Artificial Intelligence Methodology:

MCG Synapse Reasoning Development

MCG Synapse (AI reasoning) capabilities are designed to enhance clinical decision-making with the same rigor and transparency that defines the MCG care guidelines. Payers, providers, and government agencies rely on this technology to support critical functions in utilization management and case management. To build confidence and trust, MCG applies the same editorial expertise, evidence-based methods, and human oversight that have long guided our industry-leading content. At the same time, we recognize that many AI solutions fail to meet this standard of transparency and reliability; a gap MCG is uniquely positioned to close.

Grounded in Evidence & Expertise

In today's healthcare landscape, AI is often met with skepticism. Many solutions operate as black boxes, leaving clinicians and health plans uncertain about the reasoning behind recommendations. This lack of transparency makes it difficult to build trust and integrate AI into utilization management and case management workflows. MCG takes a different approach: our Synapse reasoning is built on the same evidence base and clinical expertise that inform our industry-leading guidelines, with the goal of supporting decisions that are transparent, explainable, and clinically sound.

Closing Gaps in AI Reasoning

While large language models (LLMs) offer powerful capabilities, their application in healthcare decision-making is often limited by three critical challenges:

1. **Lack of a Source of Truth** – Without access to trusted guidelines, clinical reasoning from LLM foundation models generates variable and unreliable recommendations.
2. **Overloaded Context** – Patient records can be complex, and when too much information or too many questions are presented at once, models may struggle to prioritize what is clinically relevant. This increases the risk of omissions or errors in reasoning.
3. **Lack of Quantitative Evaluation** – Without systematic evaluation against defined ground truths, teams lack a clear starting point for improvement. When changes are made, there is no way to confirm whether they actually addressed the problem or performed reliably across the entire dataset.

MCG addresses these challenges by grounding our Synapse reasoning in trusted clinical guidelines, structuring information to reduce cognitive overload, and applying rigorous, quantitative evaluation methods at every stage of development.

Return on Investment in Time Savings

MCG has developed AI solutions for providers since 2019 and helped **reduce** utilization review times by **up to 85%**.

Overview of Methodology for MCG Synapse Reasoning Development

MCG Synapse reasoning is built through a structured process designed to ensure accuracy, transparency, and alignment with clinical standards. MCG data scientists work alongside physician editors, combining technical expertise with clinical insight. Each cycle involves:

- **Structuring Guidelines** – Collecting and structuring MCG care guidelines in a way that allows LLM agents to navigate them with ease.
- **Agent Design** – The Synapse reasoning agent is engineered to traverse MCG's guideline content, asking precise, context-driven questions to ensure accurate reasoning.
- **Data Collection** – Numerous real-world patient encounters are selected and clinical documentation deidentified in accordance with HIPAA standards.
- **Human Expert Annotation** – MCG physician editors and informaticists review encounters against MCG care guidelines, establishing ground truth for evaluation of Synapse reasoning performance.
- **Consensus Review** – Annotator disagreements are systematically resolved through structured review. As a result of this process, guideline-specific context and conventions are created. This ensures that clear and clinically valid instructions are delivered to the Synapse reasoning agent.
- **Performance Evaluation** – AI outputs are tested against annotator labels, with a thorough analysis of error modes.

The MCG Commitment to Trust & Accuracy

AI in healthcare only succeeds if its reasoning is transparent, reliable, and aligned with high-quality, clinical standards. MCG's approach supports all three. By grounding MCG Synapse reasoning in trusted, evidence-based guidelines, reducing the noise of overloaded patient context, and applying rigorous evaluation against human-annotated ground truths, we eliminate the uncertainty that often undermines other solutions in the market.

The result is not just innovation for its own sake, but AI reasoning that health organizations can trust to support decisions with the same rigor and clarity as the evidence-based MCG care guidelines.