

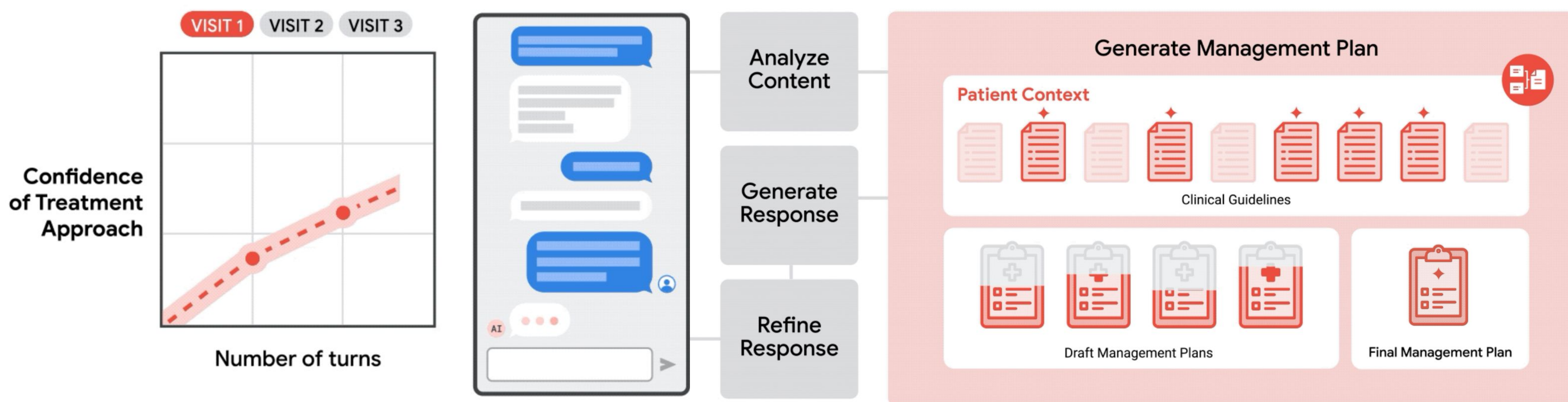
AMIE | Towards Conversational AI for Disease Management



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Motivation: LLMs have shown promise in **diagnostic** dialogue, but their capabilities for **management reasoning**, including disease progression, therapeutic response, and safe medication prescription, remain under-explored.

