

# Patient Journey Evolved

How patient-centric data delivers answers in minutes not months

# Evolving the patient journey study starts with harmony.

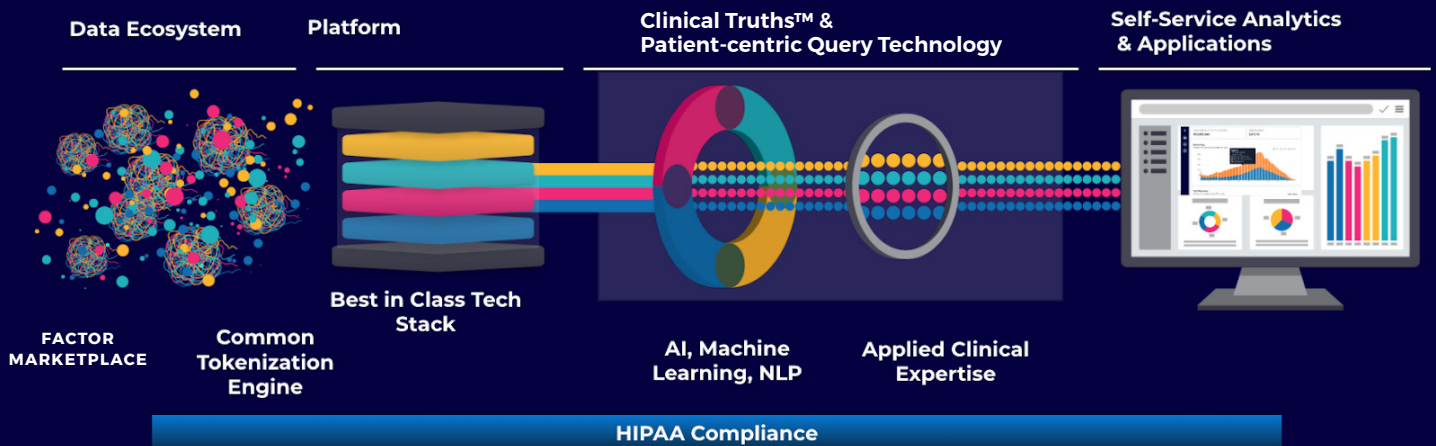
Laboratory data is different from other healthcare data – far from analytics ready and nearly impossible to analyze at scale – as lab results are read and interpreted by a human for analysis of a single patient. And with no mandated industry standard to follow, different forms and formats can be found across and even within labs. These realities create process inefficiencies and time lags that seem unavoidable.

While many in the healthcare industry understand the business value of a patient’s labs over time, few have been able to unlock its true value to inform decisions and improve healthcare outcomes at scale. Creating harmony and standardization between lab data types allows healthcare stakeholders to extract its complete analytical value. And once normalized, lab data can be married with other healthcare data types on an advanced platform so it can drive answers to questions in minutes versus months.

## Data Faster. Action Sooner.

Prognos was first to market creating harmony between lab data types and extracting its complete analytical value. Now prognosFACTOR® is liberating healthcare with agile access to the data you need when and how you need it.

prognos | FACTOR®



Buy only the data you need, when and how you need it. With a Datavant token, an entire ecosystem of healthcare data is at your fingertips. Then seamlessly and securely integrate your own data to create the complete dataset that meets your specific commercial needs.

45B+ Lab Records | 325M De-ID Patients | Medical Claims | Rx & more

### ADVANTAGES INCLUDE:

- Obtaining greater clinical specificity at the test result and biomarker level
- Having options for ready access at the end user application or the developer level – for ‘clickers and coders’ alike
- Getting query test results from hundreds of commercial, educational, and research labs across the U.S., as well as Medical and Rx claims from large data sources
- Going back and generating new extracts as new questions arise or iterations are needed

## The most significant data – measurable and ready for action.

Accelerating the process to commercialize novel therapeutics, medications, and treatments is paramount with today's increasingly personalized medicine needs. Consider the many targeted drugs that have come to market, in particular, oncology, that target specific

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Prognos FACTOR Logic™ is a proprietary data technology that can instantaneously query vast amounts of patient-centric healthcare data.

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biomarkers. The approval of a novel targeted therapy typically leads to an increase in testing for the applicable biomarker. Testing rates for these novel biomarkers will continue to grow, as specialists expand adoption of these newly-launched brands and as other products gain FDA approval.

## The proof is in the platform.

Understanding the patient journey – from symptoms, to testing, to diagnosis, and treatment – is a standard and essential part of any life science company's business practice. The information gleaned assists in patient and physician segmentation, forecasting, and building a marketing plan for upcoming and newly launched products, and is often updated annually to see if the journey has changed.

As products are launched into increasingly complex markets, defining the rules to be used when building a journey from secondary data is no easy or quick task. Typically when contracting with a data partner for creation of a journey, rules need to be defined at kick-off, with little leeway for modifying those rules along the way. The breadth of these rules is wide. It includes defining the market basket, diagnoses, comorbidities and product groupings, look back periods for newly diagnosed or treated, grace periods for continuing therapy, and look

In a concerted effort toward commercial excellence, the ability to go from months to minutes is a game changer for HEOR and commercial teams as they rely on granular clinical insights, such as biomarker testing, to see where there is opportunity to intervene earlier in the patient journey. The ability to design and iterate patient cohorts with clinical specificity is crucial to getting the right treatment to the right patient at the right time.

