



Creating a Data-Driven Advantage in Life Sciences



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When You Know More, You Can Do More

Teradata has more than 30 years of experience working with business and government leaders, creating and implementing data-driven solutions with the flexibility and scalability to effectively handle changes now and in the future. Teradata solutions and applications transform big data sets into actionable knowledge and valuable insights. Teradata delivers complete, best-of-breed solutions that include data platforms, discovery platforms, integrated data warehouses, analytics, and marketing applications.



What Would You Do If You Knew?

With increasing regulation, changing market demands and customer expectations, pricing pressures, and healthcare reform, life sciences companies are being forced to quickly adapt to deliver a higher quality of care while reducing costs and driving innovation. Healthcare payers want new therapies that are clinically and economically better than the existing alternatives, together with hard, real-world outcomes data to back any claims about a medicine's superiority. To realize success in this challenging environment, life sciences companies are reassessing how they manage their information assets and deploy advanced analytics.

The unprecedented explosion of data in today's highly connected world also adds another layer of complexity, making it necessary to align the appropriate technology with business requirements to understand, adapt to, and identify opportunity in this rapidly changing environment. This data deluge is stretching the abilities of current commercial sales and marketing, R&D, finance, manufacturing, and regulatory IT infrastructures.

As these technologies strain under the pressure, it becomes more difficult to shift from being product focused to being more customer centric and to bring safe, effective drugs to market faster, cheaper and

with less risk. This pressure also hinders visibility into the manufacturing and supply chain process, and stands in the way of realizing a global view of financial performance.

While data relating to products, brands, practices, research, compliance, contracting, rebating, and drug usage that streams into departmental and corporate databases every day holds the answers, analytics unlocks them—uncovering new questions that lead to new insights to make the right decisions at the right moment, empowering the actions that produce more amazing outcomes.



Amazing Outcomes Start Here

Teradata in Life Sciences

Eight of the top 10 life sciences companies choose Teradata to lead their way to a better understanding of their business and their customers, and position their products to be superior through data. Many of the world's most successful life sciences companies use Teradata for such critical tasks as:

- Conducting safety signal detection and analysis on all products for any condition/event within hours or days versus weeks or months.
- Ongoing rationalization of global corporate-wide spend to significantly reduce costs.
- Analyzing success of marketing channels for all products within the portfolio and being able to rapidly redirect efforts as needed.

These amazing outcomes in life sciences start with collecting, unifying, and analyzing all of the data that surrounds your company to maximize product success; launch safe, effective treatments quickly; optimize the supply chain; and, maintain profitable growth.

With a long history of being overly product focused, life sciences companies have been shifting to be more customer focused so they can optimize sales channels to customers (prescribers, payers, and patients) using integrated marketing and real-world evidence data. The payoff is the ability to deliver the right message at the right time to all customer audiences, which is also key to adherence and compliance—the ability to influence prescribers to continue writing prescriptions, or start new drugs, and influence patients to continue on drugs by getting refills as prescribed.

Delivering a new drug can cost as much as \$1 billion or more. That means companies are trapped between pressure to reduce development costs and accelerate time through the pipeline with the need to ensure better outcomes and provide enhanced value for patients. Plus, as the chronic disease market has become saturated and generic drugs offer lower cost alternatives, the focus is shifting to developing more niche/specialty drugs that have smaller patient populations and smaller revenue streams. This trend adds even more pressure to the need to bring safe and effective drugs to market faster and cheaper, which is why the ability to rapidly analyze very large and growing sources of real-world observational, clinical, and other data holds so much potential.

Advanced analytics also have the power to impact manufacturing and the supply chain, delivering the ability to do detailed batch traceability and track raw materials to finished goods and back from finished goods to raw materials. Data can help companies be proactive in identifying, solving, or preventing product-related issues, as well as optimizing supply by refreshing demand forecasting methods to analyze relevant industry and consumer data.

The ability to analyze and impact global financials is another major opportunity. To succeed, life sciences companies need to maintain financially sustainable, fiscally healthy operations and adopt strategies to accelerate performance, maximize resources, and find

new sources of revenue. Having a global view of data allows for the rationalization of spend on a global scale, enabling the opportunity for savings, improved supplier goods and services, higher quality human capital resources, and streamlined operations.

Time for a New Approach

For too long, there has been a lack of integrated internal and external data sources, with vast amounts of information spread across the enterprise in disparate systems. A new approach does not mean starting from scratch. The goal is to leverage your existing ecosystem and capabilities, providing an integrated approach to harness all your data and embrace data reuse to speed time to market and improve operating expenses.

