

INNOVATOR CASE STUDY



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From Clinical Insight to Hospital Value in Brazil

The Global Health Innovation Grants (GHIG) program focuses on fostering the growth and scale of health-focused innovations and social entrepreneurs in low- and middle-income countries (LMICs) through one-year grants. Since 2016, liH has worked with grantees to identify metrics that align with their project objectives and activities. Analyzing this data, liH provides an assessment of the portfolio in each cohort, as well as over time, to identify areas for improvement for the program. *This case study is one of six from the GHIG9 grantee cohort.*



1. Company and Innovation Overview

Founded in 2019, [Munai Health](#) is a health technology company based in Curitiba, Brazil, that addresses the fragmentation of clinical data across hospital systems. Munai's **clinical intelligence platform, INTI**, is designed to close that gap. It **connects a hospital's existing data sources and applies machine learning to detect clinical deterioration**, including sepsis, acute kidney injury, and other in-hospital adverse events, before it becomes an emergency. The platform also supports antimicrobial stewardship, clinical documentation, and discharge decisions. Munai sells the platform to hospitals and health insurers rather than to individual patients; the platform reaches patients through the clinical teams caring for them. Together, these capabilities position INTI as clinical



Industry/ Sector	Health technology/AI-powered clinical intelligence
Geographic Focus	Brazil (primarily), with hospital deployments in Peru
Year Founded	2019

Business Type	For profit
AI Innovation	AI-powered clinical intelligence platform integrating predictive machine learning and large language model (LLM) tools into hospital workflows.
Headquarters	Curitiba, PR, Brazil

intelligence infrastructure that connects hospital data, AI-generated insights, and clinical workflows.

The platform now runs in more than 30 partner hospitals across Brazil and Peru and has processed some 18 million medical encounters. Its **deterioration prediction system has been validated in a multicenter study** spanning six Brazilian hospitals,¹ and the company's partners range from public health authorities and Becton Dickinson (BD) to international grant-makers including the Gates Foundation, the Inter-American Development Bank, and The Pfizer Foundation.

Munai increasingly operates as clinical intelligence and learning health system infrastructure, extending beyond its predictive models to connect clinical data, decision support, and hospital workflows.

2. Problem Definition and Context

Consider a hospitalized patient whose condition begins to change through several small signals rather than one obvious emergency. A gradual rise in heart rate. A creatinine level that edges upward over two days. Each **value is captured and stored, but in a different system, and no single view brings them together**. Individually, none of the changes crosses the threshold that would trigger an urgent response. Together, they describe a patient whose risk of deterioration is rising in a way the fragmented data landscape makes it difficult to see. By the time the clinical team recognizes the pattern, the patient may already be hours into a decline that earlier intervention might have slowed or prevented. This scenario is an illustrative example rather than a documented Munai case, but it reflects the type of clinical gap the platform is designed to address.

This **data fragmentation problem** is common across Brazil's health system. Patient information, including laboratory results, admission records, and clinical notes, is generated across different



Photo credit: Munai.

encounters and stored in electronic health records and other clinical systems. Public and private institutions, municipal and state networks, hospitals and clinics each run their own record-keeping infrastructure, so the pieces of a patient's history end up scattered across platforms that do not readily exchange information.² The same fragmentation repeats inside a single hospital, where the electronic health record and the laboratory system do not necessarily feed into a common view. Although data is digitized and readily available, it often serves as **noise rather than actionable information**.

For each deterioration event, approximately USD\$8,000 in additional hospitalization and ICU costs may be incurred, according to estimates from Brazilian hospital data. The core challenge is not a lack of data, but rather the gap between having information and being able to act on it.

Each value is captured and stored, but in a different system, and no single view brings them together.... For each deterioration event, approximately USD\$8,000 in additional hospitalization and ICU costs may be incurred.



Photo credit: Munai.



3. The Solution

To address the data fragmentation challenge, Munai developed INTI, an **AI solution that uses machine learning and LLMs** drawn from the hospital's existing systems. Rather than requiring clinicians to open and monitor a separate system, the platform **delivers alerts, dashboards, and decision support prompts** directly through the electronic health record and other tools clinicians already use.

