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Accelerating RCM with AI Breakthroughs

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Contents + Appendices

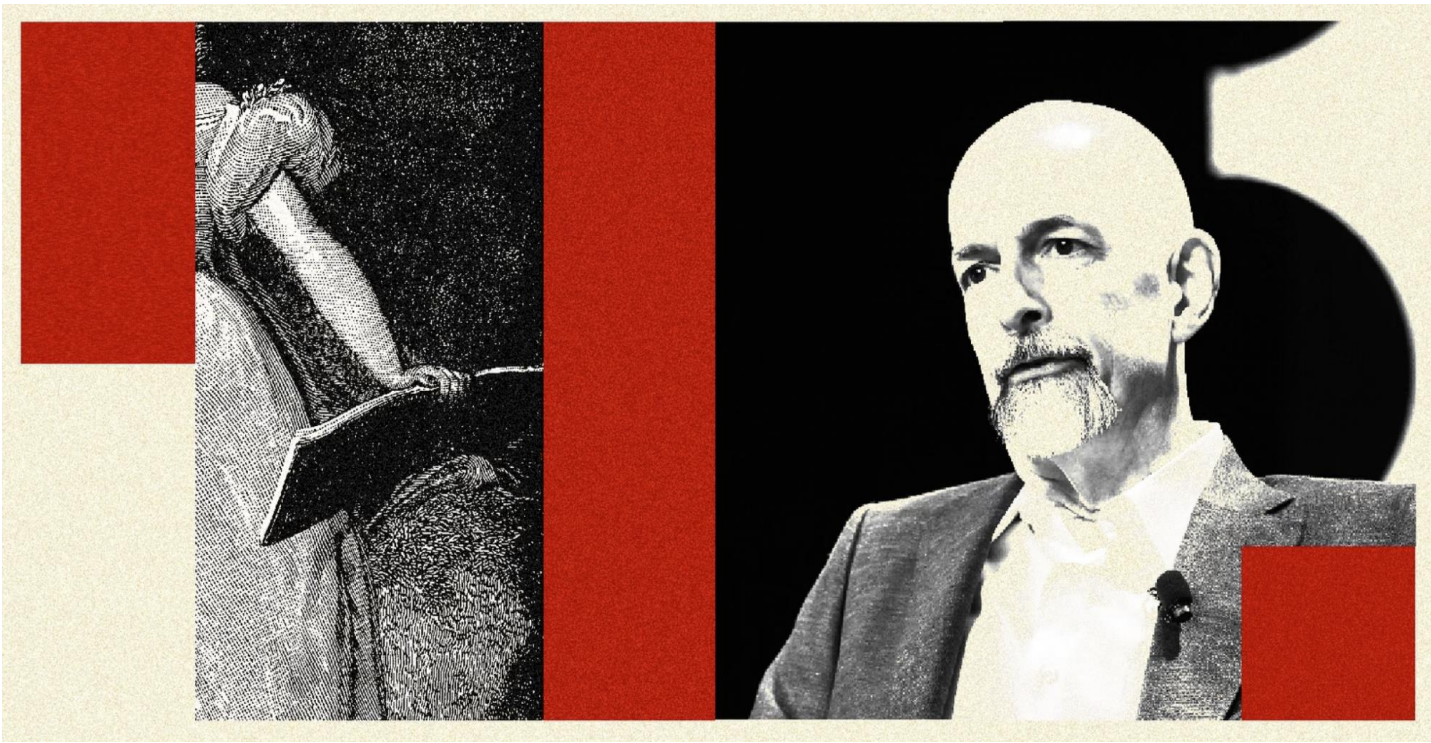
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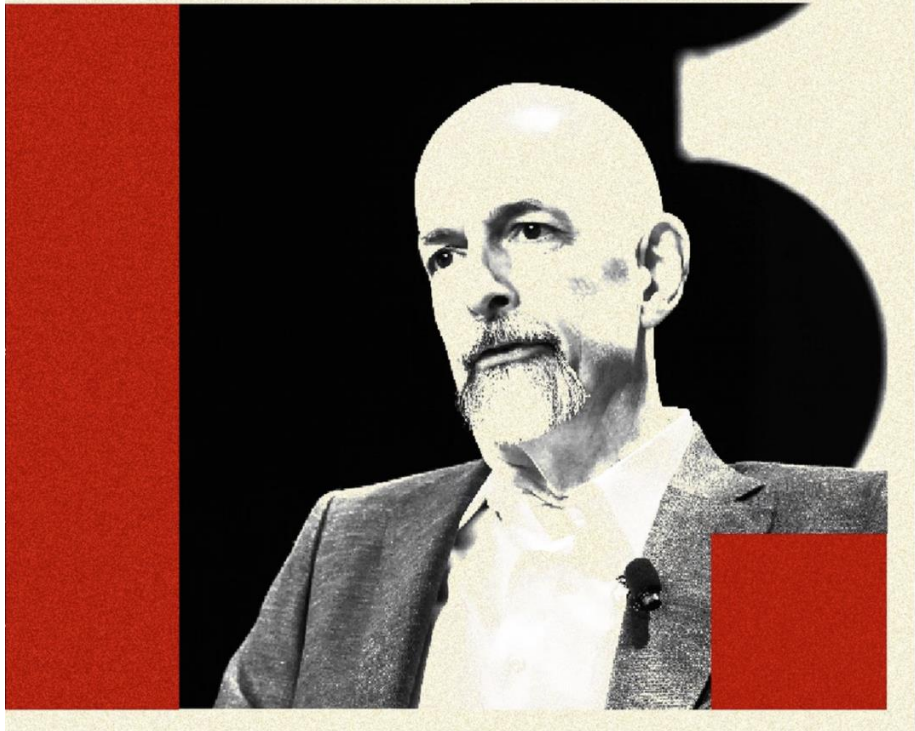


Speculative novels have an impressive track record of prophesying what innovations are to come, and how they might upend the world.

Perhaps no writer has been more clairvoyant about our current technological age than Neal Stephenson. For example, his novels coined the term *metaverse*, ...[and] laid the conceptual groundwork for cryptocurrency.

