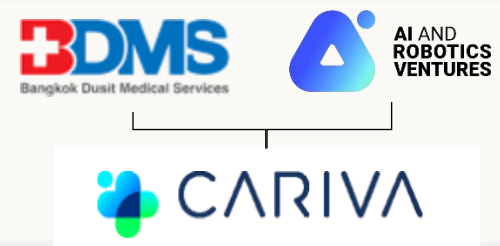# // Agentic AI
The Future of Personalized & Preventive Healthcare

with: Tara Sripo, M.D.

role: Medical AI Specialist

org: PreceptorAI powered by CARIVA

Outline

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AI vs Agent

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Summary

What is Agentic AI?

Artificial Intelligence

Machine Learning

Deep Learning

Generative AI

Speech Generation

Music Generation   *Image Generation*

Video Generation

Protein Design

"LLM"
Large Language Model

Text Generation (including code!!)

etc.

"MLLM"
Multimodal Large Language Model

understand and generate various forms of content ranging across text, images, video, audio, and more.

Agentic AI ?

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🏁 "AGI" : Artificial GENERAL Intelligence
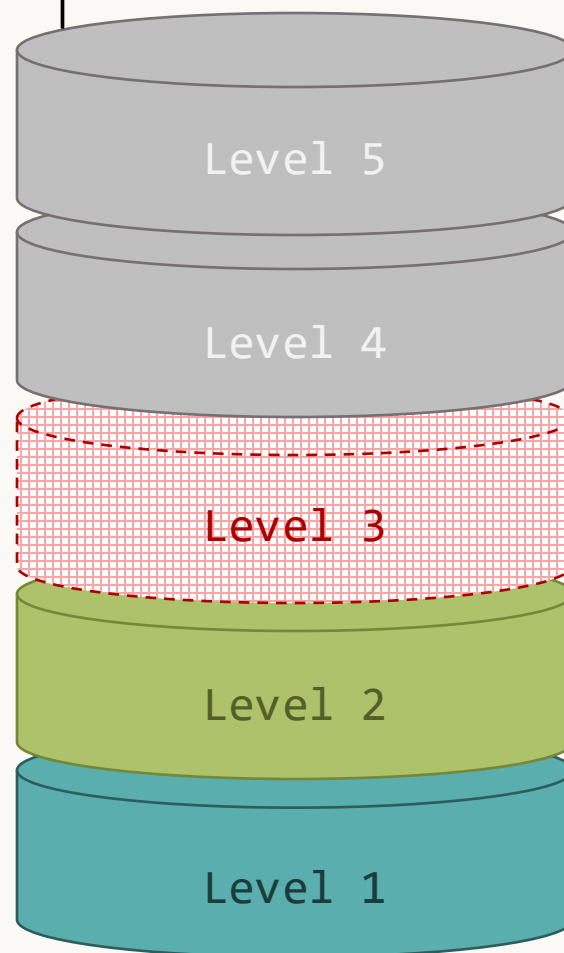
Level 5 — Organizations — AI that can do the work of an org.

Level 4 — Innovators — AI that can aid in invention

Level 3 — Agents — Systems that can take actions

Level 2 — Reasoners — Human-level problem solving

Level 1 — Chatbots — AI with conversational language

Prompt chaining decomposes a task into a sequence of steps, where each LLM call processes the output of the previous one.
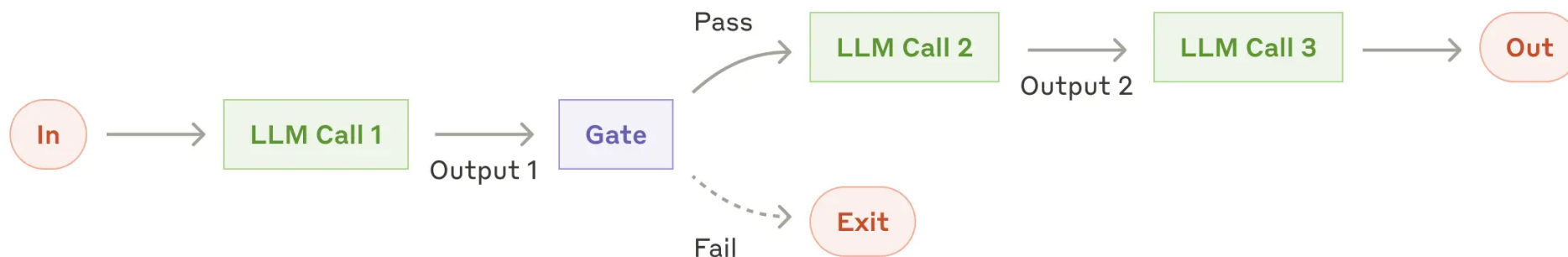
Example: Generating Marketing copy -> then translating it into a different language.

https://www.anthropic.com/engineering/building-effective-agents

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Routing classifies an input and directs it to a specialized follow up task.

