

# **Carta Healthcare Whitepaper:**

## **A Clinical, Technical, and Operational Case for Hybrid Intelligence**

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## **Abstract**

Clinical data abstraction is foundational to hospital quality measurement, public reporting, reimbursement, and performance improvement. As artificial intelligence capabilities advance, interest in automating abstraction has increased. However, growing evidence suggests that fully autonomous AI systems are not appropriate for abstraction workflows that require clinical interpretation, contextual reasoning, and accountability. This paper examines the limitations of autonomous AI in clinical abstraction and presents Hybrid Intelligence, the integration of advanced AI with expert human validation, as a more effective and operationally sound model. Drawing on national survey data, technical considerations, and measured health system outcomes, this paper outlines why Hybrid Intelligence aligns more closely with clinical reality and healthcare governance requirements.

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## **1. Introduction**

Clinical data abstraction converts complex medical records into structured data used for registries, quality programs, accreditation, and public reporting. The outputs of this process influence STAR ratings, reimbursement, benchmarking, and strategic decision-making. Errors in abstraction propagate beyond operational inefficiency, affecting institutional credibility and financial performance.

Despite its importance, abstraction is frequently framed as a technical extraction task. This framing underestimates the interpretive complexity of clinical documentation and the role of professional judgment. As artificial intelligence technologies mature, there is increasing pressure to automate abstraction entirely. However, the appropriateness of fully autonomous AI for this domain warrants careful examination.

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## 2. The Interpretive Nature of Clinical Data Abstraction

Medical records are not designed for abstraction. They are longitudinal, fragmented, and authored for care delivery rather than secondary analysis. Relevant data elements may appear across operative reports, progress notes, discharge summaries, imaging reports, and external documentation. These sources frequently conflict or evolve over time.

Abstractors must determine which documentation reflects clinical intent, whether a data element represents baseline status or a complication, and how to reconcile discrepancies across sources. These determinations require contextual understanding and clinical reasoning. They are rarely reducible to deterministic rules or probabilistic inference alone.

As a result, abstraction is not simply data extraction. It is a process of interpretation, validation, and accountability.

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## 3. Limitations of Fully Autonomous AI

Fully autonomous AI systems approach abstraction by identifying patterns in unstructured text and populating structured fields based on learned associations. While effective at accelerating information retrieval, these systems exhibit fundamental limitations in clinical contexts.

Autonomous AI struggles with temporal reasoning across long records, distinguishing historical conditions from active problems, and determining clinical relevance when multiple values are present. It cannot reliably infer intent or adjudicate conflicting documentation. When documentation is incomplete or care occurs outside the primary electronic health record, autonomous systems lack the situational awareness to identify gaps.

These limitations create downstream risk, including rework, audit exposure, and erosion of trust in reported data.

National survey data reinforces this concern. In a [2025 survey of healthcare](#)

[leaders](#), 62.5 percent identified data misinterpretation as the primary risk of AI operating without human oversight. Only 12.5 percent reported that fully autonomous AI delivered the greatest value in their organizations. Conversely, 75 percent emphasized the necessity of human validation, and 50 percent stated that AI should augment, rather than replace, human decision-making. These findings reflect operational experience rather than theoretical caution.

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#### **4. Hybrid Intelligence as an Alternative Model**

[Hybrid Intelligence](#) integrates artificial intelligence within a human-governed abstraction process. Rather than replacing clinical expertise, AI is used to support and accelerate expert judgment.

In this model, AI performs tasks well suited to computation at scale, including ingestion of longitudinal records, section classification, identification of candidate data elements, and consistent application of registry logic. This reduces manual search burden and standardizes repetitive tasks.

Human clinical experts retain responsibility for interpretation and validation. They assess AI outputs, review supporting documentation, resolve ambiguity, and make final abstraction decisions. Accountability remains human, preserving auditability and alignment with clinical governance standards.

Hybrid Intelligence mirrors established clinical practice, in which decision-support tools enhance efficiency while clinicians retain responsibility for judgment.

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#### **5. Technical Foundations Supporting Hybrid Intelligence**

The effectiveness of Hybrid Intelligence depends on the reliability and interpretability of the underlying AI. Carta Healthcare has built its platform to support this model through a supervised, clinician-centered architecture.

At the core of the Hybrid Intelligence platform are advanced large language

models: [Claude from Anthropic](#). These models are designed for long-context reasoning, enabling analysis of medical records that span hundreds of pages. They support nuanced interpretation of clinical language, temporal relationships, and contextual cues that are critical in abstraction workflows.

Anthropic's ongoing technical investments focus on improving reasoning depth, reducing hallucination behavior, strengthening instruction adherence, and enhancing safety in high-stakes domains. These advances improve the quality and consistency of AI-generated candidate outputs. Carta Healthcare integrates these models within a controlled environment in which outputs are surfaced with source attribution and uncertainty indicators for expert review.

Importantly, AI outputs are never treated as final determinations. The system is explicitly designed to support human validation, ensuring that advances in AI capability enhance clinical reliability rather than introducing automation risk.

From an IT perspective, this architecture allows health systems to benefit from continuous AI improvement without managing model training, tuning, or lifecycle governance. Carta Healthcare absorbs the technical complexity while maintaining stable workflows and audit-ready processes.

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## 6. Operational and Financial Outcomes

Hybrid Intelligence has [demonstrated](#) consistent operational impact across health systems. Organizations using this approach routinely reduce abstraction time by 66 percent or more. Standard cases previously requiring approximately 30 minutes are completed in 15 to 22 minutes. Complex cases that once required five to six hours are completed in 60 to 90 minutes.

At scale, these gains translate into thousands of hours saved annually. Health systems have eliminated persistent abstraction backlogs and reduced abstraction costs by approximately 50 percent without increasing staffing. In multiple instances, teams were reduced through natural attrition while maintaining performance and expanding registry participation.

Improved abstraction fidelity also contributes to improved quality outcomes.

More accurate capture of clinical care has been associated with improved STAR ratings, including advancement from 2 to 3 STARs and first-time STAR achievements. These outcomes have direct implications for reimbursement, public reporting, and institutional reputation.

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## **7. Implications for Healthcare Leaders**

For quality leaders, Hybrid Intelligence provides defensible data, reduced audit risk, and predictable operations. For physicians, it ensures that care delivery is accurately represented in quality programs. For IT leaders, it offers access to advanced AI capabilities without assuming the governance and safety risks associated with autonomous systems.

The evidence supports a clear conclusion. Fully autonomous AI is not sufficient for clinical data abstraction. Hybrid Intelligence aligns more closely with clinical reality, regulatory expectations, and operational needs.

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## **8. Conclusion**

Healthcare does not require AI that replaces clinical judgment. It requires systems that respect clinical complexity, preserve accountability, and deliver measurable results. Hybrid Intelligence represents a pragmatic and evidence-based approach to achieving these goals.

As abstraction demands continue to grow, models that integrate advanced AI with expert human validation will be essential to sustaining quality, efficiency, and trust in healthcare data.