1. Wong, Matteo, [Atlantic](#), "Neal Stephenson's Most Stunning Prediction," 06 Feb 2024.





And, nearly three decades before the release of ChatGPT, he presaged the current AI revolution. But Stephenson is far more pessimistic about today's AI than he was about the metaverse. *“A chatbot is not an oracle, it's a statistics engine that creates sentences that sound accurate.”*

2. Wong, *Op cit.*



So, What Is Artificial Intelligence?

1. Fuzzy model of the Internet?
2. Fairly-straightforward autocorrection algorithm?
3. Coherent text from the “statistics of conventional wisdom?”
4. “Stochastic parrot?” [Randomly determined; having a random probability distribution or pattern that may be analyzed statistically but may not be predicted precisely]



So, What Is Artificial Intelligence? (cont'd)

5. System that seeks the underlying logic of its training data? [The bigger the dataset, the more-general the rules it will discover]
6. Combination of computer-processing abilities to produce insights and analytics, at or above human capability?
 - a. Cognitive automation
 - b. Machine learning
 - c. Reasoning
 - d. Hypothesis generation and analysis
 - e. Natural language processing
 - f. Intentional algorithm mutation



Defining AI in RCM Is Difficult

- “AI” is used as an umbrella term for several more-specific technologies
- Although many RCM vendors say they provide AI-powered solutions, this doesn’t necessarily tell prospects what these technologies do
- The “big three” established AI technologies associated with RCM are:
 - **Robotic Process Automation (RPA)**: Uses structured data to replace manual functions
 - **Machine Learning (ML)**: Ingests unstructured data and generates insights
 - **Natural Language Processing (NLP)**: Allows computers to understand written, spoken, or even scribbled human language
- Since ChatGPT, many people don’t consider these tools to be “true AI”



Defining AI in RCM Is Difficult (cont'd)

- **Generative Large Language Models (LLMs):** Vendors of “AI-driven” RCM solutions often call them “Artificial Intelligence,” although the solutions are really using RPA, ML, and NLP-augmented ML
- The miraculous advances of generative AI, as showcased by ChatGPT, have yet to deeply and/or widely-penetrate the RCM world
 - Gen AI isn’t yet performing the miracles for RCM that it can for a student writing a term paper
 - Healthcare RCM is far more complicated, and carries major compliance and privacy exposure risks – and penalties
- Nevertheless, RCM LLMs are coming, and we must be prepared

3. Eramo, Lisa A., [hfm](#), “How AI is About to Change Healthcare,” 01 Oct 2023.



How “Traditional” AI in RCM Reduces Costs

- **Traditional AI:** AI that powers eligibility, estimates, authorizations, and AR recovery is “traditional AI,” an AI subset known as “machine learning (ML)”⁴
- **Problem-solving AI:** Also known as “problem-solving AI,” it accesses large datasets to identify patterns and execute specific tasks:
 - It can make predictions or decisions without being explicitly programmed
 - Its decisions are based on human-defined rules (algorithms)
- **Powerful + Persistent:**
 - Traditional AI can often detect patterns missed by RCM professionals
 - Traditional AI has long been achieving results for healthcare RCM

4. Delzio, Suzanne, MDClarity Blog: <https://www.mdclarity.com/blog/ai-revenue-cycle-management>, “AI in RCM: How Generative and Traditional AI Improve Revenue Cycle Management,” 20 Nov 2023.



How “Traditional” AI in RCM Reduces Costs

- Use of AI + ML with automation is helping healthcare organizations cut labor costs and reduce prior-auth and claims denials, improving net revenue
- McKinsey & Co.⁵ asserts that, by using AI + ML, US healthcare overall could cut \$200 to \$360 billion in (mostly) administrative costs
- An Institute for Robotic Process Information and Artificial Intelligence study quoted in a KPMG analysis⁶ claims AI + ML can create 25 - 50% cost savings
- Physician, hospital, and healthcare system case studies touting savings after using AI + ML + automation are on nearly every RCM company’s website

5. Baxi, Sanjiv, Sagar Parikh, Michael Peterson, and Andrew Ray, McKinsey & Company blog, “Setting the Revenue Cycle Up for Success in Automation and AI,” 25 Jul 2023

6. Bismark, Alain and Almeida Diaz, KPMG White Paper, “Bots in the Rev Cycle: Hospitals Increase Revenue Recovery with Robotic Process Automation,” ©2017.



Artificial Intelligence (AI) + Machine Learning (ML) Trends

- 1. Automation of Administrative Tasks:** AI + ML are being used to automate administrative tasks like patient registration, appointment scheduling, and insurance verification. This reduces errors, streamlines processes, and improves RCM efficiency
- 2. Predictive Analytics for Denial Management:** ML algorithms are used to predict and prevent claim denials by analyzing historical data, payer patterns, and claim submission practices. This helps providers reduce revenue leakage
- 3. Patient Payment Optimization:** AI-driven tools are employed to predict patient payment behavior and tailor payment plans accordingly. AI uses internal and external patient data to suggest an optimal approach for collecting self-pay balances



AI + ML Trends (cont'd)

4. **Enhanced Coding Accuracy:** ML algorithms are used to improve medical-coding accuracy by suggesting appropriate codes based on medical records and documentation. This potentially reduces coding errors and helps ensure accurate billing
5. **AI-Enhanced Revenue Integrity:** AI systems are used to audit medical claims for compliance and accuracy. This helps ensure that providers bill for services that were actually rendered, reducing the risk of fraud and non-compliance
6. **Telehealth Billing:** As telehealth expanded during and after the pandemic, AI-powered RCM systems helped providers navigate the complex virtual-care billing and reimbursement landscape



AI + ML Trends (cont'd)

- 7. Integration with Electronic Health Records (EHRs):** AI + ML play a role in optimizing seamless integration between RCM and EHR systems. This helps ensure that patient data are accurately captured and claims are processed efficiently
- 8. Price Transparency Compliance:** AI tools are used to help providers comply with price transparency regulations by calculating and displaying the cost of services to patients before they are rendered
- 9. Fraud Detection and Prevention:** Machine learning algorithms are employed to detect fraudulent claims and billing activities, helping healthcare organizations avoid legal issues and financial losses. To minimize denials, this can mirror payers' systems



AI + ML Trends (cont'd)

- 10. Streamlined Prior Authorization:** AI-driven tools help streamline the prior authorization process by analyzing patient data, historical records, and payer requirements to expedite approvals and reduce delays
- 11. Natural Language Processing (NLP) for Documentation:** NLP technologies are used to extract valuable information from unstructured clinical documentation, improving coding accuracy and ensuring that all billable services are captured
- 12. Data Security and Privacy:** As healthcare organizations handle sensitive patient data, AI is used to enhance cybersecurity, detect breaches, and ensure compliance with data privacy regulations like HIPAA



Functions Where AI is Used in Healthcare RCM

- 1. Claims Processing and Denial Management:** AI algorithms can review and process claims data, identifying errors or missing information that could lead to claim denials. They can also analyze historical data to predict the likelihood of claims being denied, allowing for proactive measures to prevent denials.
- 2. Automated Coding and Documentation:** AI-powered systems can assist medical coders by analyzing clinical documentation and suggesting appropriate medical codes for diagnoses and procedures. This helps reduce errors and ensures accurate coding, which is crucial for proper reimbursement.