The platform targets several clinical areas. Gradient-boosted tree models trained on historical clinical data predict in-hospital deterioration, re-admission, and ICU re-admission. LLMs support clinical documentation by **transcribing audio, retrieving information across databases, producing summaries, and comparing patient data** against local guidelines to **flag whether care is aligned**. Together, these tools turn data that would otherwise remain scattered into real-time alerts, dashboards, and decision-support outputs that the clinical team can use during routine care.

Munai is designed to connect clinical insight with action. The platform brings together fragmented clinical data to identify patient risks, delivering relevant alerts to the appropriate care teams through the systems they already use. These alerts are linked to defined clinical response workflows, helping teams act on the information and measure what happens afterward. In this way, Munai extends beyond prediction by **connecting clinical intelligence to clinical action and measurable hospital outcomes**.

For patients, the benefit is indirect but material: earlier recognition of deterioration means the clinical team can **intervene before a condition becomes urgent**, and tools such as guideline alignment checks help identify care that may not match local standards.

Flowchart of Munai's Implementation Logic





4. Implementation Strategy

INTI is built on HL7 and FHIR interoperability standards, which allow it to integrate with existing hospital infrastructure without requiring a system replacement.³ The platform sits across the hospital's data sources, runs machine learning models on the combined data stream, and **surfaces alerts and dashboards inside the clinical workflow**. The hospital deploys the platform across its inpatient beds; clinicians do not need to open a separate application—alerts arrive where they already review patient information, such as within the electronic health record interface. The prediction itself is necessary but not sufficient: value appears when the hospital builds a disciplined clinical response around the signal.



5. Challenges Faced

Munai's end users and its buyers are not the same people. Clinicians—physicians and nurses—see the alerts and act on them; hospital executives and administrators decide whether to purchase the platform. In Munai's chief medical officer's telling, **healthcare professionals can value the tool, but if it is not aligned with the hospital's financial strategy, it may not be adopted**. For the clinician, value means a clearer view of patient risk, less time spent piecing information together, and tools that fit into existing workflow. For the hospital executive, value must translate into

operational efficiency, quality improvement, regulatory compliance, or financial return. Compounding this mismatch, **a broad platform that addresses multiple clinical areas can be difficult for a hospital to evaluate and purchase as a single offering**. Munai initially offered the full platform at a single price, which made it harder for hospitals to understand what they were buying.

Revenue predictability is a significant challenge. Professional services—custom machine learning projects for specific partners—provide larger individual contracts and valuable customer relationships, but they are project-based: revenue is less predictable, and margins can be thinner than under a recurring model. Building a larger base of recurring software as a service (SaaS) revenue would offer greater predictability, but this transition takes time in a market where hospital sales cycles are long.

Entering the public sector adds another challenge: legal, contractual, and administrative processes in Brazil can cause substantial delays independent of the technology's readiness. In Munai's account, the initial bureaucratic stage is the major obstacle—not the technology integration itself.

Finally, **the way hospitals are paid for care** can shape how they evaluate tools like Munai's. Under fee-for-service, a hospital bills for each day a patient stays—which means a platform whose clinical benefit includes earlier detection and

Story from the Field: Turning an Alert into Action*

A mid-sized Brazilian hospital deploys INTI across its inpatient beds. Machine learning models generate a risk score for each inpatient, and when a score crosses a threshold, the system issues an alert.

The hospital has incorporated this alert into its clinical governance protocol: a physician is expected to evaluate the flagged patient within one hour, and compliance is reinforced through a hospital-designed incentive. Munai provides the signal; the hospital provides the response protocol, the accountability structure, and the clinical judgment about appropriate action.

* Story is an illustrative composite drawn from Munai's interview and company materials, not a single named hospital followed end to end.

shorter lengths of stay may face a financial logic that does not automatically reward those outcomes. Under bundled payment, by contrast, the hospital bears the cost of complications that extend the stay, aligning financial incentives more naturally with the platform's clinical value. In Munai's assessment, **the payment model shapes how a hospital evaluates the financial case**—one external condition among several (not the only factor, and not something Munai can solve through product design alone).