Leveraging FACTOR Logic, prognosFACTOR can instantaneously query vast amounts of patient-centric data down to the biomarker level. This is game-changing when considering the many novel therapeutics in progress or on the market today.

forward and overlap periods for building regimens. Even something as simple as physician specialty buckets and age groupings must be considered before the study begins.

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The ability to iterate on cohort and patient journey information is often stymied by time and cost.

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Once the rules are defined, the life science company must wait weeks or months to see the final product. And if anything needs to be adjusted, or additional data needs to be purchased, once those results are available, additional time and investment are likely tacked on before new output is available. In the end, after spending more than six figures and waiting weeks upon weeks for results, there is no guarantee you'll get exactly what you need.

# Harmony and speed starts with powerful tech.

Prognos evaluated available technologies in hopes of finding a solution that would query varying unique patient data at the speed and scale required. While many technologies scored high marks in certain areas and performed well in reference to individual capabilities, no one technology could deliver exactly what was needed.

To overcome the challenges in representing the unique nature of healthcare data using conventional data technologies, Prognos' team of engineers developed a faster and more logical patient-centric approach – FACTOR Logic. While conventional data technologies provide general purpose features such as partitioning, they are not suitable for partitioning by patient. Most data technologies support partitions in the order of thousands or tens-of-thousands. These partitioning systems fall apart when attempting to partition data by, for example, 325+ million patients.

Given patient-centric analytics are at the core of Prognos' platform and applications, it was clear that common data partitioning technologies available in the industry could not deliver.

Assigning patient healthcare data integers in a columnar fashion, Prognos found the queries could be easily and massively parallelized (in tables). Since the analysis on one patient's history has no dependency on another patient's history, the team implemented raw concurrency without a synchronization mechanism to hinder performance. This level of concurrency was not available in any of the technologies Prognos evaluated.

Moreover, upon investigating industry use cases against the data, it revealed that there are two distinct execution steps to the queries. The first step is to identify a population within the data sets, and the second step is to perform aggregation and transformation on the history of the identified population. Prognos' analyses showed that the first step required the most resources, and the second step (which is less resource hungry) is run multiple times to investigate different dimensions of the data. In order to best support such use cases, healthcare

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*“We designed FACTOR Logic such that the history of a particular patient can be accessed without a scan, or key lookup. This helps reduce query latency and ensures greater clinical specificity.”*

*Ali Koc, VP, Engineering, Prognos Health*

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analytics require fast, lightweight and dynamic views of data. Prognos needed to be able to identify a population in a few seconds, and then run various aggregations repeatedly on various dimensions of the same population. Therefore, with prognosFACTOR, companies can iterate and fine tune patient cohorts and perform patient journeys faster than ever before.

# Built for speed and agility – this is the power of FACTOR Logic.

This ability to iterate across the commercial lifecycle creates agility when it comes to launch and commercial excellence. Below is a table of query and response times built to address this very real pain point for pharmaceutical professionals who need more agility and measurability with patient cohort and journey information access and decision making.

## TEST SERVER INFORMATION

**Number of patients:** 309,418,999M

**Number of records :** 19,281,349,950B  
(lab records, Rx claims, medical claims)

**Running on a single node AWS EC2 r5.metal**  
(96 cores 768GB RAM)

**Total Memory Utilization is 506GB**  
(data + pre-allocated query executors)

*Diabetes cohort criteria defined as those with E11\* ICD code AND either Hemoglobin A1c/Hemoglobin.total in Blood OR Hemoglobin A1c/Hemoglobin.total in Blood by HPLC lab tests with value greater than 7.*

	QUERY	RESPONSE TIME
1	Among diabetes patients, computing the frequency counts for the number of times a patient between the age of 60-69 is tested for hemoglobin A1c in the year following an observation of a record indicating a visit to an endocrinologist	1.25 seconds
2	Computing frequency count of the number of days that patient had supply of GLP-1 monotherapies in the year following initiation of therapy. Initiation of therapy is any fill of the drug up to a year after the index date. The Index date is dates where a patient is observed to satisfy the diabetes cohort criteria.	650 milliseconds
3	Computing distribution of the number of days diabetes patients maintain an uninterrupted supply of given therapy, defined as no gaps in availability of the therapy of longer than 15 day grace period.	545 milliseconds

The image displays two overlapping screenshots of the prognosFACTOR Patient Journey application. The top screenshot shows the 'Patient Journey: For Lilly - Diabetes Patient Journey' interface with a navigation bar including 'Market Size', 'Market Share Analysis', 'Patient Journey Events', 'Persistence & Compliance', and 'Lines of Therapy'. The 'Patient Journey Events' section is active, showing a table with columns for ID, Event, Segment, Count, and Medication. Below the table is a box plot visualization. The bottom screenshot shows a similar interface with the 'Persistence & Compliance' section active, featuring a 'Compliance' chart showing the 'Proportion of Days Covered' over time, and a 'Date Range for Therapy Initiation' slider.

Featured are screenshots of the query results on prognosFACTOR's Patient Journey application.

# Get ready to go from question to answer in ~~60 days~~ seconds.

See what decision speed looks like in action by scheduling a demo of prognosFACTOR today.



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