Functions Where AI is Used in Healthcare RCM

- 3. Prior Authorization Optimization:** AI can analyze patient data and insurance policies to determine the likelihood of obtaining prior authorization for procedures or treatments. This can speed up the authorization process and minimize delays in patient care.
- 4. Billing and Payment Predictions:** AI models can predict patient payment behaviors based on historical data, helping healthcare organizations optimize billing strategies and anticipate potential delays in payment.



Functions Where AI is Used in Healthcare RCM (cont'd)

- 5. Patient Eligibility Verification:** AI systems can verify patient insurance eligibility in real-time, reducing the chances of denied claims due to eligibility issues.
- 6. Fraud Detection and Prevention:** AI can identify patterns of fraudulent activities by analyzing claims data and detecting anomalies. This helps prevent fraudulent claims from being processed and improves overall revenue integrity.
- 7. Revenue Leakage Prevention:** AI can assist in identifying instances of revenue leakage, such as underbilling or missed charges, by analyzing billing and claims data.



Functions Where AI is Used in Healthcare RCM (cont'd)

- 8. Automation of Routine Tasks:** AI-powered bots and virtual assistants can handle routine tasks, such as appointment scheduling, appointment reminders, and follow-up communications with patients regarding billing and payments.
- 9. Predictive Analytics for Payment Trends:** AI models can analyze historical payment data and patient behavior to predict payment trends, helping organizations allocate resources effectively and plan for potential revenue shortfalls.



Functions Where AI is Used in Healthcare RCM (cont'd)

- 10. Data Analytics for Performance Improvement:** AI can provide insights into RCM performance by analyzing data from various sources, helping healthcare organizations identify areas for improvement and optimizing processes.
- 11. Financial Counseling:** AI can assist in providing patients with personalized financial counseling based on their insurance coverage, treatment plans, and payment options.
- 12. Workflow Optimization:** AI can analyze workflows within the RCM process and suggest improvements to streamline operations, reduce inefficiencies, and enhance overall revenue capture.



Functions Where AI is Used in Healthcare RCM (cont'd)

- 13. Natural Language Processing (NLP) for Documentation:** NLP-powered AI can extract relevant information from clinical documentation, such as patient charts and medical notes, to ensure accurate coding and billing.
- 14. Price Transparency:** AI can assist in providing patients with accurate cost estimates for procedures and treatments, enhancing transparency in healthcare pricing.



Drawbacks and Challenges of AI + ML Use in RCM

- 1. Data Quality and Standardization:** AI + ML algorithms require high-quality, standardized data for accurate predictions and decision-making. In healthcare, data can be fragmented and of varying quality, which can lead to inaccuracies in RCM (and clinical) processes
- 2. Privacy and Security Concerns:** Healthcare data is sensitive and subject to strict privacy regulations. Implementing AI + ML solutions requires robust security measures to protect patient information. Breaches can cause significant legal and financial consequences
- 3. Implementation Costs:** Integrating AI + ML into existing systems is expensive. To do so, providers may need to invest in new technology, staff training, and ongoing maintenance, which can strain budgets



Drawbacks & Challenges of AI + ML Use in RCM (cont'd)

- 4. Interoperability Issues:** Ensuring seamless integration between AI + ML solutions and existing EHR systems and RCM platforms can be challenging. Lack of interoperability can hinder the effectiveness of these technologies.
- 5. Bias and Fairness:** AI + ML algorithms can inherit biases from historical data, which can result in unfair treatment of certain patient populations. Ensuring algorithmic fairness and avoiding discrimination is a complex challenge in healthcare RCM.
- 6. Regulatory Compliance:** Healthcare is heavily regulated, and AI + ML applications must comply with various regulations and standards. Complying with regulatory evolution can be a significant hurdle.



Drawbacks & Challenges of AI + ML Use in RCM (cont'd)

- 7. Provider Resistance:** Providers may resist adopting AI + ML solutions due to concerns about job displacement or mistrust of algorithmic decision-making. Convincing doctors, nurses, and allied care professionals to embrace these technologies can be a challenge.
- 8. Lack of “Explainability:”** Many AI + ML algorithms seem like “black boxes” that provide seemingly-accurate predictions, but lack transparency in explaining how decisions were made. In healthcare, explainability is crucial for trust and regulatory compliance.
- 9. Maintenance and Updates:** AI + ML models require regular maintenance and updates to remain effective. Providers must allocate resources for ongoing model monitoring and improvement.



Drawbacks & Challenges of AI + ML Use in RCM (cont'd)

- 10. Limited Data Availability:** In some cases, providers may not have access to the large datasets required to train robust AI + ML models. This can limit the scope and accuracy of predictive analytics.
- 11. Ethical Concerns:** The use of AI + ML in healthcare RCM raises ethical questions about the potential for over-reliance on algorithms, the dehumanization of care, and the commodification of patient data.
- 12. Complex Implementation:** Implementing AI + ML solutions in healthcare RCM often involves complex processes, including data integration, customization, and workflow adjustments. These complexities can slow down adoption and ROI realization.



HR Implications and Challenges of Using AI + ML

- 1. Skills Gap:** Implementing AI + ML in RCM requires employees with skills in data analysis, machine learning, and AI development. Many organizations may need to upskill or hire new employees to fill these roles, which can be challenging in a competitive job market.
- 2. Training and Education:** Existing employees may need training to use and understand AI + ML tools effectively. Ensuring that employees are proficient in these technologies is crucial for implementation success.
- 3. Job Displacement Concerns:** Employees may fear that AI + ML technologies will automate their jobs, leading to job displacement. Managing employee anxiety and addressing concerns about job security is essential for smooth adoption.



