

White Paper

USING AI & MACHINE LEARNING TO DRIVE COMMERCIAL SUCCESS IN THE EU

How pharma can harness AI & machine learning to analyze vast customer data sets, while still adhering to data privacy laws.

YILIAN YUAN, PhD, MBA, Senior Vice President, Global Data Science and Advanced Analytics, IQVIA

FRANK WARTENBERG, PhD, President, Central Europe, IQVIA

AGNIESZKA WOLK, PhD, MSc, Senior Director Data Science, IQVIA

YASEMIN ILGIN, PhD, MSc, Director Data Science, IQVIA



TABLE OF CONTENTS

Executive Summary	3
Part 1: A Personalized Approach	4
Part 2: The Regulatory Landscape	6
Part 3: AI & Machine Learning in Action: Four EU Case Studies	9
01: Multichannel Marketing in Germany	9
02: Digital Engagement Across the EU	10
03: Tracking Multi-Indication Products	11
04: Pharmacy Targeting	12
Part 4: The Right Partner	13
Conclusion: Measurable Value Delivered	14
About the Authors	15

EXECUTIVE SUMMARY

Artificial intelligence (AI) and machine learning are already transforming the sales and marketing process in the EU's healthcare landscape. Companies that don't get on board soon risk losing market share and annoying customers.

Healthcare industry sales and marketing teams in the EU have little time to capture the attention of the prescribers and customers who use their products. They have to make rapid decisions about their marketing and sales efforts. But without clear data about the impact those decisions have on prescriptions, they've had to rely on instinct and personal experience to customize their approach. At the same time, the healthcare industry is becoming more competitive and dynamic. Teams need access to deeper market insights to craft data driven strategies and implement their efforts with speed and precision.

Advances in AI & machine learning, combined with healthcare data from pharmacies, insurers, healthcare professionals (HCP), labs, marketing campaigns, and social media, can provide them with that competitive edge.

Healthcare companies that integrate AI & machine learning into their sales and marketing strategies can replace gut instinct with evidence-based insights that predict complex patterns in prescribing and sales behavior. These technologies make it possible to quantify physician potential and attitudes, optimize multichannel marketing (MCM), run brand diagnostics, and to profile, target and segment HCPs.

These tools can uncover specific physician and patient-level insights without compromising data privacy rules. Every sales and marketing team can personalize their efforts for each individual customer, delivering better business results with fewer resources and in less time.



However, it only works when organizations have a machine learning strategy with all the necessary elements:

- Access to diverse industry data sets and expertise
- Deep healthcare industry and regulatory knowledge
- Advanced AI & machine learning technologies
- Technical expertise to build AI & machine learning algorithms that are fit for purpose and generate meaningful insights

Effectively deploying AI & machine learning technologies can transform a commercial strategy, give brand teams an edge in the marketplace, and ensure companies successfully navigate complex EU regulations governing data privacy.

PART 1: A PERSONALIZED APPROACH




The pharmaceutical marketing model relies heavily on personal promotion with physicians via multiple channels including rep visits, conferences, meetings, and webinars, as well as non-personal promotional channels such as email and other digital media. A great number of promotional channels coupled with increased competition has made it difficult to measure the impact of marketing efforts on sales results, and to predict which channels will have the best outcome.

But with new AI & machine learning-driven healthcare solutions built on extensive industry data, sales and marketing teams can now precisely analyze results. Teams can understand exactly the messages,

promotional channels, and sales strategies that customers are most likely to respond to and when. These technologies are already disrupting the way many healthcare industry sales and marketing teams approach their go-to-market strategies, enhancing their experience-based decisions with data-driven insights that allow them to:

- Optimize MCM activities
- Identify highly-specific patient populations
- Customize digital engagement
- Leverage multi-indication analytics
- Enhance HCP (physician and pharmacy) profiling, segmentation and targeting

TECHNOLOGY IS STRENGTHENING SALES AND MARKETING STRATEGIES...

