



— CASE STUDY · REVISED OCTOBER 2026

How Agnos helped a specialty care provider build one comprehensive view of the patient

Aggregating medical records, images and pathology from every prior provider so surgeons treating the sickest patients could see the whole picture. Updated with what AI now makes possible on the same foundation.

Client

Commercial health information exchange serving hospitals and providers

Engagement

Architecture, engineering, QA, DevOps, cloud

Platform

Azure serverless, micro-frontends, FHIR-aligned

"Patients and their doctors suffer from the painful process of aggregating all of a patient's clinical records when urgent treatment is needed for a chronic illness like heart disease or cancer."

FROM THE ORIGINAL 2021 CASE STUDY. THE PROBLEM HAS NOT CHANGED. THE TOOLS HAVE.

THE CLIENT

Easy access to medical data, so caregivers can concentrate on patients

Agnos assisted the client in offering its healthcare providers a comprehensive platform where hardware and software are perfectly aligned to make their practice more profitable, modern and efficient.

Patients and their doctors suffer from the painful process of aggregating all of a patient's clinical records when urgent treatment is needed for a chronic illness like heart disease or cancer. These chronic diseases sometimes require dangerous procedures like a heart transplant or high-risk, completely invasive surgery like that required to remove a brain tumor. How can physicians, especially surgeons, treating a patient with a chronic illness get all the comprehensive patient healthcare information needed to provide the best care to that patient?

The client is a commercial healthcare information exchange medium that offers easy access to medical data, allowing caregivers to concentrate on their patients. It provides services to hospitals and providers and gives new patients' caregivers easy access to past medical records by collecting the records from the patients, digitizing them, indexing them and making them easily searchable.

Clinical teams may access, share and send medical imaging results to any associated institution with a simple click. The core of the client's value proposition is the delivery of medical records from prior hospitals or clinics (Providers) to the current hospital (the client's Customer) where the patient is being treated or admitted.

Problem statement

Without one comprehensive view of a patient's medical history, the wrong medicine can be prescribed, patient allergies might not be considered, and previous childhood illness that caused permanent damage to internal organs may not be contemplated. How does a surgeon challenged with complex brain surgery, or faced with implanting a much-needed new heart, mitigate as much risk as possible by having a comprehensive and complete view of a patient's medical history?

- A patient's information is scattered across many different doctors, many different Electronic Medical Records (EMRs) and the many geographies where that patient was treated.
- Complete or detailed information about patients was not kept up to date or handled properly.
- Scaling operations was challenging because of the number of separate applications.
- Internal applications were largely monolithic and built on outdated technology.
- Manual processing was required to rank cases by priority and assign them to team members.

PROPOSED SOLUTION

Automate the processes that create an aggregated patient record

Agnos helped the client improve its ability to enable automated access to all types of medical images and patient information by automating the processes that create an aggregated patient record. The work Agnos and the client did together improved the ability to capture missing health information when patients desperately needed lifesaving surgery.

WORKFLOW**Task management system**

Business rules control the creation, assignment and prioritization of tasks. A queue-based approach prioritizes the day's work items and assigns them to team members automatically.

PLATFORM**Azure, serverless, event-driven**

Azure cloud services were chosen because the previous internal apps were built on Microsoft technologies. Serverless architecture made scaling easier, with event-based communication between services.

EXPERIENCE**Micro-frontend unified interface**

One interface replaced the need to switch between multiple applications for day-to-day tasks.

STANDARDS**FHIR-aligned enterprise architecture**

Architecture decisions aligned with the client's current technology while preparing for the FHIR standard across all software development.

How we did it

Together, Agnos and the client improved the ability to locate and retrieve medical records, images or pathology slides and organize them in a customized, consistent manner, so that physicians, especially surgeons, had one comprehensive view of the patient, structured, organized and easy to use to save lives.

- Agnos provided a global team of software engineers and technology consultants with strong technical skills and deep domain knowledge in healthcare.
- Agnos created user and technical stories to capture all functional and non-functional requirements.
- Agnos quality assurance engineers implemented a Test-Driven Development (TDD) approach, wrote test cases, completed all types of functional testing (smoke testing and black-box testing among them) and automated regression testing.
- Agnos applied its expertise in software-defined everything and DevOps and addressed all of the client's cloud and IT infrastructure needs, accelerating go-live and supporting maintenance afterwards.
- Agnos helped with the related enterprise architecture decisions, aligned with the client's current state of technology and with future considerations such as implementing FHIR across all software development.