6. How Challenges Are Overcome

Munai is responding by making both the product and its value proposition easier for hospital decision-makers to evaluate. To bridge the buyer-user gap, the company **anchors its financial case in the approximately USD\$8,000-per-event cost of avoidable deterioration**, and frames the platform's value in terms of quality improvement, complication avoidance, and alignment with accreditation requirements. On the product side, Munai is moving toward a modular structure that **separates basic platform access from individual clinical modules**, making the platform easier for hospitals to understand and buy in stages. Commercially, the company balances near-term flexibility with longer-term predictability: professional services provide cash flow, customer access, and product learning today, while a growing base of recurring SaaS subscriptions builds a more durable revenue stream; partnership collaborations also extend Munai's reach beyond its own sales capacity.

Munai is equally **selective about where and how it expands**. In the public sector, the company's experience shows that the first institutional entry is slow, but once a relationship is established, it can expand into additional use cases. On reimbursement, Munai directs its commercial efforts toward hospitals and settings where the payment structure is more likely to recognize the financial value of avoiding complications, while

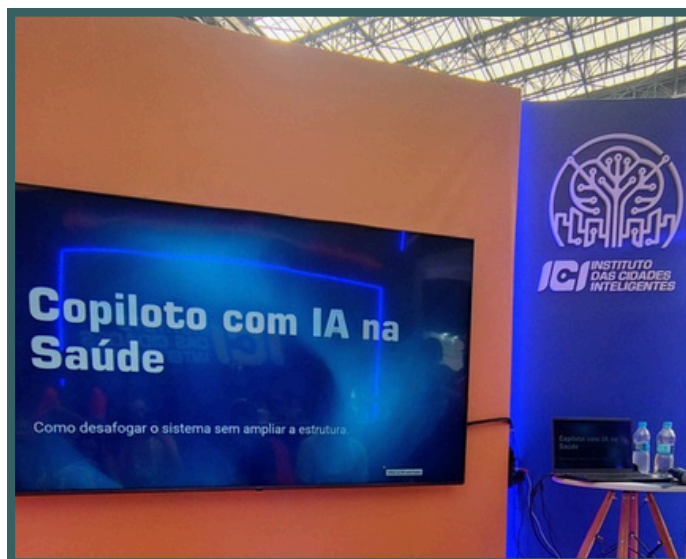


Photo credit: Munai.

making its case in terms—quality improvement, complication avoidance, intensive care unit utilization, accreditation readiness—that apply across payment models.



7. Government Adoption and Public Sector Role

Munai works with both **public and private partners**. Its public-sector engagement began with the local city hall in Curitiba, entering through public clinics that operate on a single unified electronic health record—unlike hospitals, which each maintain their own systems. The primary challenge was not technology integration, but navigating bureaucratic processes. Significant delays resulted from contract negotiations, legal reviews, and administrative approvals, making the initial stage the most difficult to overcome.

Once the initial contract was in place, expansion followed. A single city hall engagement grew into three use cases: a) public clinics, b) a proof of concept for an emergency algorithm, and c) the clinical deterioration scoring system for hospitalized patients—all within a municipality of approximately two million inhabitants.

On the regulatory side, Munai holds medical-device registration with Anvisa, Brazil's national health regulatory authority. The company

complies with [Lei Geral de Proteção de Dados \(LGPD\)](#); Brazil's data protection law, similar to Europe's GDPR) and maintains documentation with the national board of medicine for telehealth services. Munai points out that **regulatory compliance functions as an investment in quality and patient safety**: the requirements are costly, but meeting them signals a level of clinical seriousness that is difficult for less-prepared entrants to replicate.

“Building a beautiful interface is easier than ever. But building a reliable healthcare platform requires substantial investment in quality, infrastructure, and regulatory compliance. These investments are costly today, but we believe they will become our strongest competitive advantage—and a significant barrier to entry for others.”

– Hugo Morales, Chief Medical Officer, Munai

Regulation also shapes demand. Brazil has a national quality accreditation system with checklists that hospitals must meet. Munai notes that hospitals pursuing accreditation have a reason to see it as a partner in reaching those quality standards, which can create urgency in the sales process.



8. Business Model

Munai operates a **business-to-business** model with two **complementary revenue** streams: a) **professional services** (e.g., custom machine learning projects for laboratories, large clinics, and hospitals) provide project-based revenue; and b) **SaaS subscriptions** provide recurring revenue through monthly per-bed pricing, covering platform access and ongoing updates. The company aims to grow the recurring subscription share over time.