Example: Routing surgical questions to LLM Call 1
pediatric questions to another LLM (Call 2)
to optimize accuracy (or cost, speed).

https://www.anthropic.com/engineering/building-effective-agents

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AI vs Agent

OpenAI

A practical guide to building agents

What is an agent?

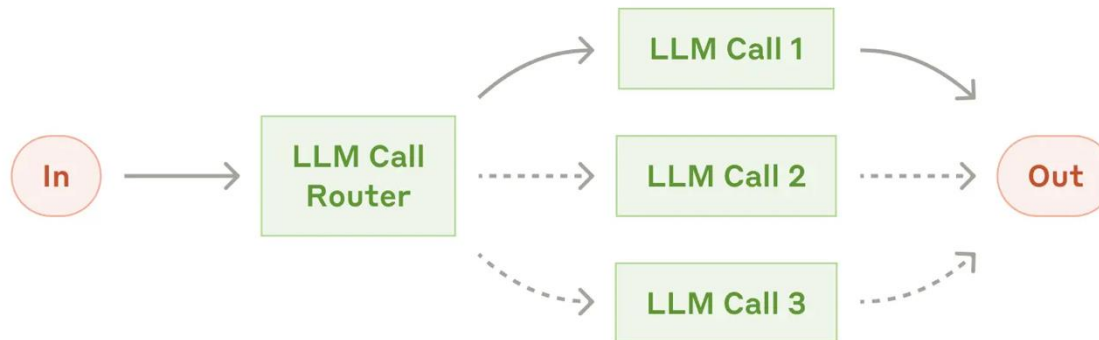While conventional software enables users to streamline and automate workflows, agents are able to perform the same workflows on the users' behalf with a high degree of independence.

Agents are systems that independently accomplish tasks on your behalf.

A workflow is a sequence of steps that must be executed to meet the user's goal, whether that's resolving a customer service issue, booking a restaurant reservation, committing a code change, or generating a report.

Applications that integrate LLMs but don't use them to control workflow execution—think simple chatbots, single-turn LLMs, or sentiment classifiers—are not agents.

More concretely, an agent possesses core characteristics that allow it to act reliably and consistently on behalf of a user:

01   It leverages an LLM to manage workflow execution and make decisions. It recognizes when a workflow is complete and can proactively correct its actions if needed. In case of failure, it can halt execution and transfer control back to the user.

02   It has access to various tools to interact with external systems—both to gather context and to take actions—and dynamically selects the appropriate tools depending on the workflow's current state, always operating within clearly defined guardrails.

4   A practical guide to building agents

https://cdn.openai.com/business-guides-and-resources/a-practical-guide-to-building-agents.pdf

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Agents begin their work with either a command from, or interactive discussion with, the human user.

Once the task is clear, agents plan and operate independently, potentially returning to the human for further information or judgement.

2. Executor

1. Planner

Action

Human ← - - - → LLM Call

Environment

Feedback

3. Evaluator

Stop

https://www.anthropic.com/engineering/building-effective-agents

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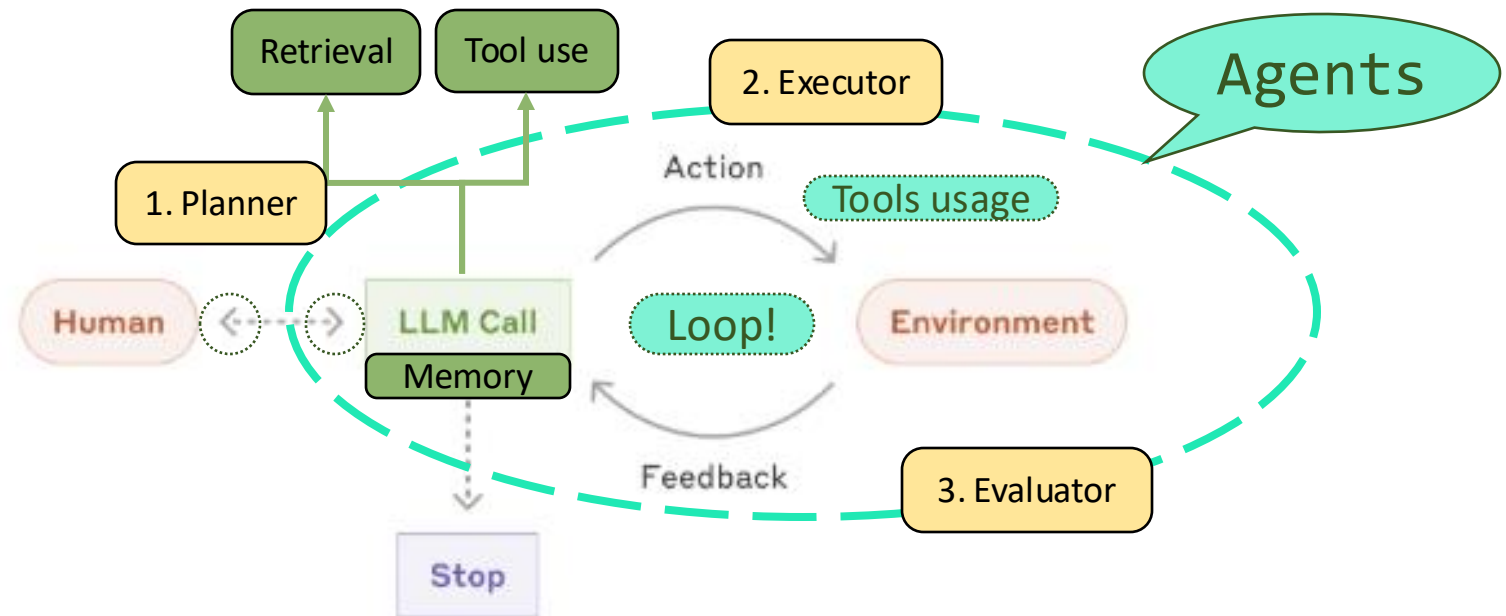Agents begin their work with either a command from, or interactive discussion with, the human user.