Before this partnership, a comprehensive view of the patient that surgeons could use was a vision for Tomorrow. **When you work with Agnos, Tomorrow Starts Today.**

TECHNICAL ARCHITECTURE

The decisions that made the platform scale

DECISION	WHAT WE DID AND WHY
Orchestration with Azure Durable Functions	Initializing the work queue took up to an hour. Durable functions with child activities introduced parallelization; as nodes are added, the function scales with them.
Schema models	JSON schema models were standardized across the system for validation. Frontend TypeScript models were generated automatically from C# classes, keeping frontend and backend in sync.
Service Bus topics instead of Event Grid	In several places ordered messaging was required rather than discrete events. Service Bus topics brought session IDs, partition keys and filtering for ordered delivery.
Default and mock data	Bringing up a new environment needs default data and sample data; both were standardized and committed to a repository.
Common backend library	The existing shared library for Azure Function Apps (microservices) was extended with common code for Cosmos repositories, Service Bus and more.
Standard UI component library	A shared UI library conforming to e-health styling guidelines gave every micro-frontend the same look and behavior.
Static analysis	A SonarQube community instance was hosted in Azure, with a SQL database, for static code analysis across repositories.
Unit test coverage	There was no unit test coverage at the start. With coverage (including branch coverage) added to CI/CD quality gates, the outreach repositories exceeded 65%.
DevOps	Agnos brought CI/CD to all repositories; every microservice and frontend could be deployed with a single click.
Branching strategy	With releases affected by constant re-prioritization of stories, a release-based branching strategy was worked out.

Business outcome

The typical delay doctors faced in treating chronically ill patients, caused by waiting for records from all their previous providers, was reduced. The burden on clinical staff of locating, requesting and organizing medical records, images and pathology slides from many providers was greatly reduced.

Repeated tests and rescheduled appointments caused by missing records were reduced, which meant a better patient experience and lower cost for the health plan paying the claims. Pathology slides reached the right place for a second opinion efficiently and safely. Clinical decisions were better informed.

IMPACT

One view of the patient changes what an HIE can do

Having one comprehensive view of each patient enables this Agnos customer to partner with pharmaceutical companies, research organizations and academic medical institutions to conduct important clinical studies. It has improved care in HIE regions and communities because clinical teams can view, share and transfer medical imaging studies with any connected site using a single click.

An image-enabled HIE positively affects patient care and reduces the administrative burden on hospitals, imaging centers and medical practices. Patient outcomes improved because the imaging studies clinical teams need to diagnose and plan treatment became available faster. Costs fell as workflows eliminated the time and materials spent burning, QA-testing and transferring imaging studies on CD.

Most importantly, patient experience and satisfaction improved by eliminating the need for repeat testing and unnecessary radiation exposure.

2026 ADDENDUM · PART ONE

What has changed since this work: the arrival of AI

When this platform was built, aggregating a record meant indexing documents and routing tasks to people. Five years on, the same problem is being attacked with generative and agentic AI, and the industry has moved from pilots to production.

50%

of US healthcare organizations have implemented generative AI; more than 80% have deployed first use cases to end users

McKinsey, Q4 2025 survey, published April 2026

~500M

health records exchanged over TEFCA, the national interoperability network, up from about 10 million in January 2025

HHS, February 2026

650+

healthcare organizations using Microsoft's Dragon Copilot ambient documentation; 20% documentation time saved in Penn Medicine's study

Microsoft via Healthcare IT News; Deloitte 2026 Outlook

~4x

projected ROI reported by providers on AI use cases, led by revenue cycle management; 12-month average payback

Bain & Bessemer, October 2026

Three shifts matter most for an aggregated-record platform like this one. First, **the records now arrive**. National exchange has made retrieval a solved problem for a growing share of encounters; the bottleneck has moved from *finding* the record to *reading* it. Second, **models can read**. Large language models extract, normalize and summarize unstructured clinical text, scanned faxes and imaging reports at a quality that was not available in 2021. Third, **agents can act**. The task management system we built encoded business rules by hand; today, agents can triage, draft and route within guardrails, and 67% of provider revenue-cycle AI already runs as semi- or fully autonomous agents (Bain).

2026 ADDENDUM · PART TWO

If we built it today: AI at every layer of the solution

Everything in the original architecture still stands. What changes is what each layer can do. The table pairs each component we delivered with the AI capability that now sits naturally on top of it, and the guardrail that has to come with it.