OPTIMIZE MCM ACTIVITIES	IDENTIFY HIGHLY-SPECIFIC PATIENT POPULATIONS	CUSTOMIZE DIGITAL ENGAGEMENT
		
<p>Sales teams can optimize the impact of multi-channel promotional investments by analyzing the response rates from past campaigns. They can focus on the right healthcare professional (HCP), segmenting them into the right channel at the right time.</p>	<p>Predictive analytics can provide insight into prescribing patterns for precision medicine candidates through patient genomics and biological data. The technology can identify which patients should start treatment or when they should move to second-line treatments. This helps sales teams to accurately target the most relevant physicians.</p>	<p>AI & machine learning-powered digital engagement solutions can optimize channel effectiveness, recommending the timing, frequency, and content of email messages. This targeted approach at the individual HCP level reduces physician churn rates (or physicians that stop writing prescriptions for your treatment) and maximizes the impact of digital campaigns.</p>

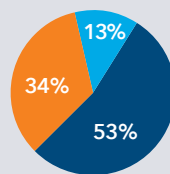
PHARMA IS GOING THROUGH TRANSFORMATION. FIRST MOVERS GAIN AN EDGE.

Organizations that deploy effective AI & machine learning-powered solutions with the right technical, industry and regulatory expertise can transform their commercial sales strategies, and give brand teams an advantage in the marketplace.

AI & machine learning-powered technologies are being deployed around the world with positive results. However, the EU market has been slow to adopt these new tools despite recognizing their value. In a recent survey of webinar attendees on *Mobilizing Artificial Intelligence for Pharma Commercial Success*, nearly 60 percent said AI & machine learning technology would bring cost savings, greater insights, speed, and accuracy to their sales and marketing efforts. However, more than one third of EU attendees admitted that they were not familiar with AI & machine learning

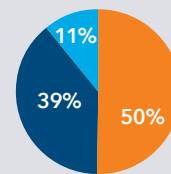
Results of EU webinar polling questions

How familiar are you with AI/ML applications in pharma? (56 votes)



Very familiar
Somewhat familiar
Not familiar

How extensively are you currently applying AI/ML in your commercial analytics? (54 votes)



Regularly use AI/ML
Somewhat applying AI/ML
Not at all

Source: IQVIA, December 2018

applications in pharma, and the vast majority (88 percent) either aren't using these technologies, or are only just beginning to test how they can be used.

This gap between recognizing the value of AI & machine learning for commercial applications and actually leveraging the technology is an opportunity for early movers to gain a significant competitive advantage in the marketplace.

...THROUGH DATA-DRIVEN INSIGHTS

LEVERAGE MULTI-INDICATION ANALYTICS



Many drugs have multiple indications and are distributed through multiple channels. Going beyond traditional methods, AI & machine learning-powered analytics can paint a clearer picture of how multi-indication products are used. Teams can track product performance by indication, specialty, region and source of business to inform their future marketing efforts.

ENHANCE HCP PROFILING, SEGMENTATION AND TARGETING



Local retail pharmacy sales analytics can deliver precise targeting lists highlighting individual pharmacy sales potential and behavioral profiles that prioritize marketing and inform strategies – i.e. offer discounts in price-conscious markets versus value-add opportunities in high sales shops.

PART 2: THE REGULATORY LANDSCAPE

One reason healthcare industry sales and marketing teams in Europe have been slow to embrace AI & machine learning is the complex regulatory environment in the EU. With varying regulations by country and strict data privacy rules, some healthcare companies are skittish about using AI & machine learning technologies for commercial insights.

In some cases, their fears are well founded. Regulations directly affect which data sets can be used for commercial purposes, and how they can be accessed and analyzed to maintain patient privacy.

GDPR AND PATIENT CONSENT

Several countries across Europe have implemented their own e-privacy laws that limit access to physician and patient level data, including Germany's Statute for Secure Digital Communication and Applications in the Health Sectorⁱ. However, the most impactful regulation is the EU's General Data Protection Regulation (GDPR), which went into effect in May of 2018. GDPR is a sweeping regulation that requires businesses to protect the personal data of any EU citizen. More specifically, the regulation targets patient consent and patient data. Under GDPR, requests for consent to review and use patient data must be easy to understand, easy to access, and clearly define how personal data will be used. The data also must adhere to strict anonymization rules so that a patient's identity is protected.