The inability of scientists, epidemiologists, and statisticians to conduct research on all available data increases costs due to repetitive and redundant activities. It also lengthens the research and development process, exposing life sciences companies to greater risk and cost associated with adverse events and otherwise avoidable negative patient outcomes.

These siloed data sources make it nearly impossible to respond to customers (prescribers, payers, patients) in a timely manner or analyze interactions with customers and take immediate corrective sales and marketing actions.

Evolving the information management ecosystem will enable the ability to make vast amounts of external data relate to internal data—to rapidly analyze information without IT intervention—to drive R&D innovation. Harnessing the power of unstructured big data from patients, networks, and providers will enable new opportunities for commercial, marketing, and regulatory areas.

Is your company leveraging existing data to reduce the risks associated with clinical trial recruitment and execution?



From Insights to Action: The Data-Driven Transformation

Data-driven organizations excel at capturing, accessing, and analyzing all forms of data to extract intelligence. Teradata helps the world's leading life sciences companies transform data into insights that lead to greater knowledge of customers, products, processes, trends, and opportunities. By pairing customized life sciences analytics with real-time business needs, Teradata empowers life sciences companies to realize exceptional results across the enterprise.

When data is treated as a strategic asset, organizations can transform to be analytics driven to use data to gain a competitive advantage. For life sciences companies, there's great wealth waiting to be tapped in a diverse range of data relating to products, brands, practices, research, compliance, contracting, rebating, and drug usage.

Without financial and operational data integrated, do different departments come to different conclusions with different data?

The Analytics Advantage

Teradata helps enterprises know more about their customers and business so they can do more of what really matters, better and faster than any alternatives. By unlocking the potential in diverse data, Teradata empowers life sciences companies with a number of new capabilities that impact many areas, including:

- Sales and marketing analytics
- Managed markets analytics
- Research and development
- Regulatory and compliance reporting
- Supply chain management
- Data-driven finance

Through these unique and powerful analytics, newfound knowledge can be applied in meaningful ways to deliver significant value in four primary areas:

Customer centricity

Deliver the next generation customer experience to drive product success by understanding customer behavior, preferences, experiences, perceptions, and outcomes. Optimized commercial operations enable closed-loop marketing with continuous learning, improvements, and agile tactical corrections to quickly meet customer or market needs, and implement effective programs to ensure prescriber compliance and patient adherence.

Bring safe, effective treatments to market faster

Enable faster, more confident science with all-data analysis and hypothesis testing done in rapid iteration with the latest methods and techniques (including genomics, proteomics, bioinformatics, advanced science analytics, etc.). The more you know enables better decisions around protocol design, patient and investigator recruitment, clinical trial execution (go/no-go), health and economic outcomes, and more. Observational/real-world evidence data can add value during all phases of Health Economics and Outcomes Research (HEOR) activities for a drug. In the early development stages, it supports a better understanding of disease epidemiology and medical practice. In later stages, it provides input into the development of value dossiers and cost effectiveness models and patient evaluation. Post-launch, through observational studies, it can help validate previous database and modeling work, as well as support decision makers requiring reviews or substantiation of claims and appropriate use.