Once the task is clear, agents plan and operate independently, potentially returning to the human for further information or judgement.

https://www.anthropic.com/engineering/building-effective-agents
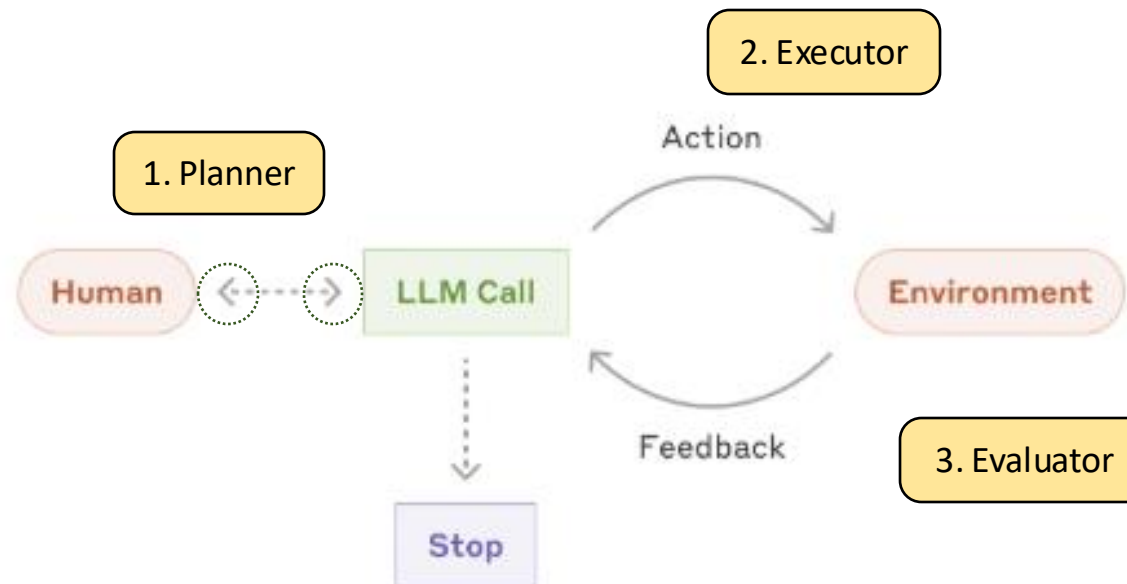
AI vs Agentic AI

	General AI Workflow	**Agentic AI**
Core Concept	**Predefined** sequence of LLM calls	An **autonomous** system that reasons and acts to achieve a goal
Workflow	"**Static and Rigid**" The path is determined by human.	"**Dynamic and Adaptive**" The agent determines its own path.
Decision-Making	"**Human-led**" All decisions are pre-programmed.	"**AI-led**" The agent makes decisions in real-time.
Complexity	Best for *well-defined, repeatable tasks*.	Capable of handling *complex, unpredictable problems*.
Human Role	**Designs the workflow**	**Provides the goal** and **makes the final clinical decision**.

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	Complexity & ambiguity	Value	Viability	Cost of error
Coding	✅ design doc → PR	$$$	Claude is excellent at coding!	Easily verifiable with good unit tests & CI
Search	✅ ambiguous, multi-step process	$$ - can save hours of research time	Search tools + Claude are a great combo!	Can double check results with citations
Computer use	✅ autonomously navigating interfaces	$ - RPA, each complex task automated is >$5	Sonnet is quite good at using screenshots + click tools	Easily reversible - just click again, go back
Data analysis	✅ need to analyze data with unknown contents	$$	Claude is great at text-to-SQL, dataviz, etc	Needs double checking, but error rate low enough to be useful

https://www.anthropic.com/engineering/building-effective-agents

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1 | Is the task complex enough? | No ⟶ Workflows
Yes ⟶ Agents

