

AI MedAgent FSD

Full Self Delivery: supervised autonomous closed-loop medication management

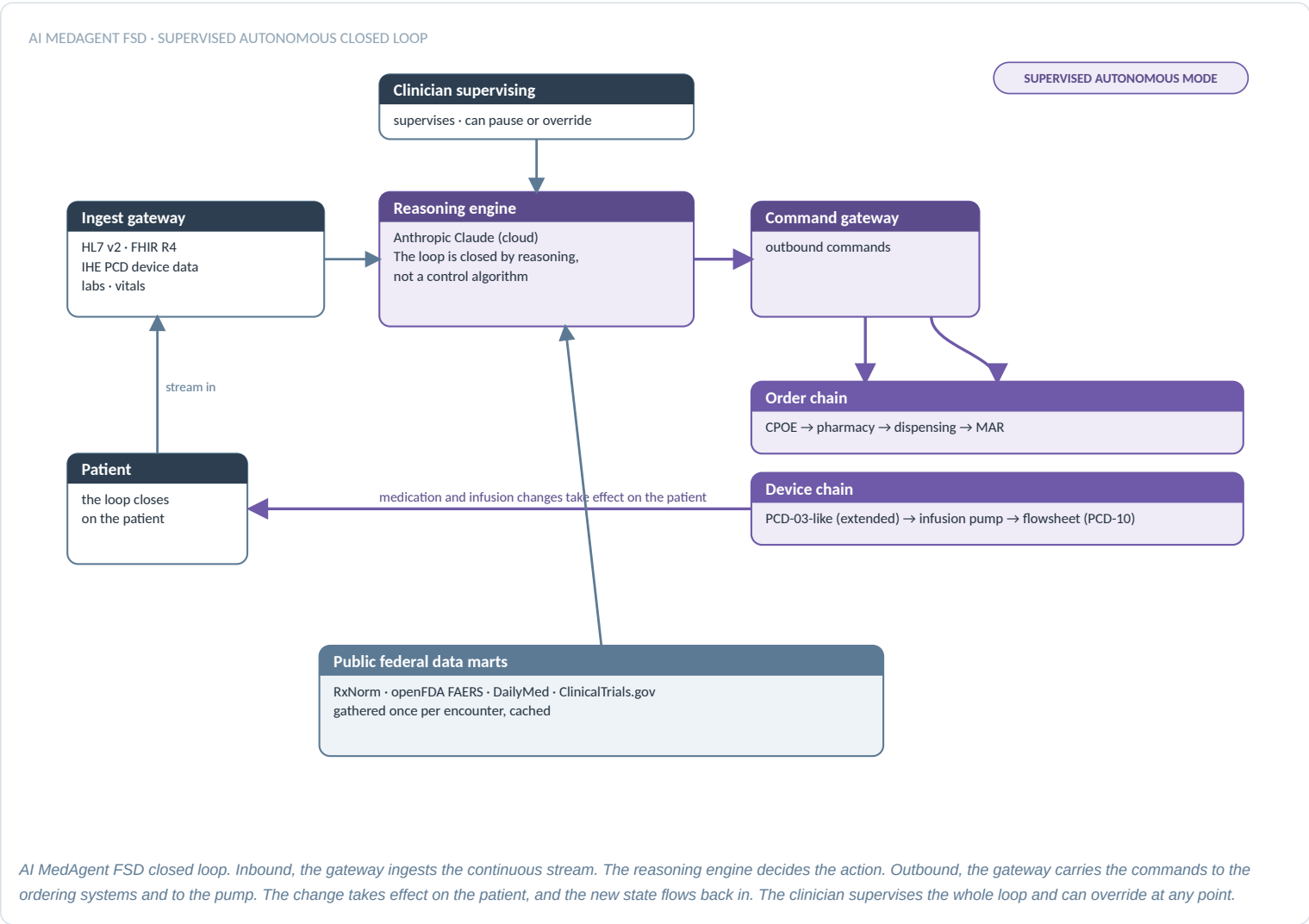
A demonstration of a future capability. Supervised autonomous mode. Not cleared for clinical use. Not a medical device.

What it is

AI MedAgent FSD, for Full Self Delivery, extends the method from advisory to autonomous. In FSD mode the system does not stop at a recommendation. It reasons over the live stream and decides: it issues a medication order and drives it through ordering, pharmacy, dispensing, and the administration record, and it changes an infusion rate by commanding the pump directly. It also decides when not to act, and when the right action is one it is not authorized to take, in which case it hands the decision back. The clinical team is aware and supervising throughout, exactly as a driver supervises an autonomous vehicle. This is a demonstration of a future capability. It is not cleared for clinical use.