...the most impactful regulation is the EU's General Data Protection Regulation (GDPR)... a sweeping regulation that requires businesses to protect the personal data of any EU citizen. More specifically, the regulation targets patient consent and patient data.

ⁱ https://2016.export.gov/build/groups/public/@eg_main/@byind/@healthtech/documents/webcontent/eg_main_113097.pdf

ⁱⁱ <https://gdpr-info.eu/art-4-gdpr/>

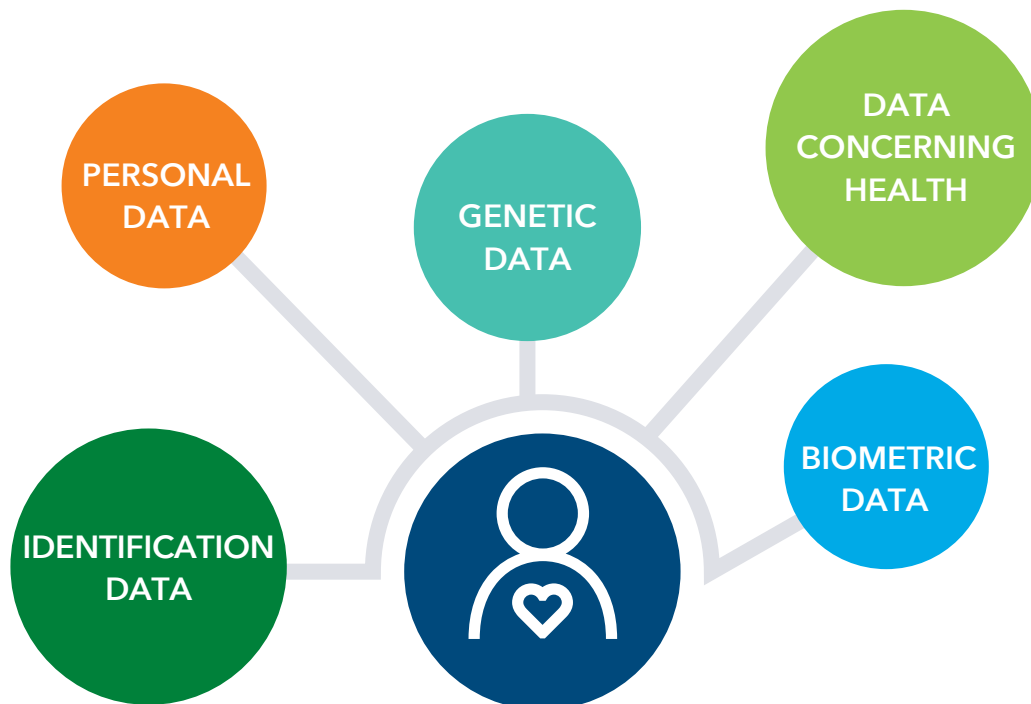
The types of data considered personal under GDPR include:ⁱⁱ

- **Identification data:** Information that can identify an individual (name, ID number, address, email, social media accounts, etc.).
- **Personal data:** Factors describing a person’s physical, physiological, genetic, mental, economic, cultural or social identity.
- **Genetic data:** Personal data relating to the inherited or acquired genetic characteristics that give unique information about the physiology or the health of that person, usually derived from a biologic sample.

- **Data concerning health:** Personal data related to an individual’s physical or mental health, including provision of health care services.
- **Biometric data:** Personal data resulting from specific technical processing (i.e. facial recognition, finger print analysis) relating to an individual’s physical, physiological or behavioral characteristics.

Companies that fail to comply with GDPR – either accidentally or intentionally – face fines of up to €20 million or four percent of annual global revenue.

DATA PROTECTED BY THE GENERAL DATA PROTECTION REGULATION (GDPR)



Patient consent and patient data of all types are strictly guarded under GDPR

AI, MACHINE LEARNING AND GDPR: RISK OR OPPORTUNITY?

GDPR has large, but manageable implications for the use of AI & machine learning in healthcare industry activities. The law requires companies to de-identify and anonymize any clinical data before it is analyzed, and to redact any data that could potentially expose a patient or physician's identity. This includes electronic medical records, lab results, prescriptions, insurance claims, and any other data that can be linked back to an individual.