2 | Is the task valuable enough? | <$0.1 ⟶ Workflows
>$1 ⟶ Agents

3 | Are all parts of the task doable? | No ⟶ Reduce scope
Yes ⟶ Agents

4 | What is the cost of error /error discovery? | High ⟶ Read-only/human-in-the-loop
Low ⟶ Agents

How We Build Effective Agents: Barry Zhang, Anthropic (YouTube video)

Outline
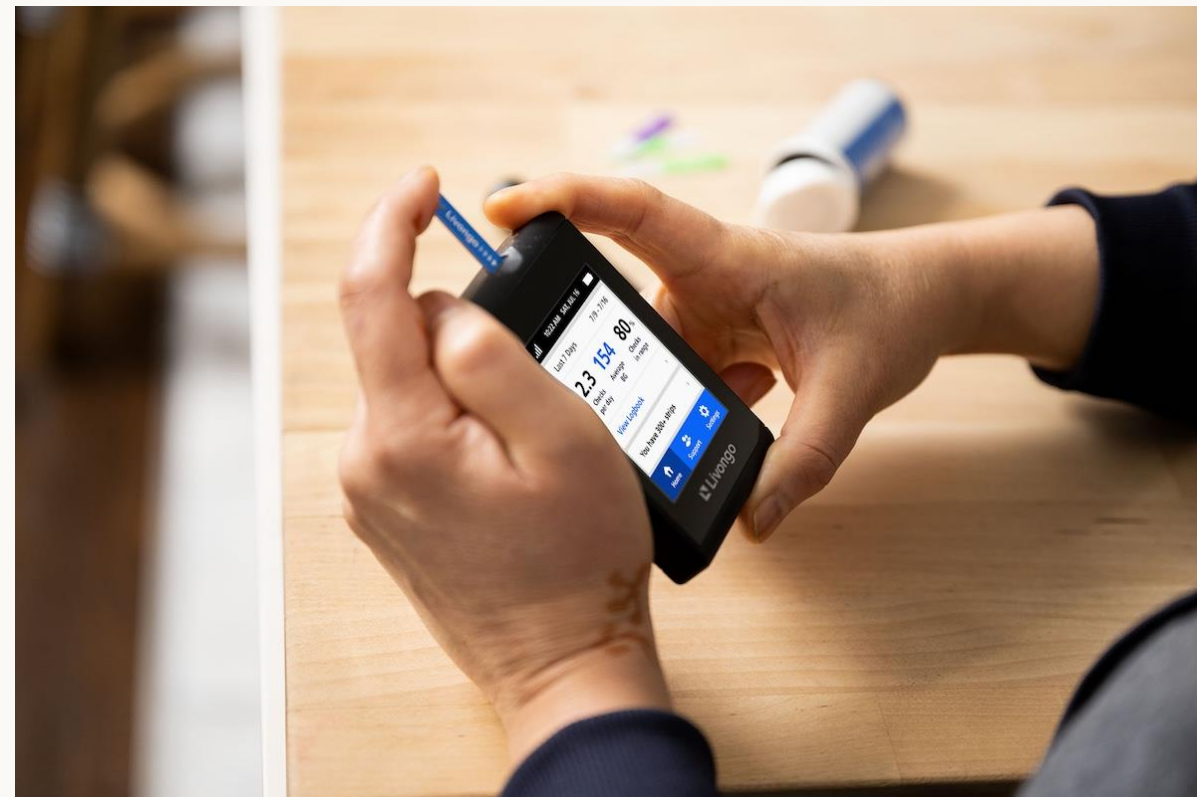
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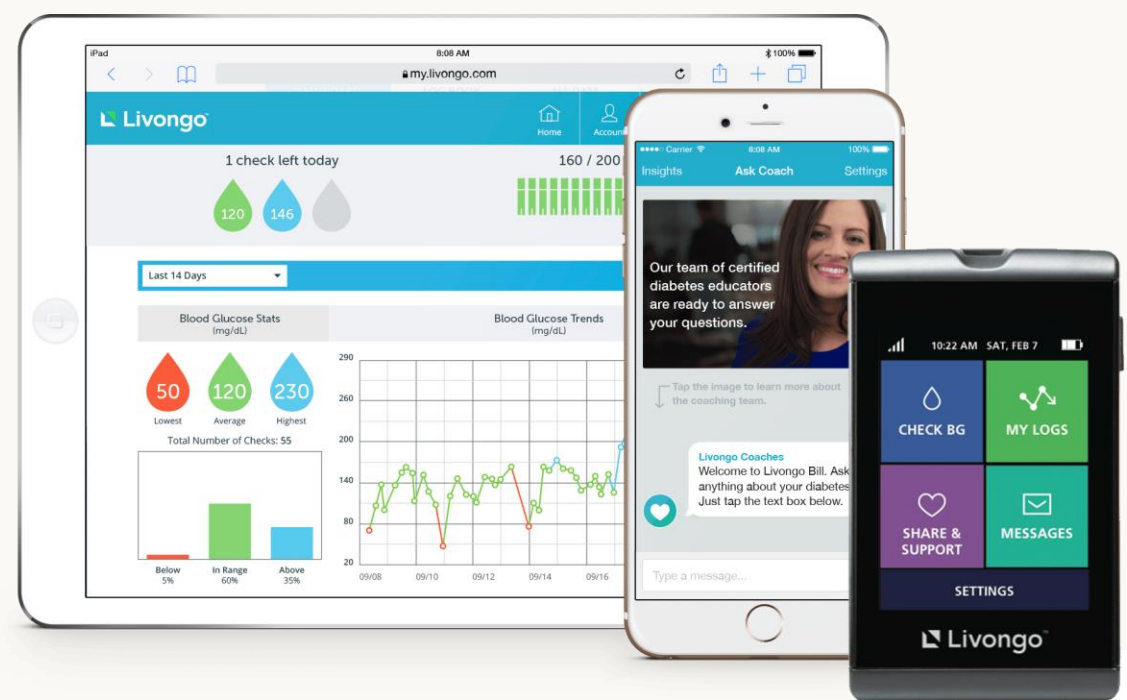Summary