LAYER WE BUILT	THEN (2021)	NOW, WITH AI
Record intake	Scan, digitize, index by hand and by rules	Document intelligence: OCR plus LLM extraction turns faxes, discharge summaries and pathology reports into structured FHIR resources (Condition, MedicationStatement, AllergyIntolerance, DiagnosticReport) with confidence scores and source citations back to the page.
Task management system	Rule-based creation, priority and assignment	Agentic triage: an agent reads the inbound packet, decides what is missing for the surgical team, drafts the request to the prior provider and schedules the follow-up. A human approves anything that leaves the building.
Micro-frontend	One screen replacing many applications	Clinical summarization at the point of care: a problem-oriented, longitudinal summary generated for the surgeon's question ("anything relevant to anesthesia?"), every sentence linked to its source document.
Service Bus and durable functions	Ordered messaging between services	Event-driven agents: the same backbone now carries agent steps, so each action is logged, replayable and auditable. Nothing an agent does is untraceable.
QA and TDD	Hand-written test cases and automation	AI-assisted testing: generated test cases from user stories, synthetic-but-realistic patient data, and evaluation suites that score model output for accuracy and omissions, not just code for bugs.
DevOps and CI/CD	Single-click deployment	AI-driven SDLC: coding agents work from specifications and open pull requests; CI remains the gate; humans merge. Agnos runs client engagements this way today.
Imaging exchange	Share studies across the HIE with one click	Imaging AI in the loop: prior studies retrieved and pre-read, with the FDA's list of AI-enabled medical devices now past 1,600 (about three in four in radiology), surfaced as decision support, never as the decision.

The one thing that does not change. Every row above ends in a person who is accountable. AI reads, drafts, routes and proposes; a clinician or an operator decides. The event backbone we built in 2021 is what makes that accountability auditable today: each agent step is a message, each message is logged, and each log is replayable. That is what "responsible AI" means in practice on this platform.

2026 ADDENDUM · PART THREE

What the big firms agree on, and what can go wrong

The pattern the big firms agree on

McKinsey's April 2026 survey finds administrative efficiency is the domain most often cited as having the greatest potential for both generative AI and multi-agent workflows, and clinical productivity the most widely implemented (54% of care organizations). Deloitte reports that more than 80% of health systems prioritize agentic AI for clinical operations, care delivery and revenue cycle, and that early adopters favor multi-agent solutions (82%) while cautious organizations buy point solutions (92%).

Bain's 2026 scorecard adds the discipline: returns concentrate in administrative work; clinical AI returns are among the lowest; and the share of internally built generative AI solutions fell from 42% to 26% because organizations struggled to operate, monitor and update what they built. Accenture's finding that only half of IT executives report strong alignment between technology initiatives and business strategy explains why. The lesson for an HIE is to put AI first where records are read and routed, and to buy operating discipline, not just models.

What can go wrong

- **Confident wrong answers.** A summary that omits an allergy is worse than no summary. Every generated statement must cite its source and every omission must be measurable.
- **Protected data in the wrong place.** Models, prompts and logs are all PHI surfaces. Business associate agreements must cover every model endpoint; Agnos builds inside the client's cloud BAA, never on consumer tools.
- **Integration debt.** McKinsey's respondents rank integration as the first barrier to scaling. An agent that cannot write back to the EMR is a demo.
- **Unowned models.** Deloitte's governance call is for traceability, explainability and a named owner for drift and downstream errors. 43% of McKinsey's respondents cite risk and safety as a roadblock; the specific fears are inaccuracy, bias, security and compliance.
- **Trust.** 81% of healthcare executives told Accenture they must prioritize a trust strategy alongside their technology strategy; patients who trust their providers are six times more likely to stay.

Guardrails Agnos puts in place

- Build inside the client's existing cloud and BAA (AWS Bedrock or Azure OpenAI), with no PHI leaving the tenant.
- Retrieval-grounded generation only: the model answers from the record, and shows where.
- Human-in-the-loop on every action that touches a patient, a payer or an external provider.
- Evaluation suites in CI: accuracy, omission and hallucination rates measured on every release, the way unit coverage was measured on this platform.
- Full audit trail on the event backbone; every agent step replayable.
- A named model owner, a drift alarm and a kill switch, written into the runbook on day one.

2026 ADDENDUM · PART FOUR

The future state we are building toward

The platform's ordered event backbone, FHIR-aligned data and single view of the patient are exactly the foundation agentic AI needs. Here is where that foundation leads over the next three to four years.