HR Implications and Challenges of Using AI + ML (cont'd)

- 4. New Roles and Responsibilities:** The introduction of AI + ML may create new roles, such as AI system administrators, data analysts, and algorithm trainers. Healthcare organizations need to define these roles and responsibilities clearly.
- 5. Change Management:** Managing the cultural shift towards AI + ML adoption can be challenging. Healthcare organizations must invest in change-management strategies to ensure employees embrace these technologies.
- 6. Data Governance:** Data quality and integrity in AI + ML applications are critical. HR teams need to work closely with data management teams to establish and enforce data governance policies.



HR Implications and Challenges of Using AI + ML (cont'd)

- 7. Ethical Considerations:** AI and ML raise ethical questions in healthcare, such as the potential for bias, discrimination, and the dehumanization of care. HR professionals should be involved in discussions around the ethical use of these technologies.
- 8. Reskilling and Upskilling:** Employees may need to be reskilled or upskilled to work alongside AI and ML systems. HR departments should facilitate training programs and resources for continuous learning.
- 9. Recruitment Challenges:** Attracting and retaining talent with AI and ML expertise in the highly competitive healthcare industry can be difficult. HR may need to develop creative recruitment strategies.



HR Implications and Challenges of Using AI + ML (cont'd)

- 10. Employee Retention:** The fear of job displacement can lead to high turnover. Retaining experienced employees while integrating new technologies is a delicate balance that RCM + HR must manage together.
- 11. Performance Evaluation:** Traditional performance metrics (KPIs) may need to be adapted to account for the contributions of AI + ML systems and the employees who work with and/or oversee them.
- 12. Compliance and Regulatory Training:** Ensuring that employees are aware of and compliant with regulatory requirements related to AI + ML in healthcare is crucial. RCM + HR should facilitate training and monitor adherence.



HR Implications and Challenges of Using AI + ML (cont'd)

- 13. Collaboration and Communication:** Effective communication and collaboration between technical teams (IT, data scientists) and non-technical RCM staff are essential for successful AI + ML adoption.
- 14. Data Security and Privacy:** RCM + HR must work closely with IT and legal departments to ensure that AI + ML applications comply with data security and privacy regulations, such as HIPAA.
- 15. Workforce Planning:** RCM + HR need to engage in strategic workforce planning to align the workforce with the organization's AI + ML adoption strategy, ensuring that the right talent is in place.



Implementation Risks and Challenges for AI in RCM

1. Data Quality and Accuracy: AI models heavily rely on data for training and decision-making. If the data used is incomplete, biased, or inaccurate, it can lead to:

- a. Faulty predictions
- b. Incorrect billing
- c. Potential financial losses

To maintain accuracy, it is crucial to ensure data integrity, proper data pre-processing, and ongoing monitoring



Implementation Risks and Challenges (cont'd)

2. **Privacy and Security:** RCM involves handling sensitive patient data:

- a. Medical records
- b. Insurance information
- c. Financial details

Implementing AI introduces additional points of vulnerability and increases the risk of data breaches or unauthorized access

To protect patient privacy and comply with data protection regulations, it is essential to implement robust security, including:

- d. Encryption
- e. Access controls
- f. Regular audits



Implementation Risks and Challenges (cont'd)

- 3. Regulatory Compliance:** Healthcare is heavily regulated by laws and regulations governing billing practices, patient data privacy, and insurance reimbursement:
- a. AI systems must adhere to these regulations, which can be complex and subject to change
 - b. Ensuring that AI models and processes comply with all applicable laws and regulations is crucial to avoid legal and financial consequences



Implementation Risks and Challenges (cont'd)

- 4. Lack of Explainability (XAI):** AI models, such as deep learning neural networks, are often considered "black boxes" because their decision-making processes are not easily explainable:
- a. This lack of transparency can raise concerns about how AI algorithms arrive at specific decisions or predictions
 - b. In the context of RCM, it is important to strike a balance between:
 - i. accuracy
 - ii. the ability to provide clear explanations for decisions made by AI systems



Implementation Risks and Challenges (cont'd)

5. Resistance to Adoption: Implementing AI in RCM may encounter resistance from employees who fear that AI technologies could:

- a. Replace their roles
- b. Disrupt established workflows

Overcoming resistance and ensuring proper training and change management efforts are essential to:

- c. Gaining employee acceptance
- d. Maximizing the benefits of AI in RCM



Implementation Risks and Challenges (cont'd)

6. Ethical Considerations: AI systems need to be designed and deployed ethically to:

- a. Ensure fairness
- b. Avoid bias
- c. Prevent discrimination

Decision algorithms should be regularly monitored and audited to detect and mitigate any:

- d. Potential biases
- e. Unintended consequences that may arise during AI decision-making processes



Implementation Risks and Challenges (cont'd)

- 7. Imaginary Citations:** Large language model AI systems have been known to create imaginary, but seemingly-real, literature citations. They generate responses based on patterns in the data on which they were trained and the input they receive. If an LLM generates imaginary literature citations, it is probably due to several factors:
- a. **Data Patterns:** LLMs are trained on large datasets, potentially containing various types of text from the internet, including academic papers, articles, and websites. They learn to generate text based on patterns in this data, which may include creating citations in a similar format to what has been in the training data.



Implementation Risks and Challenges (cont'd)

- b. Imitating Human Behavior:** An LLM's goal is to generate responses that appear human-like and contextually relevant. In some cases, it may generate citations as a way to provide authoritative-sounding information or to mimic the behavior of citing sources, even if the citations are not real
- c. Ambiguity or Misinterpretation:** An LLM may unintentionally include imaginary citations due to ambiguity in the prompt or a misunderstanding of the context
- d. Limited Understanding:** LLMs may not always have a comprehensive understanding of the topics they discuss. As a result, they may inadvertently generate incorrect or imaginary citations



Implementation Risks and Challenges (cont'd)

To mitigate these risks, organizations should establish proper governance frameworks for AI implementation. Best Practice governance frameworks should include, at minimum:

- Robust data management practices
- Ongoing monitoring and auditing of AI systems
- Transparent communication with stakeholders
- Involving domain experts in the development and validation of AI models

Additionally, engaging legal and compliance teams to ensure adherence to regulations and ethical guidelines is crucial in mitigating risks associated with AI in RCM.



