

SIGNAL 1

From Ambition to Action: Translating AI hype into value

Executive Summary

Enthusiasm around the potential of AI in healthcare is at an all-time high. Yet, few systems are truly leveraging AI to drive improved clinical, operational or financial performance. Health systems face a set of technical and practical barriers to implementing AI-based tools including slow and expensive development cycles, regulatory complexities, and adoption challenges.

As the number of AI applications expands in the coming years, with tools that will address everything from staff assignment to patient engagement, health systems must make the necessary investments to position themselves to use AI safely and at scale.

Signal 1's Health AI Platform is built from the ground up to power a world-class healthcare AI program. The platform provides all of the technical tools to accelerate model development, streamline model deployment and management, and automate monitoring and regulatory compliance. Built specifically for the healthcare industry, the platform integrates seamlessly with existing IT systems and AI governance practices to maximize the value of existing data investments and unlock the potential of AI solutions.



Health systems are struggling to translate AI hype into action

Talk of the promise of AI has grown exponentially in recent years. Perhaps nowhere is the enthusiasm greater than in healthcare, where 90% of executives rank AI as a top or high priority.¹ Their enthusiasm is not misplaced. The potential for AI to deliver significant value, at a time when health systems face margin pressure, quality and access issues, and workforce challenges, is real. A recent analysis estimates that AI could deliver up to \$360 billion in savings a year to the healthcare industry, with the hospital sector alone seeing annual savings of around \$100 billion.¹

Yet, despite growing investment, few health systems have meaningfully integrated AI tools into their operations and even fewer have a coordinated approach for how to use AI to achieve strategic, operational and financial objectives. To be sure, there are some successes, mostly targeted point solutions that address key administrative pains – for example, in the areas of revenue cycle management or clinical documentation. But, by and large, the reality has yet to live up to the hype, AI investments have been slow to deliver ROI, and concern about the proliferation of point solutions and reliance on outside vendors is growing.

At Signal 1, we've spent the last two years talking to health system executives about the challenges they are facing when it comes to AI adoption. Through these conversations, along with our experience deploying AI in other regulated industries, we've identified three challenges they face around AI adoption.

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of health system executives rank AI as a top or high priority.¹

1. The current approach to building and deploying AI models is slow and expensive

Building AI models for real-world use is hard. It involves complex data preparation, often from disparate sources. Once this data is in the hands of data scientists, they must execute multiple training, testing, and evaluation cycles. Then begins all of the work to ‘deploy’ the model – building pipelines to feed the model with live data, generating predictions at high frequency, applying rules to those predictions, and integrating the output back into existing information systems or new interfaces.

Every health system we’ve talked to is struggling with model deployment. Our conversations suggest that it can take up to 24 months for a single model to be built and deployed, with many models never making it to production. Health systems that have managed to deploy models report a lack of standardization around deployments with every deployment effectively starting from scratch.

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2. Current and emerging AI regulations present novel risks for health systems

The growing use of AI tools within healthcare delivery has attracted the attention of regulators. The U.S. Department of Health and Human Services recently announced their Final Rule for implementing Section 1557 of the Patient Protection and Affordable Care Act. This rule requires health systems, by March 2025, to implement policies and procedures to identify and mitigate discrimination against any individual that may result from the use of patient care decision support tools.³ This represents a particular challenge for AI-based decision support tools where the reasons behind each prediction – and whether they are biased for certain groups – are often opaque and may change over time.

For health systems developing AI tools that meet the definition of Software as Medical Device (SaMD), the regulatory implications are even more significant as these systems could be considered a manufacturer of a medical device.⁴ While the FDA has not typically enforced its rules for health systems deploying SaMD for internal use, there is ambiguity in the FDA's evolving stance which represents a significant risk to internal AI programs and research.

3. End-user adoption of digital tools is hard and AI's black-box nature makes it even harder

Once a model is built and validated, the work of implementation begins. Decades of research into the barriers of digital health adoption tells us that this is no menial task.⁶ With AI, these same barriers are experienced even more acutely – particularly those related to end-user beliefs about the technology. Whether target users are weary of the so-called 'black box', have challenges interpreting and acting on probabilistic output, or fear that their job will be replaced, deploying AI often requires a new approach.