AMIE System: Two-Agent Architecture



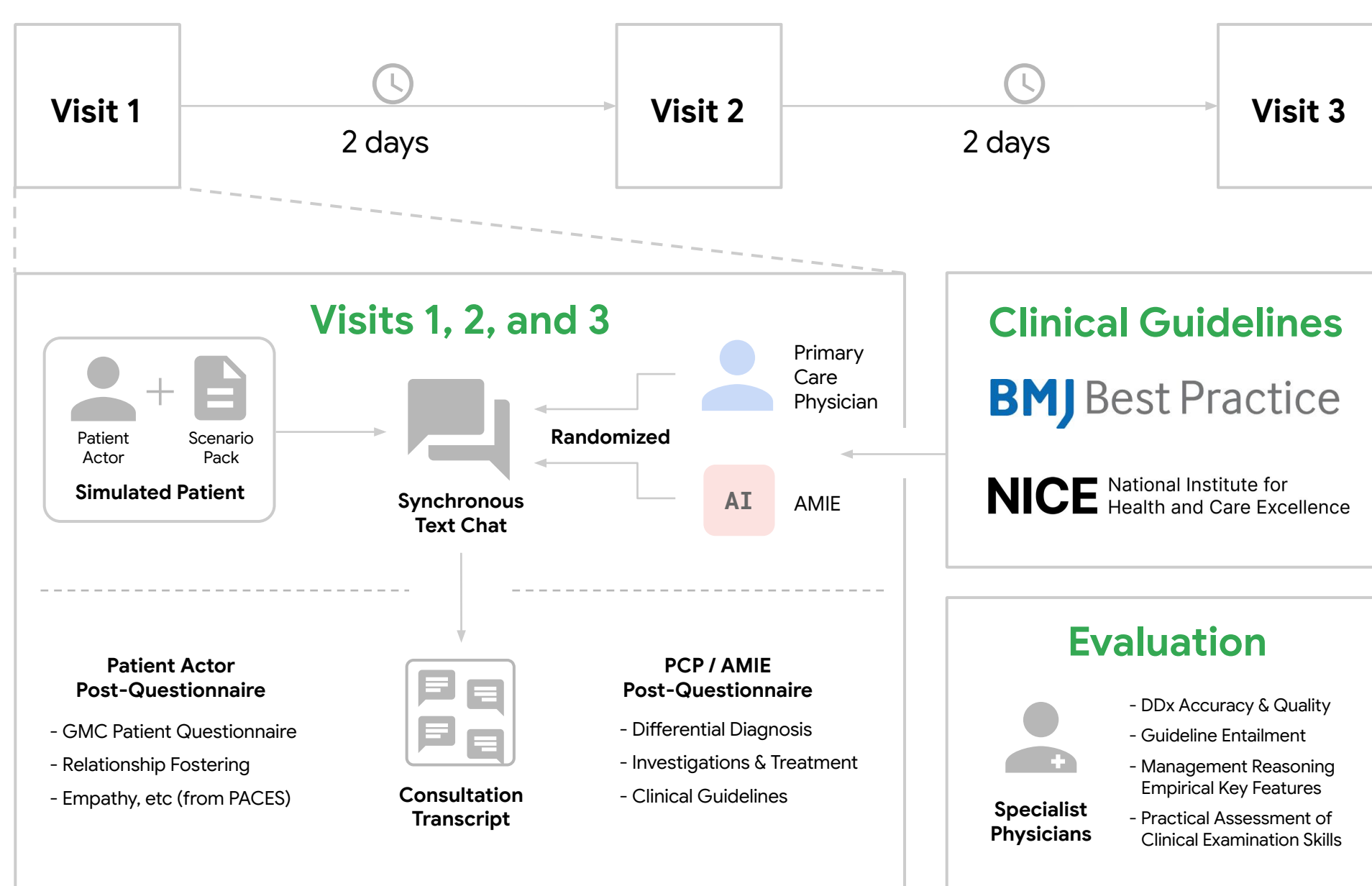
1. Dialogue Agent

Optimized for fluent empathic clinical dialogue (low latency)

2. Management (Mx) Agent

Optimized for reasoning over guidelines & drug formularies

Evaluation 1: Randomized Multi-visit OSCE Study



Methods

- 100 Multi-visit case scenarios across 5 medical specialties
- 627 Clinical guidelines
- 20 Patient actors
- 21 Primary care physicians
- 30 Specialist physicians for triplicate ratings per scenario

Evaluation 2: RxQA Benchmark

Methods: Curated 600 medication reasoning questions grounded in drug formularies and validated by pharmacists. Baseline: 3 PCPs