Future state, 2027 to 2030

- **Prior authorization and referral packets assembled by agents.**
CMS now requires standard prior-authorization decisions within 7 days (from January 2026) and electronic information sharing by January 2027. MUSC Health reports agents completing 40% of prior authorizations without human involvement (Deloitte). An HIE that already holds the record is the natural place to assemble the packet.
- **The longitudinal record becomes a conversation.**
Surgeons ask questions of the aggregated record instead of reading it end to end; patients receive plain-language summaries of their own history through FHIR-based patient access.
- **Multi-agent operations.**
Intake, triage, outreach, imaging retrieval and billing agents coordinated over the same ordered event backbone, with humans supervising exceptions. Deloitte's early adopters expect more than 20% cost savings; 98% of surveyed technology executives expect at least 10%.
- **Interoperability as the moat.**
With TEFCA volume compounding, the organizations that win are the ones whose data is clean, FHIR-native and ready for models. That is the foundation this engagement laid.

Future scope with this client

- Implement CI/CD across other projects.
- Review and optimize development processes and practices to align with quality expectations.
- Outreach enhancements.
- Document intelligence pilot on the inbound record stream, measured on omission rate before any clinician sees output.

How to start. Pick the single highest-volume document type entering the exchange. Measure today's time-to-aggregate and today's omission rate by hand on a sample. Run document intelligence on the same sample inside the client's cloud BAA, with a clinician scoring the output blind. Ship only when the model beats the baseline on omissions, not just on speed. Agnos has run this sequence; it takes weeks, not quarters.

WHY AGNOS

Healthcare depth, engineering discipline, and now an AI-first delivery model

Contributions in the healthcare field. We have built patient-facing applications, provider-facing applications for single-specialty and multi-specialty hospitals, applications for SaaS vendors, enterprise healthcare solutions for medical practices, and the payer version of a patient app in collaboration with a partner.

Interoperability expertise. Extensive experience with FHIR and HL7 v2, integration with Epic, Cerner and CMS Blue Button 2.0; FHIR implemented with GraphQL, HAPI, and on Azure, Google Cloud and AWS. We started implementing FHIR for clients before it was commonly used; we have built FHIR-based accelerators and our internal data models are FHIR-based. Our interoperability implementations at CareCloud have been referenced by Google Cloud's Healthcare API teams, and our products are honored by the CARIN Alliance for meeting CMS interoperability guidelines.

Business and engineering, together. Our founders bring expertise in both business consulting and engineering. Global turn-key teams provide around-the-clock coverage, Miami-based with teams across the United States, South America, Europe and India.

Independent and transparent. We are fiercely independent and give back to customers in the form of service credits and any compensation we receive from strategic alliance partners. Under our Gain Share model, we do not make money unless you realize the business outcomes we define together. We maintain HIPAA compliance.

AI-first since 2026. Agnos now delivers software through an AI-driven SDLC: specifications become pull requests through coding agents, CI is the gate, and senior engineers review and merge. The same approach is available for your AI initiatives, built inside your cloud and your BAA.

ABOUT THIS PAPER

The AI Sherpa, about Agnos, and the sources behind the 2026 addendum



THE AI SHERPA

AI for Good and AI for Evil are the same technology. The doctor who treats himself has a fool for a patient, and the health system that takes on AI alone is in the same position. The AI Sherpa is the Agnos promise: a guide who knows the mountain, builds inside your cloud and your business associate agreements, measures every step against a baseline, and climbs with you.

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About Agnos. Agnos was established in 2012 with a mission to empower businesses with next-generation, end-to-end agile software development services. We combine human creativity with cutting-edge technologies to benefit society and shape accountable business. Our hand-picked global team of technologists and consultants, with partner capacity of more than 20,000 worldwide, offers a follow-the-sun delivery platform. Core values: agility, trust and quality. As an AI-first services company focused on the intersection of healthcare and artificial intelligence, Agnos guides healthcare organizations through responsible, secure AI, from strategy to production.

Sources for the 2026 addendum. McKinsey, "Generative AI in healthcare: current trends and future outlook," April 16, 2026. Bain & Company with Bessemer Venture Partners, "The 2026 Healthcare AI ROI Scorecard," October 14, 2026. Deloitte Center for Health Solutions, "2026 US Health Care Outlook," December 11, 2025, and "Many health care leaders are leaning into agentic AI as adoption hurdles ease," February 11, 2026. Accenture, "Technology trends 2025: healthcare," March 26, 2025, and health system C-suite survey, March 24, 2025. HHS, "TEFCA reaches nearly 500 million health records exchanged," February 11, 2026. Healthcare IT News on athenahealth and Microsoft Dragon Copilot, December 2025. FDA, Artificial Intelligence-Enabled Medical Devices list.

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