We have found that educating users on how a model's accuracy was evaluated, providing information on a model's data inputs and explaining how the model arrives at its predictions go a long way to building buy-in.



A platform approach is needed to manage AI at scale

With a broad proliferation of AI applications expected over the next 5 years, health systems need a platform to standardize AI development, deployment and management.

At Signal 1, we've developed the only AI platform purpose-built for healthcare. Our platform provides all of the technical tooling to build, operate, action, and govern AI models, thereby enabling health systems to grow internal AI programs while coordinating the management and monitoring of existing point solutions.

Build

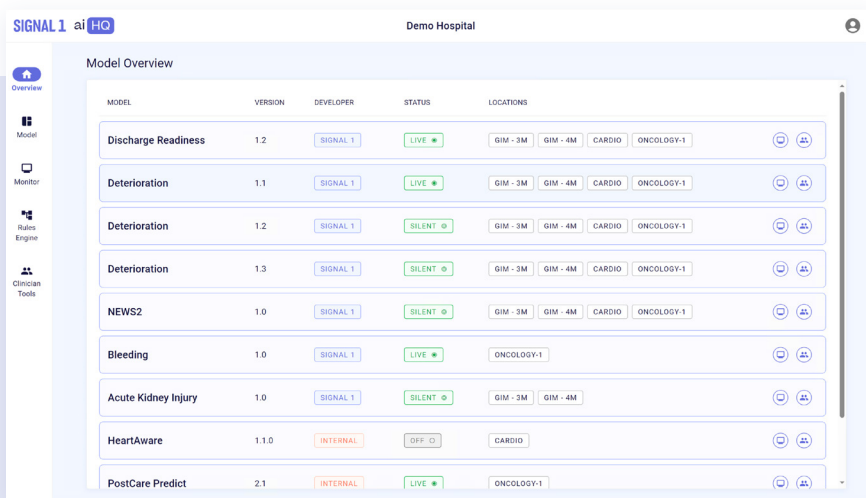
The Health AI Platform enables health systems to quickly build and validate AI models – reducing the time to model readiness from months to weeks. The platform's proprietary Data Hub ingests data via FHIR, HL7, databases, PAC and other data sources and makes this data available to data scientists through a secure, self-serve portal with built-in access and privacy controls. Once a model has been validated, it can be promoted into silent testing with the push of a button.

Every applications-based industry has coalesced around a platform.

AI will not be an exception.

Operate

The platform's Control Center makes it easy for IT teams to view and monitor AI models in a single pane-of-glass. The Control Center displays every model running on the platform, including those in silent mode. Users can click directly on a model in the Control Center display and access a detailed model card, live performance metrics and past model validation reports. Self-service controls allow users to configure how models should run and interact, allowing customizability down to the unit and site level.



The screenshot shows the SIGNAL 1 ai HQ Control Center interface for 'Demo Hospital'. The 'Model Overview' section displays a table of AI models with columns for Model, Version, Developer, Status, and Locations. The models listed are:

MODEL	VERSION	DEVELOPER	STATUS	LOCATIONS
Discharge Readiness	1.2	SIGNAL 1	LIVE	GIM - 3M GIM - 4M CARDIO ONCOLOGY-1
Deterioration	1.1	SIGNAL 1	LIVE	GIM - 3M GIM - 4M CARDIO ONCOLOGY-1
Deterioration	1.2	SIGNAL 1	SILENT	GIM - 3M GIM - 4M CARDIO ONCOLOGY-1
Deterioration	1.3	SIGNAL 1	SILENT	GIM - 3M GIM - 4M CARDIO ONCOLOGY-1
NEWS2	1.0	SIGNAL 1	SILENT	GIM - 3M GIM - 4M CARDIO ONCOLOGY-1
Bleeding	1.0	SIGNAL 1	LIVE	ONCOLOGY-1
Acute Kidney Injury	1.0	SIGNAL 1	SILENT	GIM - 3M GIM - 4M
HeartAware	1.1.0	INTERNAL	OFF	CARDIO
PostCare Predict	2.1	INTERNAL	LIVE	ONCOLOGY-1

Users can configure, deploy, pause or sunset models. Users also have access to key information such as model version, deployment status and location.

