

RADIOLOGY MANAGEMENT

July/August 2025
volume 47 number 4

The Journal of AHRA: The Association for Medical Imaging Management

The History of Radiology Information Systems (RIS)

Randall Swearingen



To AI or Not to AI? That Is the Question. (Or Is It?)

Jeffrey M. Bundy, Terrence Chen, and Krista K. Stein



Sneaux Down South: A Frozen Bayou

Kernesha Weatherly

Remote Scanning Is Here to Stay—Now What?

Amy Peronace and Geryl Fernandez

Autonomous Coding is Revolutionizing the Revenue Cycle: What Radiology Leaders Need to Know

Stacie L. Buck





Autonomous Coding is Revolutionizing the Revenue Cycle: What Radiology Leaders Need to Know

By Stacie L. Buck, RHIA, CCS-P, CPCO, CCC, CIRCC, RCC, RCCIR

It's nearly impossible to turn on or read the news without hearing a story about artificial intelligence (AI). While it seems like it's a completely new technology, in fact, we have been co-existing with bots for many years using automated systems, interacting with chat bots when contacting customer service departments, and, of course, communicating with some of the most well-known AI personalities, Siri and Alexa.

AI technology is reshaping the landscape of many industries, and it's poised to have a significant impact on the health-care industry. AI solutions are already being deployed throughout many areas of the revenue cycle including patient scheduling and registration, eligibility verification, charge capture, claims and denial management, payment collection, patient communication, and, of course, medical coding and billing.

Autonomous medical coding is more than just a buzzword; it's a transformative technology that's redefining revenue cycle operations. But what exactly *is* autonomous coding, and how can it revolutionize radiology coding? In this column, we break down the basics, explain how the technology works, and outline what every radiology leader should know about this latest transformative technology.

What is Autonomous Coding and How Does It Work?

Over the past two decades, much of the medical coding has been performed using computer assisted coding (CAC) technology. CAC is an early form of AI primarily using natural language processing (NLP) to assign CPT, ICD-10-CM, and HCPCS codes to encounters. While the use of CAC continues to be extensive, the rate of growth is significantly declining. Productivity improvements using this older-generation technology have peaked at around 30%. Autonomous coding solutions significantly outperform CAC and are now positioned to replace CAC technology.

Autonomous medical coding is the process of assigning CPT, ICD-10-CM, and HCPCS to clinical documentation without human intervention by using new-generation AI. Unlike traditional coding systems, such as CAC, that suggest codes for a human to review, autonomous coding systems not only can read medical reports, but can understand the clinical context and assign all necessary codes automatically.

To make this possible, autonomous medical coding leverages advanced AI technologies, combining machine learning (ML), deep learning (DL),

and transformer-based technology to accurately assign codes without human intervention. Transformer models, a breakthrough in NLP, are effective in interpreting unstructured radiology reports and delivering highly accurate coding results, allowing claims to go direct-to-bill without any human intervention.

ML enables the system to learn from structured historical data, while DL uses multilayered neural networks mimicking human thought processes, allowing the model to identify complex patterns in clinical narratives. Transformer models make the system smarter by helping it understand the context of entire medical reports, not just individual words, as with basic NLP technology. These transformer models can determine how different parts of the report relate to each other, enabling the coding engine to better understand complex medical language and to assign the correct CPT, ICD-10-CM, and HCPCS codes.

Why Should Radiology Leaders Rethink Traditional Coding Workflows?

Regardless of setting, whether a hospital-based radiology department or freestanding imaging center, thanks to the

Key Technologies in Autonomous Coding	
Term	Definition
Artificial Intelligence (AI)	The broad field of computer science focused on creating systems that can perform tasks typically requiring human intelligence, such as decision-making, pattern recognition, and problem-solving.
Machine Learning (ML)	A subset of AI that enables computers to learn from data and improve their performance over time without being explicitly programmed for every task.
Deep Learning (DL)	A specialized type of machine learning that uses layered neural networks to analyze complex patterns in large datasets, which is especially effective for image and language processing.
Natural Language Processing (NLP)	A field within AI that enables computers to understand, interpret, and generate human language from unstructured text, such as clinical notes or radiology reports.
Transformer Technology	An advanced deep learning model used in NLP that understands the context and relationships between words across entire documents, enabling highly accurate interpretation of unstructured text.

advanced technology behind autonomous coding platforms, radiology reports can be coded in just seconds with a high degree of accuracy. As a result, a minimum of 85% of claims can go directly to billing without human review, boosting productivity, reducing delays, and accelerating revenue collection.

Autonomous coding offers significant benefits for radiology departments within the hospital setting by addressing longstanding challenges tied to billing for radiology exams based on the facility charge description master (CDM). The CDM-driven process often relies on generic exam descriptions and RIS inputs that may not align with the radiologist's final report, leading to coding inaccuracies and possibly revenue leakage.

In many hospital settings and even in some free-standing settings, CPT codes are automatically generated from the information entered into the radiology information system (RIS) prior to the exam being performed, which often does not consider the full narrative in the radiologist's report. This can result in either undercoding or upcoding, causing either underpayments or overpayments when documentation in the report does not match the CPT code assigned from the

RIS. An autonomous coding platform can identify these types of mismatches and route them to a coder for review. Encounters can even be sent directly to the radiologist when an addendum is needed. This is a critical step for submitting an accurate and clean claim.

Additionally, in the hospital setting, often diagnosis codes are assigned outside of the radiology department by a medical coder in health information management (HIM). The coding, in this scenario, is based solely on the indications provided by the referring physician on a test order, which may not reflect the complete clinical picture or final findings.

These disconnections between procedure and diagnosis documentation increase the risk of denials and compliance issues. Autonomous coding resolves these inconsistencies leading to improved billing accuracy, reduced compliance risk, and enhanced revenue integrity. Ultimately this advanced technology enhances the radiology department's contribution to the hospital's overall revenue cycle.

Conclusion

As AI continues to reshape healthcare, autonomous coding stands out as one

of the most impactful advancements in the radiology revenue cycle. By leveraging technologies like machine learning, deep learning, and transformer models, autonomous coding platforms deliver unmatched speed and accuracy, eliminating many of the inefficiencies and risks that have long plagued traditional coding workflows. Whether it's reducing claim denials, closing documentation gaps, or increasing coder productivity, the benefits are both immediate and long-term.

For radiology leaders, understanding and embracing this technology is not just about keeping pace with innovation; it's about positioning their departments for greater financial performance, compliance, and sustainability in a rapidly evolving healthcare environment. The future of radiology coding is here, and those who act now will lead the way forward. 🚀

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