Proactive identification of patient with diabetes at risk of uncontrolled outcomes using machine learning

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Using machine learning on blood glucose trends to predict & prevent uncontrolled diabetes
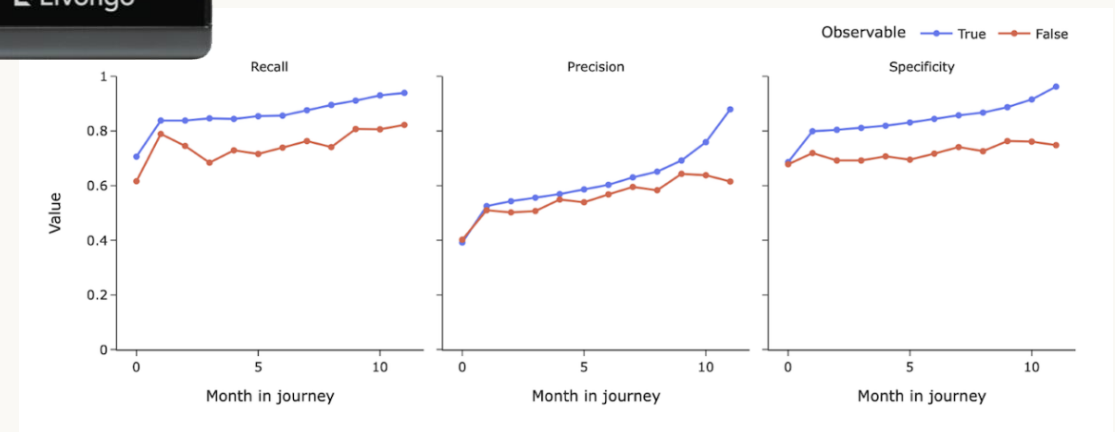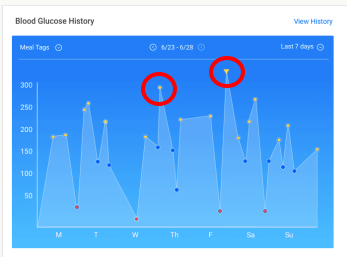
Proactive Identification of Patients with Diabetes at Risk of Uncontrolled Outcomes during a Diabetes Management Program: Conceptualization and Development Study Using Machine Learning.

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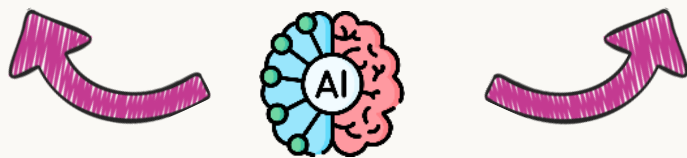
An Agentic AI must decide whether to notify the doctor or verify with the patient first.

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Mayo Clinic Advanced Care at Home

Mayo Clinic advanced care at home: Mayo Clinic Health System (YouTube video)

The future of Personalized healthcare with AI

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Margaret R. Paulson[1], Ricardo A. Torres-Guzman[2], Francisco R. Avila[2], Karla C. Maita[2], John P. Garcia[2], Antonio J. Forte[2], Gautam V. Matcha[3], Ricardo J. Pagan[3] and Michael J. Maniaci[3*]

Table 1 Patient Demographics, Average Length of Stay, 30-Day Readmission Rate, 30-Day Mortality Rate, Severity of Illness, and Risk of Mortality of All ACH Patients

