With Signals Notebook, AstraZeneca Increases Productivity for Developing Complex Therapeutics

By Revvity Signals

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Introduction

AstraZeneca is a global, science-led, patient-focused pharmaceutical company. The company's research and development (R&D) organization continually seeks new knowledge and the next breakthrough to deliver life-changing medicines.

Those efforts were hindered, however, by the company's legacy electronic laboratory notebook (ELN). Scientists avoided using it, because it was slow and clunky. It did not allow for collaboration; users had to share data on external platforms. And because it was not designed for complex new drug modalities—involving both chemistry and biology—it could not properly capture that data or enable its reuse. They needed a better way.

AstraZeneca found the solution in Signals Notebook^{TM} from Revvity Signals. Signals Notebook captures the large volumes of data created across the company, allowing it to be accessed, analyzed, and reused effectively and collaboratively, across functions and departments. The platform is also capable of handling complex chemistry and biology. Signals ChemDraw^{TM}, natively integrated with Signals Notebook, incorporates advanced hierarchical editing language for macromolecules (HELM), enabling scientists to easily and accurately represent these structures—a game-changer for scientists working on new drug modalities.

The Information Technology (IT) team, supported by Revvity Signals, worked closely with users to customize the system for the needs of scientists in different roles. In just over 18 months, more than 3800 scientists were brought onboard. Adoption has been swift and enthusiastic. Researchers find the platform easy to use, and appreciate the tools and interfaces. The solution is saving scientists time and fostering collaboration. Signals Notebook is also enabling the use of AI, freeing scientists from routine tasks.

The rollout of Signals Notebook is continuing to the remainder of AstraZeneca's R&D groups, with features being added as users identify additional needs. The company is also progressing toward a good manufacturing practice (GMP)-validated version of the Signals Notebook product for its GMP groups in research, as well as a rollout to its outsourcing partners.

> *"Our accelerated rollout programme has delivered drastic improvements for our users."*
>
> **- Philip Johnson**
> Director, R&D Technology Platforms for Drug Discovery, AstraZeneca

Facilitating Structured and Consistent Data Capture, Even of Complex Structures

Signals Notebook has a user-friendly interface, with drag-and-drop file capture, fast data entry, and powerful search capabilities. Features in the notebook, such as customizable experiment templates, create standardized structures for consistent data capture, enabling easier search and re-use. The cloud-native ELN with permissions-based management creates a shared, secure data management environment that allows scientists to easily collaborate and work more productively.

In addition, Signals Notebook has native integration with Signals ChemDraw^{TM}, which allows scientists to draw and manipulate chemical structures, including both small and large molecules. During the implementation of Signals Notebook, Revvity Signals and AstraZeneca's IT team listened carefully to AstraZeneca's scientists about their needs for drawing even more complex structures—a critical capability for the development of new biopharmaceutical modalities. Through iterative feedback and development, Revvity Signals added features, enabling scientists to accurately manipulate complex structures within the ChemDraw software.

> *"I believe we've been so successful, because we've really listened … [to] each of our different groups in research. We've looked to … save time for the folks that matter the most, those conducting the experiments in the lab."*
>
> **- Philip Johnson**
> Director, R&D Technology Platforms for Drug Discovery, AstraZeneca

"Back-to-Front" Implementation Strategy

Signals Notebook integrates with external platforms to allow data to flow smoothly. AstraZeneca used custom-developed integrations to import data from systems such as inventory into the ELN. Data is also exported from the ELN to systems that use these data, such as data analytics or chemical registration.

Because this ability to search and analyze data is central to the company's goals, AstraZeneca employed what they called a "back-to-front" Signals Notebook implementation strategy, with the aim of capturing lab data specifically for the ways that data would be used later—in analytics, data mining, and registration, for example. To accomplish this goal, the IT team conducted workshops with different R&D groups—those that would generate data and those that would use it for detailed analysis. During the configuration process, the IT team allowed the data consumers to see how data looked in context and provide feedback for the configuration. Through a collaborative effort, the teams converged on a single solution that met the needs of both those capturing the data and those using it.
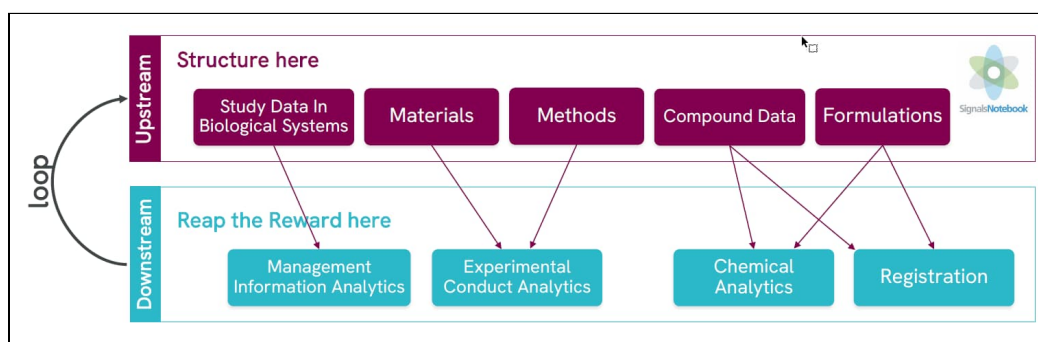

Figure 1: AstraZeneca's IT team used input on downstream data use cases to drive its upstream configuration of Signals Notebook.

Saving Time and Accessing Value with AI

In modernizing its ELN solution, Astra Zeneca sought to employ artificial intelligence (AI) features, integrated into Signals Notebook, to reduce the time scientists spent on routine tasks, such as documenting experiments. The first contextual workflow-integrated AI tool AstraZeneca made available in Signals Notebook uses a large language model to generate an experiment summary for a scientist to review and insert into the conclusion section of a lab report. Next, AstraZeneca hopes to extend the assistance available from AI tools for tasks such as writing experimental methods.

Additionally, the company sees potential in using AI to find value in unstructured data stored in Signals Notebook as well as extracted from legacy ELNs. The AI-based experiment assistant could allow users to easily search through data from the R&D organization for answers to their questions. The IT team's goal is to democratize such data analysis tools, training more individuals to access and reuse data themselves.

Summary: Maximizing the Value of Lab Data for Developing New Drug Modalities

With the implementation of a customized configuration of Signals Notebook, AstraZeneca's R&D scientists now have a fit-for-purpose solution where lab data from complex chemistry and biology can be accurately captured, accessed, shared, and re-used, thus maximizing the data's value and empowering scientists who are developing complex drug modalities. The data stored in Signals Notebook can be used by AI tools to streamline research and report-writing, saving time for scientists. Additional potential for using the data with other AI tools may further increase productivity and capture more value from the organization's data, to ultimately speed innovation to develop the medicines patients need.

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