Explainable AI

Why Explainable AI Matters

- It is crucial for organizations to fully-understand AI decision-making processes and not trust them blindly
- Explainable AI can help people understand and explain machine learning (ML) algorithms, deep learning, and neural networks (LLMs)
- ML models are often thought of as black boxes that are impossible to interpret. Neural networks used in deep learning are some of the hardest for a human to understand
- Explainable AI helps promote end-user trust, model auditability, and productive use of AI. It also mitigates compliance, legal, security, and reputational risks of production AI

8. IBM Research, <https://www.ibm.com/topics/explainable-ai>, "What Is Explainable AI?" Accessed 13 Mar 2024.



Explainable AI (cont'd)

Comparing AI and XAI

What exactly is the difference between “regular” AI and explainable AI?

- XAI incorporates techniques and methods to ensure that each decision made during the process can be traced and explained
- AI, on the other hand, often arrives at a result using an ML algorithm, but the architects of the AI systems do not fully understand how the algorithm reached that result

This makes it hard to check for accuracy and can lead to loss of:

- Control
- Accountability
- Auditability



Explainable AI (cont'd)

Explainable AI Techniques

- XAI techniques consists of three main methods. Prediction accuracy and traceability address technology requirements while decision understanding addresses human needs
- Explainable AI – especially explainable machine learning – will be essential if end-users are to understand, appropriately trust, and effectively manage an emerging generation of artificially intelligent machine partners



Explainable AI (cont'd)

Prediction Accuracy

- Accuracy is a key component of how successful the use of AI is in everyday operation
- By running simulations and comparing XAI output to the results in the training data set, the prediction-accuracy quotient can be determined
- The most popular technique used for this is LIME (Local Interpretable Model-Agnostic Explanations), which explains the prediction of classifiers by the ML algorithm



Explainable AI (cont'd)

Traceability

- Traceability is another key technique for accomplishing XAI
- This is achieved, for example, by limiting the way decisions can be made and setting up a narrower scope for ML rules and features
- An example of a traceability XAI technique is DeepLIFT (Deep Learning Important FeaTures), which:
 - Compares the activation of each neuron to its reference neuron
 - Shows a traceable link between each activated neuron and even shows dependencies between them



Explainable AI (cont'd)

Decision Understanding

- This is the human factor, because many people have a deep distrust of AI
- Yet, to work with it efficiently, they need to learn to trust it
- This is accomplished by educating the team working with the AI so they can understand how – and why – the tool makes its decisions



Explainable AI (cont'd)

Healthcare Use Cases for Explainable AI

- **Clinical Care:** Accelerate diagnostics, image analysis, resource optimization and medical diagnosis. Improve transparency and traceability in decision-making for patient care
- **Customer Experience:** Improve transparent cost estimates and admission-approvals. Speed appointment, prior authorization, insurance verification, and self-pay collection processes. Improve post-treatment customer-service interactions
- **RCM Operations:** Accelerate HIM transcription and coding. Increase confidence in billing accuracy. Optimize processes for denial prediction and contract risk assessment. Accelerate appeals and increase denial and underpayment recovery rates



HHS Artificial Intelligence Task Force Takes Shape

- Monumental objective: **create a regulatory structure to oversee artificial intelligence in healthcare**
- President Biden's **Executive Order in October 2023** directed HHS to:
 - Create a comprehensive plan to assess AI before it goes to market
 - Monitor performance and quality once the technology is in use
 - Complete objectives and wrap up the task force in 12 months
- Per Greg Singleton, HHS's "Chief AI Officer," the task force is already **contemplating how to create appropriate safety programs** and strategies to manage AI

9. Pifer, Rebecca, [Healthcare Dive Blog](#), "HIMSS 2024:HHS Artificial Intelligence Task Force Takes Shape," 14 Mar 2024.



HHS Artificial Intelligence Task Force (cont'd)

“The real-time learning environments — we’re going to have to come up with and develop some sort of assurance, monitoring, risk-management practices around — just to kind of put a buffer around those, so we’re comfortable with them. And a lot of good work is going into that.”

Greg Singleton, HIMSS 2024, Orlando FL, 13 Mar 2024



HHS Artificial Intelligence Task Force (cont'd)

- Members include **heads of HHS's various agencies**:
 - CMS and CDC
 - Food and Drug Administration
 - Office of the National Coordinator
 - National Institutes of Health
- Task force has **working groups** focused on core AI issues:
 - Drugs and devices
 - Research and discovery
 - Critical infrastructure
 - Biosecurity
 - Public health
 - Healthcare and human services
 - Internal operations
 - Ethics and responsibility



HHS Artificial Intelligence Task Force (cont'd)

- Absent a federal strategy, some AI companies and their technology and provider partners have created **self-policing governance groups**
- Despite numerous bills that have been considered by Congress, so far it **has taken a largely hands-off approach** to AI oversight
- Meanwhile, Google, Microsoft and others are already at work with major providers to use **patient data to train** and deploy AI models
- By contrast, the EU on Tue 12 Mar 2024 approved the AI Act — one of the first laws in the world to **erect guardrails around AI**:
 - It establishes **levels from “unacceptable” to “low hazard,”** which determine how much scrutiny an AI application will face
 - Some fear its **steep noncompliance fines** could stifle AI progress



HHS Artificial Intelligence Task Force (cont'd)

- Despite Congressional inaction, HHS has taken some steps to oversee healthcare AI:
 - In Spring 2023, it prohibited Medicare Advantage plans from using AI to make bulk coverage determinations
 - Office for Civil Rights is considering how Section 1557 of ACA, prohibiting discrimination in the administration of care, could apply to AI governance
 - In 2023, ONC, which oversees U.S. health IT, required government-certified EHRs using algorithms for clinical decision support to disclose how their AI is maintained and updated [“Explainable AI”]
 - FDA has an approval process in place for medical devices using AI