GDPR's data privacy rules can be particularly challenging when healthcare companies are working with a curated collection of data sets or reviewing data about specific populations. For example, if there are only a handful of patients living with a certain condition, prescription data combined with electronic case report forms could easily expose their identity.

Conversely, when companies are overly cautious or risk averse because of GDPR's 99 separate articles, each of which has multiple requirements, opportunities are missed to extract valuable data insights.

But even with these challenges, commercial teams can leverage AI & machine learning technologies to gain efficiencies and increase precision for marketing and sales strategies. Using data that is overly general makes actionable insights hard to find. However, high-value results are achievable when companies work with expert teams grounded in both the technology platforms and the regulations that govern data privacy.

For example, GDPR prevents healthcare companies from linking prescriptions back to the prescriber, which means they cannot quantify the sales potential of an individual physician. But with machine learning algorithms that can analyze accessible data without compromising privacy laws, companies can confidently estimate physician potential.

Generating high-value data and insights within the framework of GDPR is possible. It requires data science teams with technical, regulatory, and pharmaceutical industry expertise to stand up sophisticated processes for data management. However, companies can achieve significant business results when they assemble these teams and identify specific goals for using AI & machine learning.

Generating high-value data and insights within the framework of GDPR is possible. It requires data science teams with technical, regulatory, and pharmaceutical industry expertise to stand up sophisticated processes for data management.

PART 3: AI & MACHINE LEARNING IN ACTION: FOUR EU CASE STUDIES

Several healthcare companies in the EU have already begun deploying AI & machine learning for commercial applications, with measurable results, proving it can be done.

01: MULTICHANNEL MARKETING IN GERMANY

Custom messages for every HCP

A global pharma company recognized that the increased number of communication channels in their promotional campaigns, including non-personal channels, was making it difficult to measure outcomes, especially for channels with weak signals. To solve for this, the company partnered with IQVIA in 2018 to deploy an AI & machine learning solution that answered questions about the impact of their commercial efforts among physicians across Germany.

The company's questions included:

- What is the bottom-line impact of personal versus non-personal marketing channels on prescriptions?
- Do non-personal campaigns generate new prescriptions and at what rate?
- Which channels and messages do different HCP segments prefer?
- How can we optimize personal and non-personal channels across the product portfolio?
- How can we customize our approach to account for customer responsiveness to better outcomes?

To answer these questions, the IQVIA analytics team created a machine learning algorithm that combined and analyzed historical marketing activity data with historical prescription data. The analysis adhered to Germany's data privacy rules while still delivering actionable insights at an HCP segment level. The algorithm evaluated thousands of HCP prescriptions over three years, linking upticks in prescriptions to specific multi-channel marketing efforts.

With these actionable insights in hand, the commercial team could predict sales generated from different channel activity for specific HCP segments across their product portfolio. They harnessed the insights to:

- Craft future campaigns
- Decide on future investment for non-personal channels
- Customize their marketing messages
- Determine level and frequency of contact for HCP segments
- Move resources across the product portfolio to drive increased prescription rates

A CASE SUMMARY

CHALLENGES

Increasing number of communication channels makes it difficult to measure outcomes

CONSIDERATIONS

Questions are raised about the impact of commercial efforts on HCPs in Germany

ANALYTICS

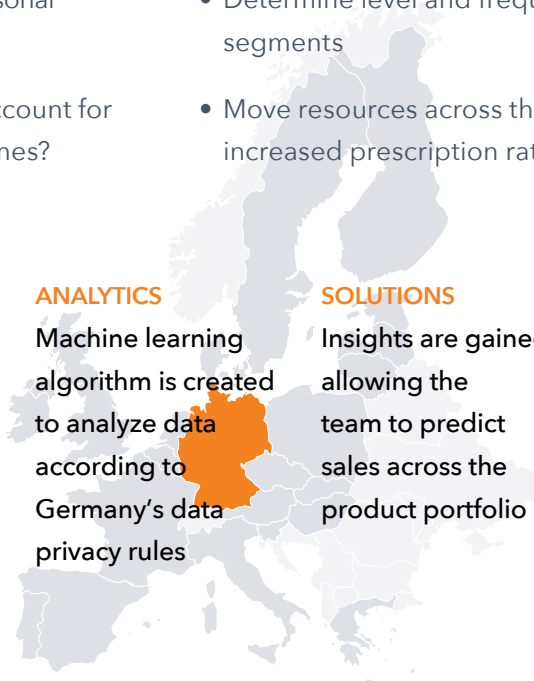
Machine learning algorithm is created to analyze data according to Germany's data privacy rules