RxQA example question

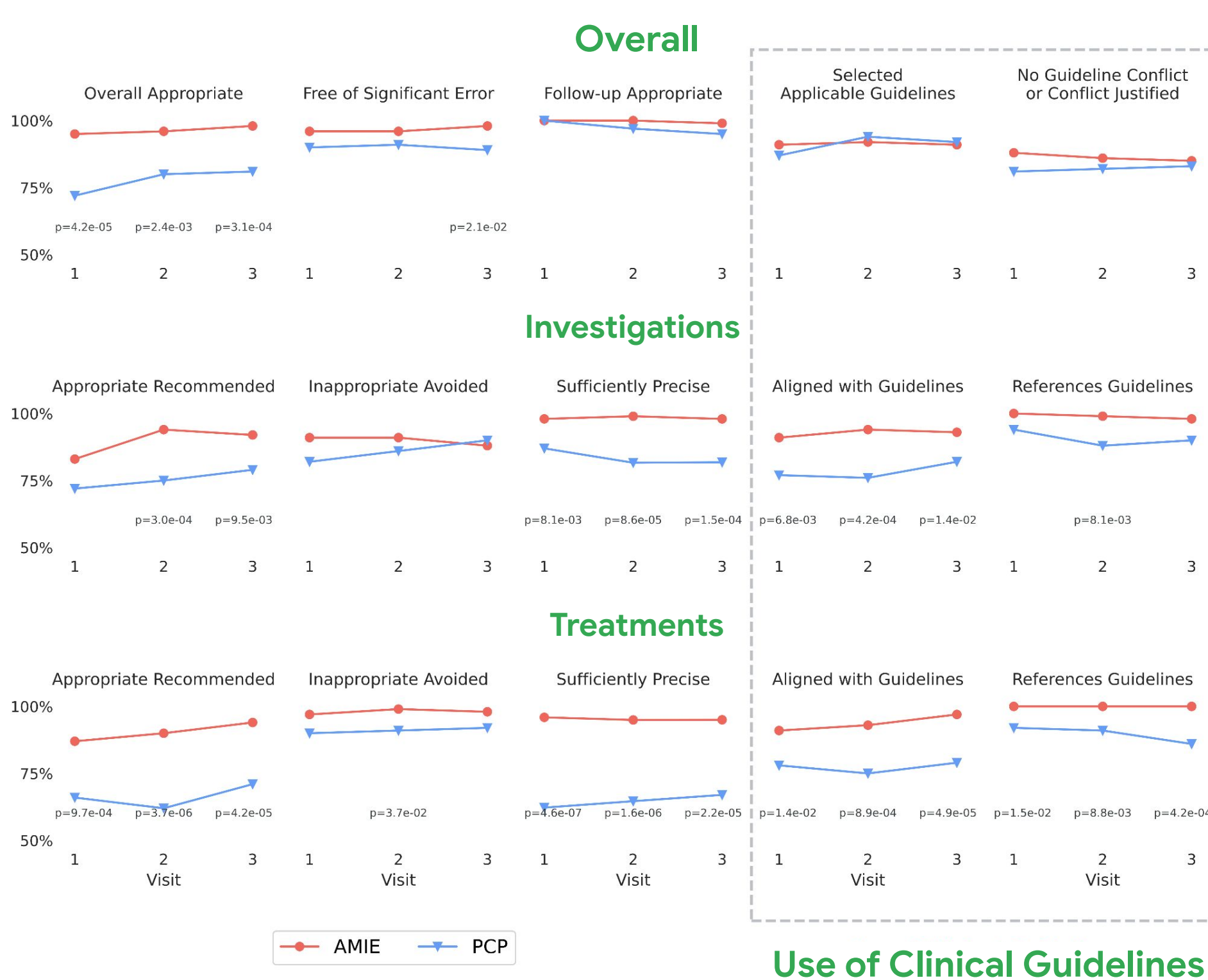
Ms. Evelyn Reed is a 68-year-old woman who arrived at the emergency department due to a bee sting. She has a history of allergic rhinitis, for which she takes loratadine daily. She also has type 2 diabetes and hypertension, managed with metformin and lisinopril, respectively. Upon examination, Ms. Reed exhibits urticaria, angioedema, dizziness, and lightheadedness. Her blood pressure is 90/60 mmHg, and her heart rate is 110 bpm. Considering the immediate need to address her allergic reaction and her current hemodynamic status, determine the most appropriate initial dose and administration route for diphenhydramine hydrochloride.

- A. 25 mg intramuscularly
- B. 50 mg intravenously over 1 minute
- C. 25 mg intravenously over 5 minutes
- D. 10 mg orally