Promising Uses of Generative AI in Healthcare RCM

1. **Physicians' notes:** AI-powered note-reading (OCR) and voice-recognition-dictation software has improved the speed and accuracy of physician's notes: ⁹
 - a. **AI's context-understanding capabilities** power OCR systems that can now comprehend words even when they are partially obscured or poorly written
 - b. **AI transcription apps** now accurately record, transcribe, and organize notes from physician /patient interactions
 - i. Most systems still incorporate "human QC" to ensure accuracy
 - ii. AI then draws from this information to handle administrative responsibilities seamlessly in the background

10. Delzio, *Op cit.*



Promising Uses of Generative AI in RCM (cont'd)

2. Patient Access: Generative AI is being trained to:

- a. Detect duplicate or redundant** patient / medical record numbers
- b. Automate eligibility assessment** to align far more closely to payer policies and contracts:
 - i. Current AI + ML solutions can only do limited prior auth tasks
 - ii. By analyzing patient data, medical histories, and payer info, future AI could assess if a patient meets prior-auth criteria
 - iii. AI could also handle some of the lengthy exceptions that now require clinical personnel. Because staffing is often inadequate and/or people are poorly trained, technology may become a last, but critical, solution to control costs



Promising Uses of Generative AI in RCM (cont'd)

3. Clinical-Denial Appeals: Generative AI has the potential to create original, fact-based appeals to health insurers. It would write unique letters for every case, using the:

a. Healthcare organization's:

- i. Clinical protocols
- ii. Past performance
- iii. Previous successful appeals

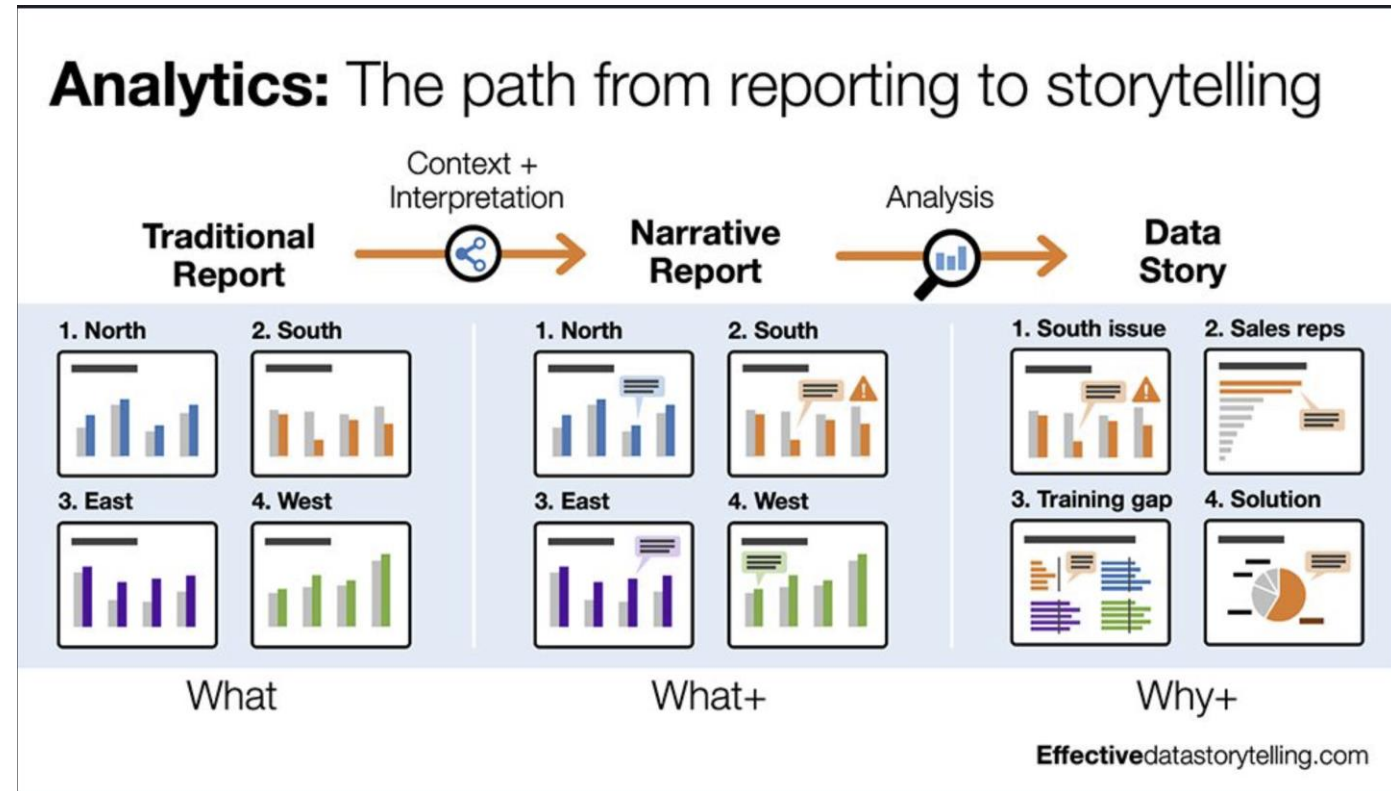
b. Payer's policy manuals and contract terms

This has the potential to become equivalent of ChatGPT for appeals. And, ideally, all outreach could be automatically-triggered



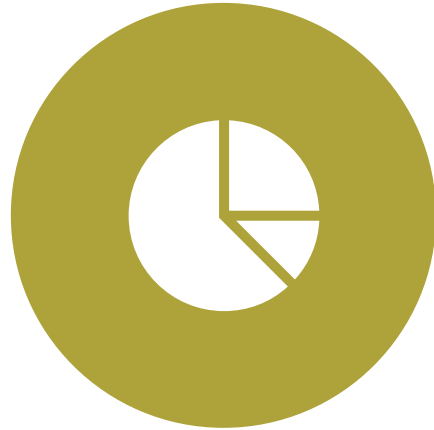
How Might AI Support RCM Use Cases – Analytics?

- Three kinds of analytics:
 - Traditional
 - Narrative
 - Story
- “Human touch” is mandatory to provide true analysis
- How could LLM AI help you prepare a data-story type presentation with less work?



11. Dykes, Brent, [Effective Data Storytelling Blog](#), “Narrative Reporting vs. Data Storytelling: Complementary but Not the Same,” 30 Nov 2023.

How Might AI Support RCM Use Cases – Others?



Analyzing Zero-Balance
Accounts to Identify
Underpayments and “Over-
Contractualization?”



Analyzing Payers’ Payment
Patterns to Check Contract
Compliance and Modeling
Accuracy?