The unique invention: reasoning as the controller

Closed-loop medication delivery is not new. Target-controlled infusion, closed-loop anesthesia, and the artificial pancreas have existed for decades. What they share is a fixed control algorithm: a feedback controller, a pharmacokinetic model, or a threshold rule that maps one measured variable to one action. AI MedAgent FSD differs in the one way that matters. The loop is closed by a large language model reasoning in the cloud over the entire medication context, not by a trigger algorithm. The controller is reasoning, not a rule. It weighs the trajectory, the active medications, the patient's state, and current federal drug-safety evidence together, in plain clinical logic, and decides the action the way a clinician would. That is the invention: autonomous closed-loop medication management driven by language-model reasoning rather than a control algorithm.



How it acts

The order chain. MedAgent issues a medication order and drives it through CPOE, pharmacist verification, the dispensing cabinet, and the EHR Medication Administration Record, using standard HL7 and FHIR messaging.

The device chain. MedAgent sends an infusion rate command to the pump with new parameters, the pump takes the new rate under supervision, and the change is reflected in the EHR nursing flowsheet by IHE PCD-10. One point deserves precision, because it matters. IHE PCD-03 Communicate Infusion Order, in the PIV profile, is one-directional by design: a pump receives a proposed program and a clinician confirms it at the bedside. No PCD profile today covers reprogramming a running infusion autonomously, without that bedside confirmation. FSD therefore requires an extension beyond current PIV semantics. That gap is not incidental to this work; it is a direct consequence of moving the controller from a bedside algorithm to reasoning in the cloud, and closing it is precisely the kind of question the standards bodies governing physiologic closed-loop control exist to answer.

The loop closes. The action takes effect on the patient, and the changed state flows back into the stream, where the next reasoning pass picks it up. The gateway now runs in both directions: ingesting and commanding. In the demonstration, the patient's response to a commanded change is a first-order approximation, illustrative only and not a validated pharmacodynamic model. It is labeled as such on screen. What is real is the loop itself: the reasoning is live, the decision drives the patient state, and the changed state is what the next pass reasons over.

It decides; it does not simply act. A controller that can only act is an actuator. Every pass returns one of three decisions. *Act*: a change is warranted and the adequate change fits inside the clinician-ordered bounds. *Hold*: no change is warranted, and none is made. *Escalate*: a change is warranted but cannot be adequately delivered, because the ordered envelope is exhausted or the right response is one the controller is not authorized to make. The third is the one that distinguishes reasoning from a rule. A feedback controller at 93 percent of its ceiling computes the next increment and sends it. Asked to titrate a vasopressor two units from its ordered maximum against a still-falling pressure, MedAgent declined, on the reasoning that the step would be permitted but insufficient, and that spending the last authorized increment would exhaust its authority while delaying the clinician. A legal action is not automatically the right action. No fixed algorithm holds that distinction, because no fixed algorithm has a concept of its own authority as a finite resource.

The clinician supervises. Every action is recorded in the EHR. The physician is aware, supervising, and able to pause or override at any point. FSD is a supervised autonomous mode, not an unattended one.

Supervised autonomy and governance

- FSD is a supervised autonomous mode. The clinical team is aware and able to intervene at any time.
- In the language of the field, FSD is a physiologic closed-loop controller for medication management, and the safety framework that governs autonomous physiologic controllers applies. The demonstration is built to be examined against it rather than to assert compliance with it.
- The clinician defines the operating bounds for every controlled parameter: minimum, maximum, and maximum single step. The controller reasons inside them and does not set them.
- Bounds are enforced server-side, after the reasoning returns. The reasoning is the controller; the guard rail does not depend on the controller behaving. When it engages, it says so in the record rather than passing a clamped value through silently.
- Every decision declares its own fallback state if rejected downstream, and the conditions under which the controller would stop acting autonomously and hand back to the clinician.
- When a reasoning call cannot complete, no action is taken and the setting is unchanged. The controller does not act without a decision.
- Every autonomous action is written to the EHR record, so the full sequence is auditable.
- The reasoning engine decides; it does not execute silently. Actions are surfaced with the reasoning behind them.
- As with the advisory mode, the demonstration patient is synthetic, traffic is TLS 1.2 or higher, and the model key is held server-side.

What it is not

AI MedAgent FSD is not cleared for clinical use and is not a medical device today. It is a demonstration of a future capability, built to show the method and to invite the scrutiny a capability like this deserves. It does not replace the clinician; it removes low-value manual steps and keeps the clinician supervising, the way autonomous driving keeps a supervising driver.

Patent and provenance

The advisory method is patent pending under US provisional applications filed in 2026. The autonomous closed-loop extension, in which the loop is closed by language-model reasoning rather than a control algorithm, is now patent pending under a separate US provisional application filed in 2026. The lineage is continuous: real-time reasoning over a live physiological signal (a processed-EEG algorithm, 1986, a feedback signal for closed-loop anesthesia), continuous medication-safety reasoning (the advisory method), and now the reasoning engine as the controller that closes the loop.

For additional information, contact Daniel Pettus at danpettus@outlook.com.