Formularies: [openFDA](#) [BNF](#) British National Formulary

Benchmark: github.com/google-health/rxqa

Management Plan Quality



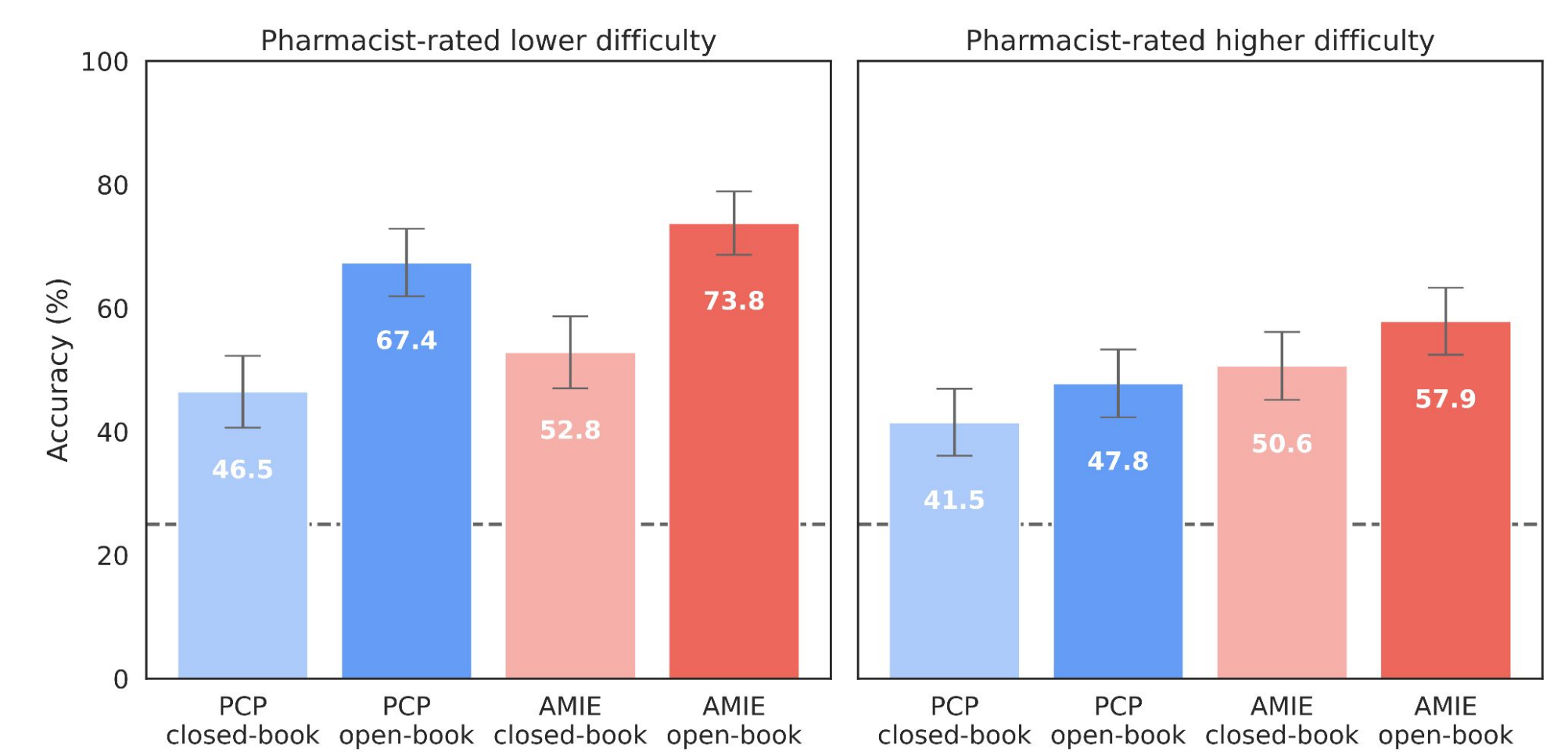
Results

AMIE's Mx plans were on par or better than PCPs for all criteria.

AMIE > PCPs for

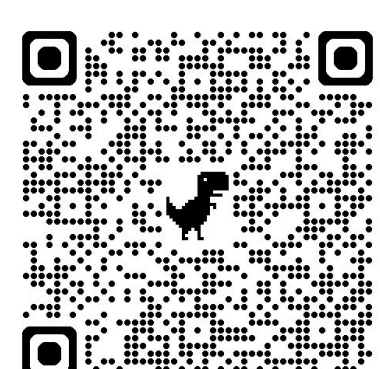
- Overall appropriateness of the management plan
- Preciseness of recommendations
- Guideline alignment

Results: AMIE > PCPs on difficult questions, and using external drug formularies helps both.



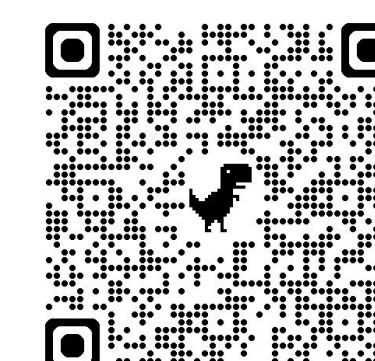
Conclusion: AMIE's management reasoning capabilities are on par or better than PCPs in simulated evaluation settings.

Building on this work: Real-world Prospective Clinical Studies with AMIE



Beth Israel Deaconess Medical Center

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