Preparing Clinical-Denials
Appeals to Improve Denial
Nurses’ and Doctors’
Productivity?

Presenter's Bio



David Hammer, Principal Healthcare Performance Management Consultants, LLC

Mr. Hammer is a Principal at Healthcare Performance Management Consultants (HPMC), Gainesville, FL. At HPMC, he works with hospitals, health systems, physician organizations, and RCM-support vendors to optimize revenue cycle and managed care outcomes. Prior to joining HPMC, David was Senior Vice President of Revenue Cycle Advisory Solutions at MedAssets and is a former Partner at Accenture. David focuses on revenue cycle and managed care issues for hospitals, health systems, and related entities. He serves many of the largest health systems, MD-led clinics, and academic medical centers in the US. He was also formerly VP of Enterprise Revenue Management at McKesson and Chief Revenue Officer for Charter Behavioral Health, a +100-facility health system. David has over 30 years of healthcare experience, including executive leadership and direction, revenue cycle transformation, information system planning / implementation, and consulting.

Background and Affiliations

Mr. Hammer holds an MBA in Management and an MHS in Health Administration from the University of Florida. He also holds a BBA in Accounting from the University of North Florida. Additionally, he is certified as a Lean Six Sigma Green Belt by Belmont University and holds a Certificate in Negotiation from Harvard Law School's Negotiation Institute. He is active in the Healthcare Information Management Systems Society (HIMSS), and the Healthcare Financial Management Association (HFMA), from which he holds the FHFMA and CHFP designations. Additionally, David is a frequent speaker at industry events and is widely recognized for his many articles in national publications. He has been repeatedly named an HFMA Distinguished Speaker, and is a 2007 recipient of HFMA's Medal of Honor service award.

Recent Publications

Mr. Hammer's most recent publication, "Cost Management and the Renewed Imperative for Cost Accounting," was co-authored with Paul Selivanoff and appeared in Management in Healthcare [United Kingdom], in January 2020. "Health Reform: Intended and Unintended Consequences," appeared in the October 2010 issue of HFMA's healthcare financial management journal (hfm). "Don't Panic: CFOs React to the New Economic Reality," appeared in hfm's March 2009 issue. Mr. Hammer authored the February 2008 cover story in hfm, entitled "Beyond Bolt-Ons – Breakthroughs in Revenue Cycle Information Systems." He also wrote the July 2007 cover story, called "The Next Generation of Revenue Cycle Management," as well as the July 2005 hfm cover story, entitled "Performance is Reality: Is Your Revenue Cycle Holding Up?" Another one of his articles, "UPMC's Metric-Driven Revenue Cycle," appeared in the September 2007 issue of hfm.

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Appendices

- A. VENDORS WITH INTEGRATED AI + ML CAPABILITIES
- B. AI + ML BUSINESS PARTNER LIST
- C. AI + ML INTEGRATIONS IN EPIC'S RCM MODULES

Vendors with Integrated AI + ML Capabilities

- 1. Epic Systems:** Epic's RCM software incorporates AI and ML to streamline billing processes, improve claims accuracy, and enhance patient revenue management. Their integration with electronic health records (EHRs) is a key feature.
- 2. Cerner (now part of Oracle):** Cerner offers RCM solutions that leverage AI and analytics to optimize revenue cycle operations. They focus on improving billing accuracy and enhancing the patient financial experience.
- 3. McKesson (now part of Change HC and Harris):** McKesson's RCM solutions use machine learning for denial management, predictive analytics, and patient revenue optimization. Their offerings aim to reduce claim denials and improve revenue capture.



Vendors with Integrated AI + ML Capabilities (cont'd)

- 4. athenahealth:** athenahealth's RCM platform incorporates AI-driven tools for automated coding, claims management, and denial prevention. They also emphasize the integration of clinical and financial data.
- 5. Change Healthcare (now part of Optum):** Change Healthcare provides RCM solutions with AI and ML capabilities for claims processing, denial management, and revenue optimization. They offer a range of services to help healthcare organizations improve financial outcomes.
- 6. Optum (formerly known as Optum360):** Optum offers RCM solutions with AI-powered analytics for claims processing, denial prevention, and revenue optimization. Their focus is on efficiency and increasing revenue capture.



Vendors with Integrated AI + ML Capabilities (cont'd)

7. **NextGen Healthcare:** NextGen Healthcare's RCM solutions leverage AI for revenue cycle analytics, patient engagement, and billing accuracy. They aim to help providers optimize their financial performance.
8. **Allscripts Healthcare Solutions:** Allscripts offers RCM solutions that integrate with their EHR systems and use AI and analytics to enhance billing accuracy, claims management, and denial prevention.
9. **FinThrive:** FinThrive provides RCM services with AI-driven tools for coding, claims processing, and revenue cycle optimization. They focus on helping healthcare organizations improve revenue integrity.



Vendors with Integrated AI + ML Capabilities (cont'd)

- 10. Waystar:** Waystar's RCM platform uses AI and predictive analytics to improve claims management, patient payments, and denial prevention. They aim to help healthcare providers increase revenue and reduce administrative costs.
- 11. Recondo Technology:** Recondo Technology specializes in AI-driven RCM solutions, including prior authorization automation and claims status management, to reduce denials and improve revenue cycle efficiency.
- 12. ZirMed (now part of Waystar):** ZirMed, now a part of Waystar, offers RCM solutions that leverage AI and analytics for claims processing, patient payment estimation, and denial prevention.



AI + ML Business Partner List

BUSINESS PARTNER	COMPANY WEBSITE	DESCRIPTION
Abax Health	abaxhealth.com	Revenue Leakage and Patient Access Solutions
Abaka	abaka.me	Artificial Financial Intelligence
AGS Health	agshealth.com	Combination of AI-enhanced technology, data-driven services, and specialized support to maximize the performance of your revenue cycle.
Akasa	akasa.com	Helps healthcare organizations improve operations, including revenue cycle, to drive revenue, create efficiencies, and enhance the patient experience.
Anthro Innovations	anthroinnovations.com	Software solutions provider developing and applying state of the art cognitive AI, natural language processing and machine learning techniques to improve claims processing.
Atos	atos.net	Digital transformation
Automation Anywhere	automationanywhere.com	Automation Anywhere Platform, delivers secure enterprise automation alongside process intelligence to improve operational efficiency, accelerate business
buddi.ai	buddi.ai	BUDDI.AI is a leading provider of clinical and revenue cycle automation solutions for healthcare.
Calpion Inc.	calpion.com	Calpion Inc. is a Dallas headquartered technology company that is known for providing innovative solutions.
Cognosos	cognosos.com	Cognosos delivers Real-time Location Services to healthcare facilities enabling them to rapidly deploy room-level accurate location services with proven ROI.
Fathom	fathomhealth.com	Medical coding automation services built for you.

