The Case for Automating to Resolve Health Insurance Claim Denials

Why on-premises AI offers greater efficiency for revenue cycle management

Introduction

Revenue cycle leaders at hospitals and health systems across the country spend a big part of their workdays dealing with claim denials from health insurers.

In a 2022 American Hospital Association (AHA) survey of nearly 800 hospitals, the hospitals collectively reported having $6.4 billion in delayed or unpaid claims that were at least six months old. Further, 95% of the hospitals stated they were spending more staff time and resources on seeking prior authorization (PA) approval from health plans to avoid delayed or denied claims, with 84% indicating that compliance with health plan policies was becoming more expensive.

Three years later, the situation hasn't improved. In the AHA's "2025 Cost of Caring" report, the association stated, "Notably, 70% of denied claims were eventually paid, but only after multiple costly reviews. These burdens not only strain hospitals financially but also delay care and divert clinical staff from patient care."

Claims denied for coding issues have become a growing area of concern because of coding complexities, coding requirements and coding competency. To wit:

- The average **coding-related claim denial dollar amount** rose 126% in 2024 to $631 from $297 in 2023, according to the 2024 Annual Benchmark Report from MDaudit.

- 85% of more than 4,000 surveyed health care providers say **discrepancies identified during coding audits**, which often lead to denied claims or repayment demands from payers, stem from complexities of the current coding system, according to a report from Black Book research.

Absent commercial health insurance companies fulfilling a recent promise to reform their PA and claims-paying behaviors, what can hospitals and health systems do to combat increasing claim denials and their growing threat to clinical and financial sustainability?

For a growing number of hospitals and health systems, industry experts say the answer is automation — specifically, automation of claims management by artificial intelligence (AI)-powered technology.

In fact, the U.S. National Science Foundation recently awarded a $550,000 grant to researchers from St. John's University in New York to develop an AI tool to improve medical coding and health care billing.

By replacing manual claims management tasks such as eligibility and benefit verification, PA approvals, claim submissions and claim appeals with smart technology that learns from its experience, hospitals and health systems are finding that they can reduce claim denials. And they can do it faster, cheaper and more securely if hospitals and health systems run their AI solutions onsite or on premises versus a cloud-based platform.

This Trailblazers report from the AHA's Market Scan will examine the benefits accruing to hospitals and health systems that are using such an approach for their claims management and describe their experiences. ●

"**Providers can enhance and support their work with smart technology, which makes the work more accurate and efficient.**"

— **GLEN PENDLEY** —
President and co-founder, Ailevate

$25.7 billion

Providers' cost of adjudicating claims in 2023

Source: Premier, 2025
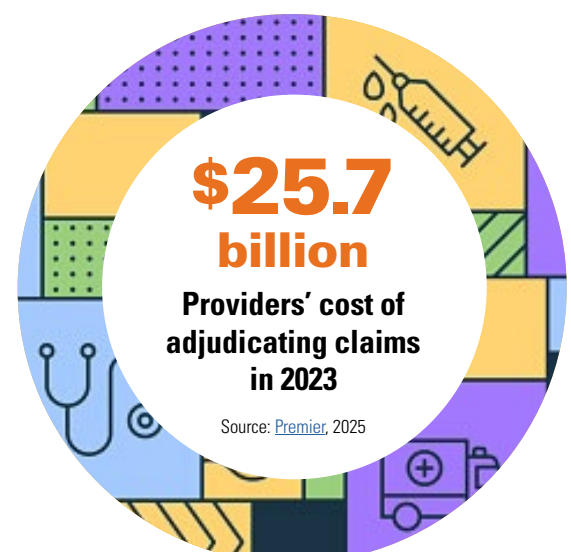
Automation, AI and claims management

Hospitals and health systems that want to fix unnecessary claim denials and reclaim or recover lost revenue should consider three questions:

1 | **Why automate revenue cycle functions and tasks?**

2 | **Why use AI-powered technology to automate those revenue cycle functions and tasks?**

3 | **Why operate that technology on-site or on premises rather than through a cloud-based solution?**

1 | Why automate revenue cycle functions and tasks?

The health care revenue cycle has three major parts: the front end, the middle and the back end. The cycle starts when a patient seeks care, and it ends when the patient's episode of care is over. A host of individual revenue cycle functions and tasks fall into each of those parts during that cycle.

● **FRONT-END REVENUE CYCLE FUNCTIONS AND TASKS** include patient registration, appointment, test and procedure scheduling, insurance and benefits verification, financial counseling, prior authorization and up-front patient collections.