	MCF	MCA	NWWI	TOTAL
Patients	543	43	337	923
Mean Age (years)	70.88 (SD 14.46)	71.82 (SD 14.37)	70.90 (SD 14.48)	70.88 (SD 14.46)
Male patients (%)	53.2% ($n = 289$)	55.8% ($n = 24$)	55.7% ($n = 188$)	54.3% ($n = 501$)
Avg. LOS (days)	4.09	4.25	4.10	4.10
30-day Readmission Rate (%)	11.6% ($n = 63$)	4.7% ($n = 2$)	11.3% ($n = 38$)	11.2% ($n = 103$)
30-day Mortality Rate (%)	1.7% ($n = 9$)	0% ($n = 0$)	2.4% ($n = 8$)	1.8% ($n = 17$)
Severity of Illness (Avg.)	2.98 (SD 0.78)	3.02 (SD 0.82)	2.72 (SD 0.82)	2.89 (SD 0.81)
Risk of Mortality (Avg.)	2.81 (SD 0.92)	3.02 (SD 0.85)	2.58 (SD 0.91)	2.73 (SD 0.92)

Abbreviations: *ACH* Advance care at home, *MCF* Mayo Clinic Florida, *MCA* Mayo Clinic Arizona, *NWWI* Northwest Wisconsin, *SD* Standard deviation, *LOS* Length of stay, *Avg* Average

Paulson, M.R., Torres-Guzman, R.A., Avila, F.R. et al. Severity of illness and risk of mortality in Mayo Clinic's virtual hybrid advanced care at home program: a retrospective cohort study. BMC Health Serv Res 23, 287 (2023)

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The major contributing factor to maternal and child mortality is a lack of access to preventive care information.

AI FOR ASSISTING NGOS IN IMPROVING MATERNAL AND CHILD HEALTH OUTCOMES

https://teamcore.seas.harvard.edu/ai-assisting-ngos-improving-maternal-and-child-health-outcomes/

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To maximize the impact of limited health workers, it's crucial to identify the best recipients for live service calls that are designed to boost engagement.
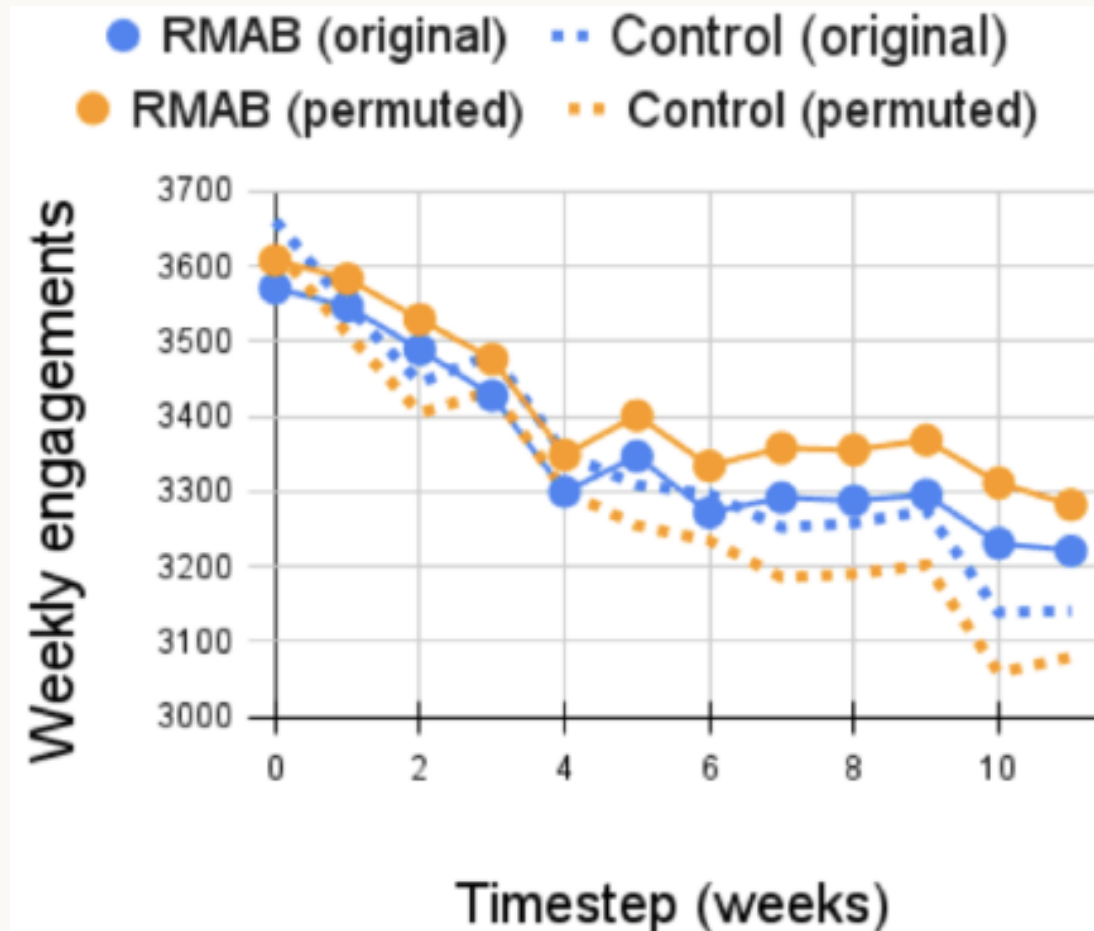