Munai is moving from a single all-inclusive offering toward a modular structure: basic platform access—the data integration and workflow layer—combined with optional clinical modules, such as

clinical deterioration prediction, antimicrobial stewardship, and re-admission risk. Each module can be evaluated and purchased separately, allowing Munai to price different clinical capabilities according to value. The modular approach is not presented as having fully resolved the company's sales challenges.

Partnerships extend the model beyond Munai's direct sales capacity. The antimicrobial stewardship module was developed in collaboration with BD, which uses its existing hospital relationships to distribute the module. Because antimicrobial consumption is easier to measure than clinical deterioration, this module lends itself to clearer value demonstration. Munai has explored risk-sharing models for this module, though no contract has been signed to date. Beyond BD, Munai's commercial channels include direct sales to private hospitals, public-sector contracts, and grant-funded projects.



9. Expected and Measured Impact

Munai has deployed its clinical intelligence platform across more than 30 hospital partners and processed approximately 18 million medical encounters. Its **clinical deterioration prediction system has been validated in a multicenter study across six hospitals**, providing peer-reviewed evidence that the platform can generate timely alerts using routine clinical data in real hospital environments.^{1,4} Published evidence does not yet establish specific reductions in mortality or complication rates across Munai's full hospital network.

The platform's intended pathways are:

- Earlier recognition of clinical deterioration, enabling intervention before conditions become urgent;
- More consistent clinical responses, supported by alerts embedded in existing workflows;
- Reduced avoidable complications through antimicrobial stewardship monitoring and guideline alignment checks; and
- Operational and financial value for hospitals.



Atendimento	Nome	Setor	Alerta
1452177	J. S. N.	UTI Adulto	Munai Score
1456175	A. M. J.	Clinica Cir...	Munai Score
7456489	C. T. S.	Clinica M...	Munai Score
8456253	I. S. B. B.	UTI Adulto	Munai Score

Munai's platform works on two fronts: the "Munai Score" anticipates risks of clinical deterioration, while algorithms and alerts for antimicrobial management optimize treatment.

Site-specific analyses from partner hospitals have also reported observational outcomes from real-world implementation:⁵

- One implementation reported a **71% reduction in unexpected cardiac arrests**, associated with structured response protocols and continuous monitoring.
- An analysis of 14,473 patients at Hospital Mãe de Deus found that shorter response times to alerts were consistently associated with **lower observed mortality**.
- At Unimed Sul Capixaba, patients managed within the structured protocol showed substantially **lower observed mortality risk** than those outside the protocol.*



10. What Comes Next

Munai's **growth does not depend on a single path**. The company can grow recurring SaaS revenue while continuing to use professional services; it can serve private hospitals, public health systems, and insurers through different commercial models—direct sales, public-sector contracts, and grant-funded projects—and it can sell directly and distribute through partners.

* These findings are site-specific observational outcomes and should not be interpreted as general causal evidence across Munai's hospital network.

The company's philosophy draws on the concept of **resilience through optionality**. Munai emphasizes the importance of building something solid and sustainable rather than pursuing growth at any cost, and of keeping multiple plans available in an environment where most early-stage companies do not survive beyond a few years. Munai's approach to financing is cautious: focused on partnership alignment rather than capital volume, and open to hybrid structures that could combine for-profit and nonprofit vehicles if that better serves the company's patient-safety mission.

"I want Munai to be something solid and sustainable.... We must always have options because once you are innovating, there is a high chance of failure. Most startups that launched with us don't exist anymore."

*– Hugo Morales, Chief Medical Officer
Munai*

Munai's next stage is no longer simply about demonstrating that AI can generate useful clinical predictions, but about systematically turning those predictions into accountable clinical actions, measurable outcomes, and scalable value for healthcare systems. ★

Sources

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AI Disclosure

During the preparation of this case study, the authors used Zoom's built-in AI transcription to transcribe interviews and Claude Opus 4.8 to improve the readability and flow of the manuscript. The editor used Canva AI tools to generate and edit maps. After using these tools, the authors and editor reviewed the content as needed to ensure accurate representation of the information.

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