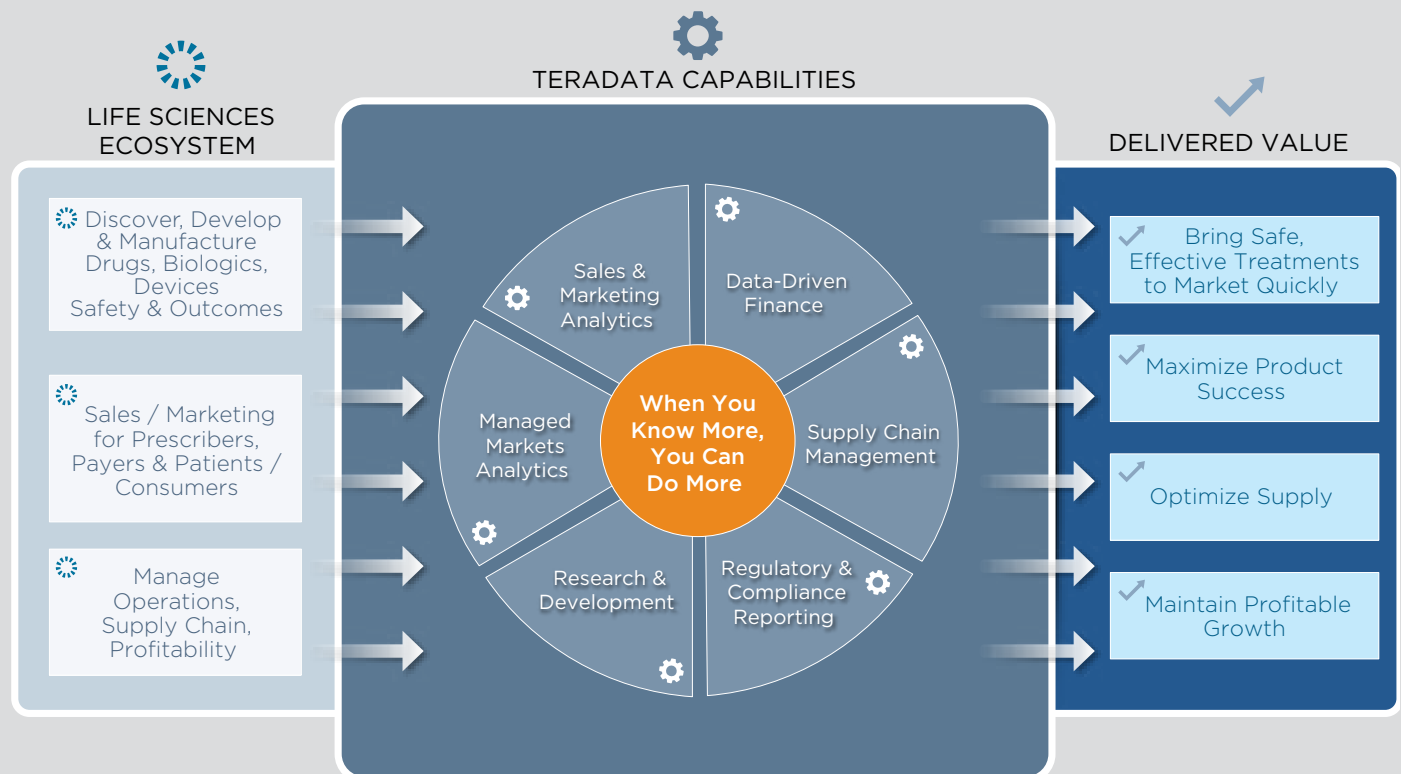
Optimize manufacturing and the supply chain

Go from a rear-view mirror view to an up-to-date global view by quickly unifying data from separate ERP systems. Full supply chain visibility, including supplier management, two-way batch traceability, and track and trace through distribution, plus the analysis of manufacturing quality, cost of scrap, capital investments, inventory analytics, and more, delivers global manufacturing efficiencies.

Maintain profitable growth

Analyzing and impacting global financials begins with consolidated global ERP systems to support financial consolidation, GL, reporting, and analysis. The result of this integrated data and integrated view is up-to-date product profitability, as well as a complete understanding of global spend in procurement to optimize the process and select high performance suppliers. Teradata solutions also help you optimize rebates through detailed data.

Teradata Framework for Creating a Next Generation Analytics Advantage



Tap Into the Teradata Advantage

Teradata's life sciences solutions are built upon the world's leading analytic data platform ecosystem, marketing and analytic applications, and consulting services. Our integrated solutions are engineered to analyze massive amounts of data in microseconds, yet designed for everyday use by the broadest constituency of business users.

Professional Services

Best practice advice from Teradata experts who have completed 30+ years of successful implementations, including proven data models and vetted processes. Services include business consulting, architecture and implementation, and optimization and management.

Analytic Data Platform Ecosystem

The world's most scalable analytics platform for structured, multi-structured and big data analytics through integrated and shared data environments (Integrated Data Warehouse) and the integrated Teradata Aster Discovery Platform. The discovery platform makes

it faster and easier for a wider group of users to generate powerful, high impact business insights from big data. Rapid discovery analytics deliver iterative exploration using a variety of analytic techniques to support dynamic decision making. The Teradata Unified Data Architecture™ is a comprehensive enterprise approach that seamlessly integrates multiple technologies into a cohesive and hybrid architecture for all data, data processing, and analytic needs.

Marketing and Analytic Applications

Build stronger customer experiences and boost sales by consolidating every element of your data-driven marketing program—including processes, resources, campaign financials, performance analytics, and even digital messaging templates—in a single application, on-premise, or in the cloud.

Data Models

Teradata Life Sciences Data Model includes both a logical data model (LDM) and a physical data model (PDM). The LDM is an integrated, cross-functional model that provides an enterprise-wide view of data. It's a comprehensive,

Unlock New Opportunities to Know More

By unlocking the potential in diverse data, Teradata empowers life sciences companies with a wide range of new capabilities that impact many areas.