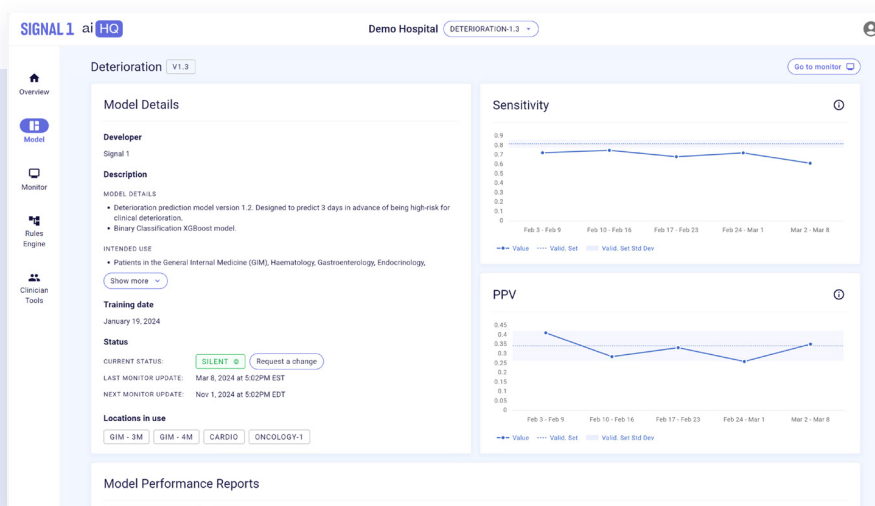
Action

The platform enables AI output to be easily actioned by clinical, operational and quality improvement (QI) teams. Patient-level predictions integrate into EHRs, control centers and secure messaging systems, enabling model output to be shared with clinical end-users within existing tools and workflows. The platform also generates powerful visualizations and reports that provide visibility into unit or system performance that can drive QI efforts. All predictions can be enhanced with Signal 1's proprietary explainability tools which also provide a mechanism to meet regulations requiring algorithmic transparency.

Govern

Signal 1's Health AI Platform equips risk and AI governance teams with the right set of tools to bring their responsible AI policies and procedures to life.

A central registry keeps track of all AI models in production eliminating the need for manual tracking in spreadsheets or other generic tools. Auto-generated model validation reports articulate point-in-time metrics related to model validity and fairness. The reports also include information about the model's most important features thereby offering another way to make transparency information available to a wide range of stakeholders. Real-time monitoring of performance and safety metrics automatically alerts teams when performance is outside of acceptable ranges, replacing manual model monitoring processes which do not scale.



Model cards have information about how each model was developed, its intended use, and defines key metrics to monitor related performance, impact, and risks related to safety or bias.



Trillium Health Partners (THP), Canada's largest community hospital, has recently announced a multi-year partnership with Signal 1 to implement the Health AI Platform to further develop its capabilities around AI and accelerate the safe adoption of AI tools to deliver improved outcomes across the hospital, health system and community.

About Signal 1

Founded in 2022, Signal 1 is building the technology platform to accelerate the AI revolution in healthcare. In addition to our Health AI platform, we are developing a library of AI applications that address key operational and care management decisions including discharge planning, ED prioritization and unexpected deterioration.

What this means for hospitals we work with:

- Streamlined AI model development and deployment with a faster time-to-value
- Automated model validation and real-time monitoring to ensure models remain accurate and safe to use
- Lower costs of ongoing model management and maintenance
- Up to 10X the output and ROI of existing data science and machine learning teams

Signal 1 develops and deploys all its products under a ISO-13485 certified quality management system using a secure SOC2 Type 2 cloud-based infrastructure.

To learn more about Signal 1's Health AI Platform,
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References

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