● **MIDDLE REVENUE CYCLE FUNCTIONS AND TASKS** include denials prevention, charge capture, clinical documentation integrity/improvement, case management, utilization review, coding and compliance.

"Claim denials often stem from issues such as prior authorization, incomplete and inaccurate data, coding errors and documentation gaps. Technology is a collaborative tool that can play a huge role in helping to reduce and eliminate these issues.**"**

— **GLEN PENDLEY** —
President and co-founder, Ailevate

● **BACK-END REVENUE CYCLE FUNCTIONS AND TASKS** include claims submission, denial management, claim appeals/adjudication, accounts receivable management, patient billing and collections, revenue integrity and financial reporting.

Many hospitals and health systems perform most of those revenue cycle functions and tasks manually regardless of where they reside along the revenue cycle spectrum. People with spreadsheets, phones, faxes, email, mail and computers do them.

Manually performing these functions and tasks — most of which are rote and repetitive — is inefficient, time-consuming and costly. More importantly, performing these rote and repetitive functions and tasks introduces the possibility of human error along the entire revenue cycle. A misstep, no matter how small, could cause a patient's health plan to deny or delay a claim for medically needed services provided to the patient.

Automating them with technology improves efficiency, consumes less time, reduces costs and eliminates human errors that can lead to claim denials or delays. ●

17%

Percentage of total administrative spending by hospitals on the movement of all payments, claims and billing throughout the "financial transaction ecosystem"

Source: "Administrative simplification: How to save a quarter-trillion dollars in US healthcare." McKinsey & Co., 2021

2 | Why use AI-powered technology to automate those revenue cycle functions and tasks?

Many hospitals and health systems have tried automating their revenue cycle functions and tasks with basic automation technology like robotic process automation (RPA) and have had little success. It's not that RPA doesn't work, it's that RPA just isn't smart enough.

RPA works well with specific rules in strictly defined boundaries. And those rules and boundaries never change. If this, do that — every single time until a human being rewrites the rules or redefines the strict boundaries.

The challenge in health care, and with revenue cycle specifically, is that everything is changing all the time. Payer contract terms change. Individual health plan benefits change. Billing codes change. Patients change health plans. Government reimbursement rules change. Payment rates change. Patients' out-of-pocket financial responsibilities change. Patients' personal financial situations change. Clinical documentation requirements change. An RPA solution may be out of date between the time a hospital or health system installs it and the time it hits the power button.

Many hospitals and health systems have learned that they need smarter technology that continuously learns and adapts to all those changes as they happen. Industry experts refer to such smart technology as modern process automation, functional AI or, more recently, "agentic" AI.

Agentic AI refers to systems that operate autonomously as their own agents, making goal-directed decisions based on available information with minimal human oversight. These systems can adapt their actions as conditions change, and in some cases, actively seek out new data or feedback to improve performance in evolving environments.

In short, it continuously updates itself and can execute revenue cycle functions and tasks based on the latest available informa-

> "Creating solutions that scale to different organizations is extremely difficult because every environment is unique. Too often, vendors assume that every environment works the same and that the data will always be perfectly structured. This is why solutions historically have had a hard time making a wide-scale impact. The introduction of agentic AI gives us the ability to address this."
>
> — GLEN PENDLEY —
> President and co-founder, Ailevate

tion pertinent to that specific function or task. A single agentic AI platform can have multiple agents within that platform working on specific revenue cycle functions and tasks and then communicating what they know to other agents on the platform. ●

INSIGHTS

Integrating artificial intelligence and automated workflows have significant potential to improve health care operations, particularly in revenue cycle management. And with third-party payer denials and the rising cost of collections, providers increasingly are exploring solutions. READ MORE »

— "3 Ways AI Can Improve Revenue-Cycle Management," AHA's Market Scan, 2024

Popular health system AI revenue cycle use cases

Percentage of surveyed health systems that said they were developing/piloting, deploying in limited areas or fully deploying AI to improve the following revenue cycle functions and tasks

83% Medical coding

79% Streamline prior authorization

66% Automate utilization review

Source: "Adoption of artificial intelligence in healthcare: survey of health system priorities, successes and challenges." Journal of the American Medical Informatics Association, 2025

3 | Why operate that technology on-site rather than through a cloud-based solution?

Although the average cost of a data breach in health care dropped this year by 24% to about $7.4 million from about $9.8 million in 2024, health care still topped the list of 17 industries in terms of breach costs, according to the "Cost of a Data Breach 2025" report from IBM.

That among many other reasons continues to make data privacy and security top of mind for hospital and health system executives.

Among those other reasons is the fact that AI technology feeds on data. The more hospitals and health systems adopt AI, the more data they need to feed AI to make it work. More AI, more data, more data at risk, more data vulnerable to a breach.