Key Business Processes	Business Improvement Opportunities					
Sales & Marketing	Syndicated Data Processing & Integration	360° Customer View / Targeting	Event-based Customer Messaging	Contract & Rebate Management	Channel Management	
Research & Development	Research Data Profiling, Integration & Analysis	Detail Clinical Data Integration	Product Portfolio Management	Safety Data Tracking and Analysis	Collaborative Data Integration (Translational Medicine)	Evidence-based Outcomes Analysis
Manufacturing	Mfg Quality Optimization	Supply Chain Visibility & Lead/Cycle Time Mgmt	Vendor Mgmt/ Score Carding	Reliability and Maintenance Planning	Demand Driven Supply Network	ePedigree (Track and Trace)
Financial Management	Financial Reporting & Analysis Improvement	Financial Process Optimization	Enterprise Performance Management	International Analysis & Reporting (IFRS)	Consistent Financial Compliance	
Other	Risk Management	Competitive Intelligence Data Integration & Analysis	Data Governance, Privacy, Security	Business Continuity	Real Estate Rationalization	Litigation / Investigation Mining & Analysis



Different by Design

From the very beginning, Teradata has focused on helping businesses use data analytics to make the best decisions and make a difference in their world, and that focus makes us unique in the industry. Teradata solutions are designed differently to analyze information better and faster. The pursuit of knowledge is our passion, and no company is more passionate about data-driven analytics than Teradata. It began when we introduced Teradata Database—the world's first parallel database designed to analyze data rather than simply store it. And it continues in our commitment to lead the industry with new innovations and new technology—a commitment that has consistently earned Teradata some of the industry's highest accolades:

Gartner Magic Quadrant Leader

- Data Warehouse Database Management Systems
- Multichannel Campaign Management
- Integrated Marketing Management
- Marketing Resource Management

Forrester Wave™ EDW Platforms

- “Teradata provides the most scalable, flexible, cloud-capable Enterprise Data Warehouse in today's market.”

Forrester Wave™: Big Data Hadoop Solutions Leader

- Forrester notes Teradata creates a unique, high-performance Hadoop appliance that few other vendors can match.



Is supply chain management done with Excel spreadsheets on weekly/monthly cycles, based on data extracts? What would it mean to go from rear-view mirror view to up-to-date view?

flexible blueprint of how data is organized and provides structure that makes it easier to manage information. The PDM is generated from the LDM and provides life sciences companies with a starting point to speed the review and application of customer requirements and adjust the model to match their way of doing business.

Managing Big Data

Organizations across all industries have more data than ever before, and the volume of data continues to grow exponentially. The potential of big data lies in tapping into tremendous amounts of transactional data (e.g. structured) and digital data (e.g. multi-structured). Life Sciences companies are looking for cost-effective ways to capture the value of the big data

“avalanche”—extraneous data and new data types that were previously often discarded due to cost, scale, or processing limitations. Apache™ Hadoop® has emerged as the cost-effective, next-generation data management platform to capture, refine, explore, and integrate multi-structure data within the enterprise.

The Teradata Portfolio for Hadoop is a flexible suite of products and services that integrates Hadoop into a Teradata environment and across a broader enterprise architecture, while taking advantage of world-class Teradata service and support.

For more information, contact your Teradata representative or visit **Teradata.com/healthcare**.

Better Insights Lead to Amazing Outcomes

Teradata helps many of the world's most successful life sciences companies transform data into insights, which leads to amazing outcomes:

A top 3 pharmaceutical company was losing market share and needed to identify prescribers who had a decline in prescription writing from period to period by analyzing all IMS monthly data, which was more than 1 billion records. With only four hours of effort by one SQL programmer, the company was able to track prescribers who had a decline of 10 percent in its dollarized scripts. With this information, the pharmaceutical company gained the ability to rapidly identify and proactively address brand switching to optimize the sales process and promotions using detailed data to measure effort versus results.

A top 15 pharmaceutical company doubled the size of its animal health division in one year with the ability to analyze more detailed customer data.

A top 3 pharmaceutical company's commercial analytics group dramatically shifted its workload from 90 percent to 40 percent data movement, prep work, and tactical queries by implementing

Teradata Data Labs and running SAS in-database, and was then able to dedicate 60 percent of its work to strategic business-changing analytics. This shift helped the company more successfully launch a new drug through faster, better insights by rapidly exploring and analyzing more than 90 data sources of varying size. The result: more sales and faster market share growth.

To prove the continued safety and efficacy of a major drug, a top 3 pharmaceutical company needed to better understand drug combinations and usage to inform outcomes, services, messaging, drug repurposing, and more. The challenge came in trying to load and explore Humedica data (900 million prescriptions and 15 million patient records) in its legacy systems to detect drug affinities. With Teradata and only two hours of effort by one programmer, the company could quickly identify the most frequent drug combinations by drug type across 15 million patients. It can now conduct rapid iterative competitor drug interaction analysis that can uncover previously unknown issues or opportunities to improve patient well being and reduce risks.

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