States Covered in India	19
Partner NGOs	40
Partner Hospitals	97
Health Workers Trained	235K
Beneficiaries	27.2M

Scale of ARMMAN

~1:100

The future of Public health policy with AI

By correctly predicting the most probable dropout group, SAHELI was able to **reduce dropouts by 30.5%** with its limited resources.

https://teamcore.seas.harvard.edu/ai-assisting-ngos-improving-maternal-and-child-health-outcomes/

The future of Public health policy with AI
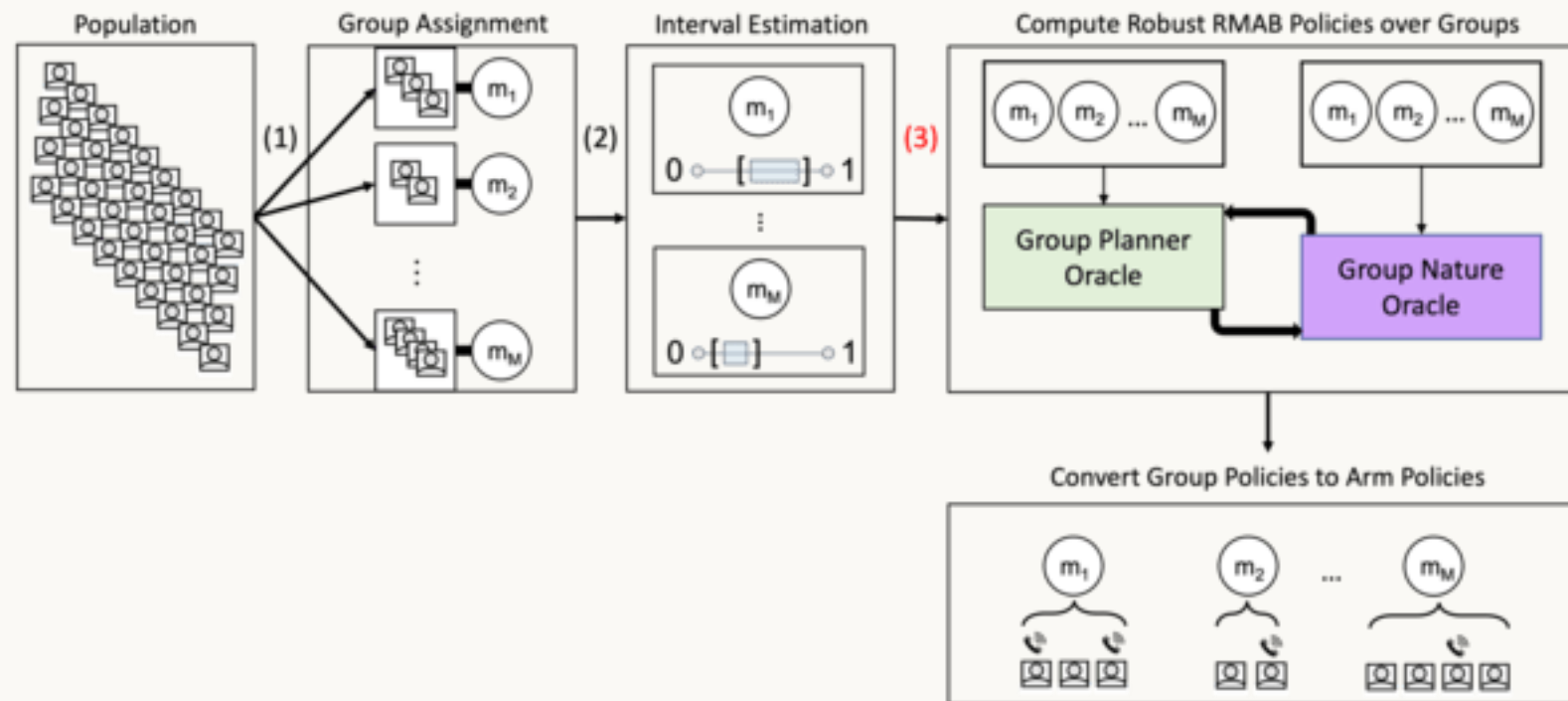
Identify impactful & solvable problem

Simplicity

"Low-cost" Computation

https://teamcore.seas.harvard.edu/ai-assisting-ngos-improving-maternal-and-child-health-outcomes/