Think of all the confidential, proprietary and sensitive administrative, business, clinical, financial and operational data it takes to produce one claim for payment for one episode of care. It's no surprise then that more than a few hospitals and health systems have been hesitant to put all that revenue cycle data in play if they automate their revenue cycle with AI-powered technology.

One way that hospitals and health systems have found to assuage their concern is to adopt an AI tool for revenue cycle that runs on-site versus a cloud-based platform. Running an on-site AI solution for revenue cycle generates a number of benefits for wary users:

FIRST | The hospital's or health system's data never leave the hospital or health system environment. Users never submit or transmit data to the cloud.

SECOND | No human touches the data. The AI platform runs behind the scenes, invisible to all who use its outputs to perform various functions and tasks along the revenue cycle spectrum.

THIRD | AI on-site allows users to see the AI's work. It's transparent. AI outputs just don't fall out of the cloud without an explanation.

FOURTH | AI on premises prevents vendors from using a hospital's or health system's own revenue cycle data for their own purposes.

Hospital and health system users have found that AI on-premises builds trust, and trust builds better results. ●
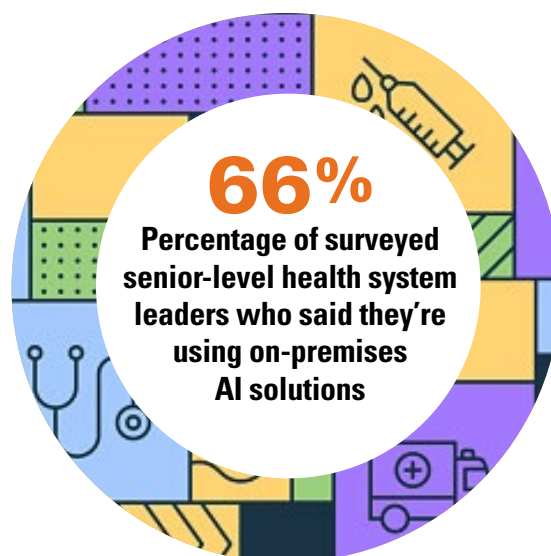
"*Part of the reason we've seen the adoption of AI technology not really taking hold in certain verticals like health care is that people are not willing to send super sensitive and confidential data to this magic black box in the sky.*"

— **GLEN PENDLEY** —
President and co-founder, Ailevate

66%
Percentage of surveyed senior-level health system leaders who said they're using on-premises AI solutions

Source: "Intelligent healthcare: A blueprint for creating value through AI-driven transformation." KPMG, 2025

ai levate

READY TO RECOVER DENIED CLAIMS?

Ailevate's Revenue Recovery is an AI-powered solution that automatically identifies and corrects coding errors in denied healthcare claims, preparing them for fast reimbursement. Built specifically for healthcare organizations struggling with denial backlogs and manual rework, Ailevate's Revenue Recovery transforms coding-related denials from a costly burden into recovered revenue.

By deploying AI agents trained on real-world claim data and regulatory patterns, Ailevate's Revenue Recovery works within existing revenue cycle systems to fix denials before they impact the bottom line. The solution's streamlined integration into current workflows requires minimal staff training, enabling rapid deployment and tangible results.

Ailevate's Revenue Recovery helps hospitals recover revenue that would otherwise be written off – turning denial management from a cost center into a revenue generator.

Learn More

Hospitals can generate savings through targeted claims management automation

Transactions between hospitals and payers during the revenue cycle are time-consuming and expensive, especially if hospitals do them manually. Using technology to automate revenue cycle transactions can generate substantial savings for hospitals — savings that can be spent on direct patient care.

That's the big takeaway from the "2024 CAQH Index Report" released by the Council for Affordable Quality Healthcare in February 2025. CAQH's latest annual report is based on 3 billion medical claims filed by 216 million health plan members involving 17 billion separate claim transactions.

CAQH researchers calculate the time and cost it takes a provider, like a hospital, health system or medical practice, to conduct seven separate functions and tasks along the revenue cycle. They calculate the time and cost it takes to do those seven transactions manually compared with electronically or automatically.

Cost is the labor cost (salaries, wages, benefits, related overhead) required to conduct the transaction. Manual means that people conduct those seven transactions by phone, fax, email and mail. Fully automated means that technology does them electronically in real time with little or no human intervention.