Revenue Cycle Resources (RCR) Hub, <https://rcrhub.com/business-partners/artificial-intelligence>, 08 Dec 2023



AI + ML Business Partner List (cont'd)

BUSINESS PARTNER	COMPANY WEBSITE	DESCRIPTION
Gain Servicing	gainservicing.com	Gain provides a service to manage LOPs on behalf of healthcare practices so that doctors can focus on treating more patients and getting great outcomes.
Genesys	genesys.com	American software company that sells customer experience and call center technology to mid-sized and large businesses. It sells both cloud-based and hybrid cloud software.
Hospital IQ	leantaas.com	AI-based operations management software platform that enables hospitals to promote excellence, create systemness, and boost efficiency.
Janus Health	janus-ai.com	Janus Health develops an end-to-end process improvement platform that studies a revenue cycle operation to determine the optimal path of each workflow and rapidly builds intelligent automation and decision support with a single click.
Leidos	leidos.com	Global leader in the development and application of technology to solve our customers' most demanding challenges.
Maverick Medical AI	maverick-med.com	Maverick Medical AI is revolutionizing the medical coding industry with its advanced autonomous coding platform.
MercIntelli Healthcare Solutions	mercintelli.com	More stringent government regulations, declining reimbursement, and the growing focus to provide greater value in healthcare services are factors which are driving healthcare markets.
nym	nym.health	Nym's software leverages AI to fully automate the medical coding process, leading to improved quality, faster payment cycles, and lower costs for providers.
Olive	oliveai.com	Automation AI purpose-built to solve healthcare's toughest challenges and provide industry-wide intelligence.
OM1	om1.com	In healthcare, results really do matter. We're measuring and forecasting outcomes at a whole new level - transforming population data into precision health.
Palantir Technologies	palantir.com	We build software that empowers organizations to effectively integrate their data, decisions, and operations.

Revenue Cycle Resources (RCR) Hub, <https://rcrhub.com/business-partners/artificial-intelligence>, 08 Dec 2023



AI + ML Business Partner List (cont'd)

BUSINESS PARTNER	COMPANY WEBSITE	DESCRIPTION
Pivot Point Consulting, a Vaco Company	pivotpointconsulting.com	Pivot Point Consulting, a Vaco Company, provides strategy and talent solutions for providers, payers and life sciences organizations
Qventus	qventus.com	AI-based software platform that optimizes patient flow across the hospital including emergency departments and inpatient units.
R Systems	rsystems.com	R Systems' mission is to help our healthcare clients enhance patient experience, reduce costs, streamline hospital operations and increase profitability through digital, business analytics and AI.
Rotera	rotera.ai	Rotera is a team of passionate advisors and engineers that develop advanced healthcare automation solutions that work with you, not in place of you.
SmarterDx	smarterdx.com	SmarterDx uses A.I. to "true up" billing data with the underlying clinical data. In the short term, this means more revenue for hospitals. In the long term, this means a cleaner data layer that drives better healthcare operations, research, and outcomes.
Tagnos Orchestrate Excellence	tagnos.com	Specialized hospital management systems and software solutions that empowers healthcare workers to provide better patient care.
TechEmergence	emerj.com	Market research and publishing company focused on the use cases and best practices of artificial intelligence in business.
TEKsystems	teksystems.com	We accelerate business transformation by solving complex technology, business and talent challenges—across the globe.
thoughtful ai	thoughtful.ai	Our goal is to enable healthcare providers with AI-powered solutions to unlock their most ambitious growth and profitability targets.
WhiteSpace Health	whitespacehealth.com	Revenue Intelligence (SAAS) Platform uses AI to detect, predict, and resolve RCM issues and effectively manage healthcare operations.



AI + ML Integrations in Epic's RCM Modules

1. Denial Management:

- a. AI-driven predictive analytics to identify potential denial risks, based on historical data and payer patterns
- b. Machine learning algorithms for real-time denial prevention and mitigation, helping reduce revenue loss.

2. Prior Authorization Optimization: AI-powered tools that analyze historical data and payer prior authorization guidelines to streamline processes and reduce delays and denials



AI + ML Integrations in Epic's RCM Modules (cont'd)

3. Coding Assistance:

- a. Natural language processing (NLP) and ML algorithms to assist coders in assigning accurate codes based on clinical documentation
- b. Identification of documentation gaps and coding suggestions to improve accuracy and reimbursement

4. Claims Processing:

- a. AI-driven claims scrubbing to identify errors or inconsistencies before claims are submitted, reducing claim denials.
- b. ML-based algorithms for automating coding and billing, to improve efficiency.



AI + ML Integrations in Epic's RCM Modules (cont'd)

5. **Patient Payment Estimation:** ML models that predict patient payment behavior based on historical data and demographic information, helping to tailor payment plans
6. **Revenue Integrity:** AI-driven audits of medical claims to ensure compliance with coding and billing regulations, reducing the risk of fraud and non-compliance
7. **Predictive Analytics:** Using AI + ML to forecast revenue, identify trends, and optimize financial strategies
8. **Workflow Automation:** AI-powered automation of administrative tasks, such as appointment scheduling, claims submission, and patient registration, improving efficiency and reducing errors



AI + ML Integrations in Epic's RCM Modules (cont'd)

- 9. Data Analytics:** Advanced analytics capabilities, including predictive modeling and data mining, to identify revenue cycle bottlenecks and improvement opportunities
- 10. Price Transparency:** AI-driven tools that calculate and display the cost of services to patients, improving price-transparency compliance
- 11. Patient Engagement:** ML-driven patient communication strategies to improve patient engagement and optimize the revenue cycle
- 12. Decision Support:** AI-based decision support tools that assist RCM professionals in making data-driven decisions related to billing, collections, and financial strategies