DUGA | PreceptorAI | CARIVA

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Timeline of Agent Releases

Application Domains

% With Safety Measure

- Publicly available formal safety policy: 19.4%
- Publicly reported external safety testing: 7.5%
- Publicly reported safety testing by developer: 9.0%

https://aiagentindex.mit.edu/
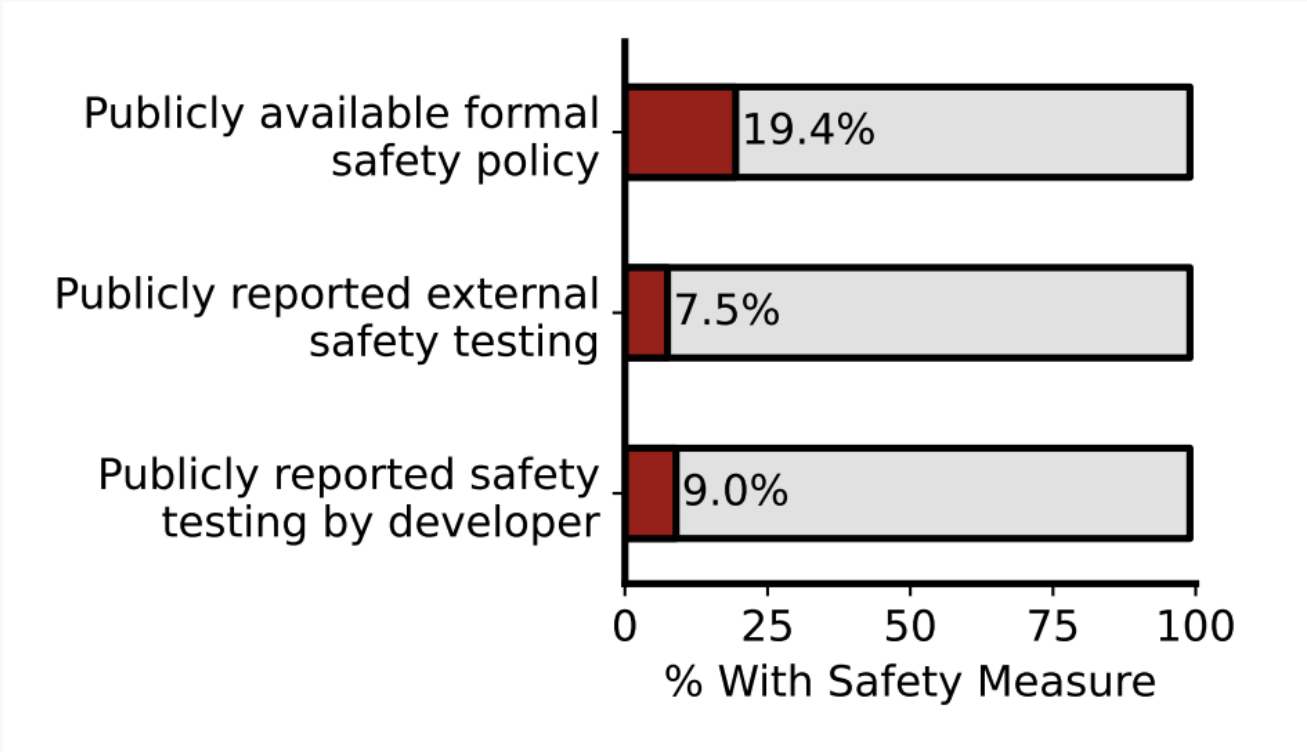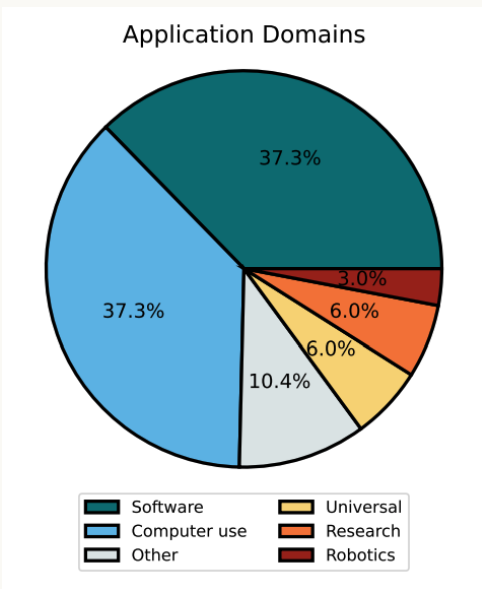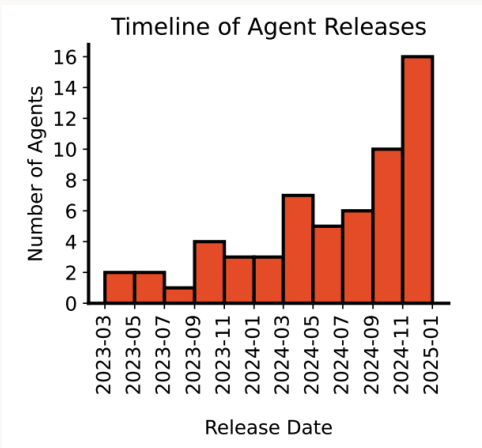
Agentic AI in Healthcare