both newly created jobs and existing positions left by workers who move to new roles or retire.⁴

Other workforce challenges:

- Burnout
- Quiet Quitting
- Employee engagement and satisfaction
- Employee retention

AI Leading Technology Pivot

Artificial Intelligence and Machine Learning are sweeping fundamental changes across all aspects of the healthcare industry, including medical coding and billing. Generative AI based on large language models can better understand human languages, contexts, emotions, and sentiments. It is conceivable that the technology behind AI solutions for medical billing involves the integration of Machine Learning (ML) and Natural Language Processing (NLP). AI-powered medical billing integrates with the existing billing process, reducing the need for manual input and making the billing process faster and more accurate. Although AI-powered medical billing has its potential promise, the algorithm has challenges of handling complex medical procedures. Currently, this technology is mostly used in the outpatient settings.

Areas of opportunities:

- Streamlining the coding process
- Reduce errors, which will lead to fewer denials
- Detect fraudulent billing based on targeted algorithms
- Automating the billing and revenue management cycle

Increased Regulations

The medical coding industry will likely only see more, not less, regulatory changes. Some trends that impact the medical coding regulations:

- The COVID pandemic
- New medical innovation, robotic surgeries, and clinical procedures
- New clinical trials and drugs
- Genetic laboratory testing
- Genome research and treatment

References

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2. [How CEOs can ensure their health systems survive and thrive in the current climate](#)
3. [HFMA survey](#)
4. [Top Trends & Statistics in Medical Billing](#)

Investment Risks

While the medical coding industry holds great potential for innovation and transformation, investment in this sector is not without its risks and concerns.

Firstly, intensifying competition is a notable concern. The competitive landscape reveals the presence of numerous AI-based technology firms striving to disrupt the field. To establish a stronghold in this space, a company must deliver a product with distinctive performance, effectively addressing coding complexity, enhancing accuracy, and ensuring user-friendly interfaces—qualities imperative in the realm of healthcare technology.

Secondly, any medical coding product invariably requires integration with existing Electronic Health Record (EHR) platforms. This integration process, often time-consuming, poses a potential hindrance to achieving swift market entry. Large-scale EHR companies may contemplate in-house innovation versus collaboration with smaller third-party vendors, further complicating the decision-making process.

Thirdly, the sale of healthcare solutions to hospitals entails a protracted sales cycle, particularly in today's competitive economic landscape. Chief Financial Officers emerge as pivotal decision-makers for new medical billing solutions. Directly targeting these individuals and presenting a compelling value proposition proves to be a formidable challenge for market entrants.

Fourthly, the Total Addressable Market (TAM) for the U.S. hospital segment remains constrained, with only 6,100 hospitals nationwide. To expand this market, consideration of applications in ambulatory care, nursing homes, long-term care, or home care could significantly enlarge the TAM.

Lastly, industry reports from Pitchbook suggest that the venture capital (VC) industry faces challenges in enhancing the value of its portfolios and identifying viable market exits through IPOs or mergers and acquisitions ². Certain segments of the digital health market appear ripe for consolidation.

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1. [Fast Facts on U.S. Hospitals, 2023 | AHA](#)
2. [38% of VCs disappeared from dealmaking in 2023 | PitchBook](#)



FCA Venture Partners is a venture capital firm investing in early-stage healthcare technology and technology-enabled healthcare services companies that improve patient care, reduce costs, and increase efficiency. FCA manages over \$250M and invests across the Series Seed to Series B stages. Our firm brings portfolio companies valuable healthcare insights, connections, and board-level experience to accelerate growth and build disruptive and sustainable businesses. Based in Nashville, the epicenter of healthcare innovation, with a strategic network in Charlotte and Winston-Salem, NC, our team has a decades-long track record including more than 60 investments in the rapidly changing healthcare industry.