As the matrix illustrates, automating key functions and tasks

INSIGHTS

Artificial intelligence and large language models offer new avenues for streamlining administrative workflows. Health care organizations must continue to explore and implement these tools thoughtfully, balancing their potential benefits with real-world limitations.
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— "From Transactions to Trust: Building Better Care Through Healthcare Automation." 2024 CAQH Index Report, 2025

along with revenue cycle and technology can lead to dramatic savings in money and time for providers (see chart).

"Administrative cost savings for providers could lead to an opportunity to pass savings on to patients," the report stated.

CAQH also stated that the volume of medical claim transactions described rose 13% last year to $62.3 billion with an estimated $83 billion spent on conducting those transactions. That includes both provider and health plan costs. If all those transactions were fully automated, the total cost would have been $64.6 billion, or more than 22% less. ●

A matrix of CAQH's manual versus fully electronic, or automated

Revenue cycle transaction	Manuel costs per transaction	Fully automated cost per transaction	Percentage cost savings	Manual average time per transaction in minutes	Fully automated average time per transaction in minutes	Percentage time savings
Eligibility and benefit verification	$8.57	$2.00	76.7%	16	4	75.0%
Prior authorization	$12.88	$5.38	58.2	24	10	58.3
Claim submission	$6.33	$3.05	51.8	12	5	58.3
Attachments	$5.54	$4.51	18.6	11	7	36.4
Claims status inquiry	$13.80	$3.64	73.6	25	7	72.0
Claim payment	$4.99	$3.16	36.7	8	5	37.5
Remittance advice	$5.67	$2.95	48.0	9	5	44.4

Source: "2024 CAQH Index Report"

Benefits of AI for medical coding speed and accuracy

Does AI technology have the power to improve the speed and accuracy of medical coding during the middle phase of the health care revenue cycle? According to a study published earlier this year in the Journal of Medical Internet Research, the answer is a resounding yes.

Twelve researchers affiliated with three universities in Norway and Sweden tested an AI solution with 15 medical coders. The researchers asked the coders to code 20 sets of clinical notes. Some of the sets of clinical notes were longer with an average word count of 307. Some of the sets of clinical notes were shorter with an average word count of 166. The researchers asked a control group of coders to code the clinical notes manually and an intervention group of coders to code the clinical notes with assistance from the AI tool.

Here's what they found:

- For the long clinical notes, the median time to code was 270 seconds without AI and 121.1 seconds with AI, or 55.1% faster.
- For the short clinical notes, the median coding time was about the same between both groups.
- For the long clinical notes, the accuracy rate was 66.2% without AI and 66.7% with AI, or 7.5% more accurate.
- For the short clinical notes, the accuracy rate was 60% without AI and 70% with AI, or 16.7% more accurate.
- 80% of the coders who used AI to code the longer clinical notes said they were satisfied with the AI tool.
- 74% of the coders who used AI to code the shorter clinical notes said they were satisfied with the AI tool.

"These findings demonstrate that assistive technology can be effective productivity tools for reducing the excessive burden of administrative documentation. This is particularly relevant in health care where manpower is limited and accurate task completion is critical," the study stated.

The study also stated, "Overall, the study demonstrates the value of AI in augmenting human performance, providing a compelling case for the broader adoption of AI-assisted interfaces to enhance productivity in clinical coding. Globally, our results demonstrate that such AI

INSIGHTS

Through automating the discharge summary coding process, such (AI) tools are expected to improve the speed and quality of the coding, thus facilitating more efficient health care delivery. This automation not only saves time, but it also ensures consistency in coding practices, leading to improved patient care and streamlined administrative processes. **READ MORE »**

— "Artificial Intelligence to Improve Clinical Coding Practice." Journal of Medical Internet Research, March 2025

tools have the potential to reduce the effort or cognitive load related to the coding task, and thus reduce one of the major barriers associated with the adoption of more complex and detailed classification systems."

Clearly, the results convinced the researchers that the use case for AI to improve coding and fix problematic claim denials is solid.

16.7%
Increase in coding accuracy from using AI to assist in coding clinical notes

Source: Journal of Medical Internet Research, 2025

Conclusion

f AI is a solution in search of a use case, revenue cycle management is a use case in search of a solution. Thankfully, for an increasing number of hospitals and health systems, AI and revenue cycle management have found one another.

As this Trailblazers report from the AHA's Market Scan details, hospitals and health systems are learning that automating key functions and tasks along the phases of the revenue cycle can save time, reduce costs and improve efficiency. Automating those critical functions and tasks with agentic AI solutions can make them smart, eliminating human error, increasing speed, improving accuracy and adapting continuously to change. Doing all that on premises makes them secure. ●

Contributor

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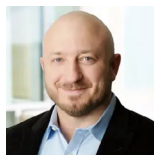
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