SOLUTIONS

Insights are gained allowing the team to predict sales across the product portfolio

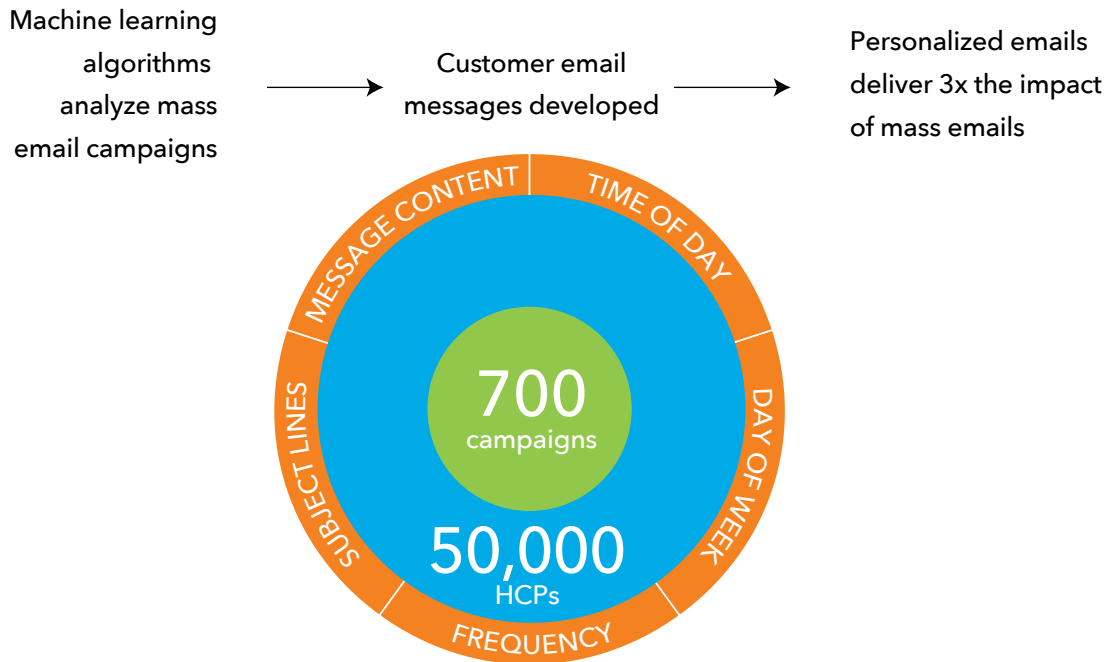
OUTCOMES

Results directed the development of future marketing strategies



02: DIGITAL ENGAGEMENT ACROSS THE EU

700 campaigns + 50,000 HCPs + 100 behavioral attributes



Email and digital channels play an important role in commercial HCP engagement, with many companies setting up complex operational CRM systems to gather HCP opt-ins and optimize communications. And while mass emails are popular because the cost per send is so low, to generate real business value from these campaigns, the messages have to be personalized. In 2018, this EU based pharmaceutical company leveraged AI & machine learning to achieve that customization.

For this client, the IQVIA analytics team employed machine learning algorithms to analyze 700 campaigns impacting 50k HCPs across the EU. They used this

information to predict HCP response to digital campaigns and optimize execution of:

- Subject lines
- Message content
- Frequency
- Time of day
- Day of the week

Armed with data-driven insights, the commercial team customized their email approach down to the individual HCP, defining the optimal content, frequency, and time-and-day to increase open and click rates.

03: TRACKING MULTI-INDICATION PRODUCTS

EMR and LRx data deliver depth and breadth of knowledge

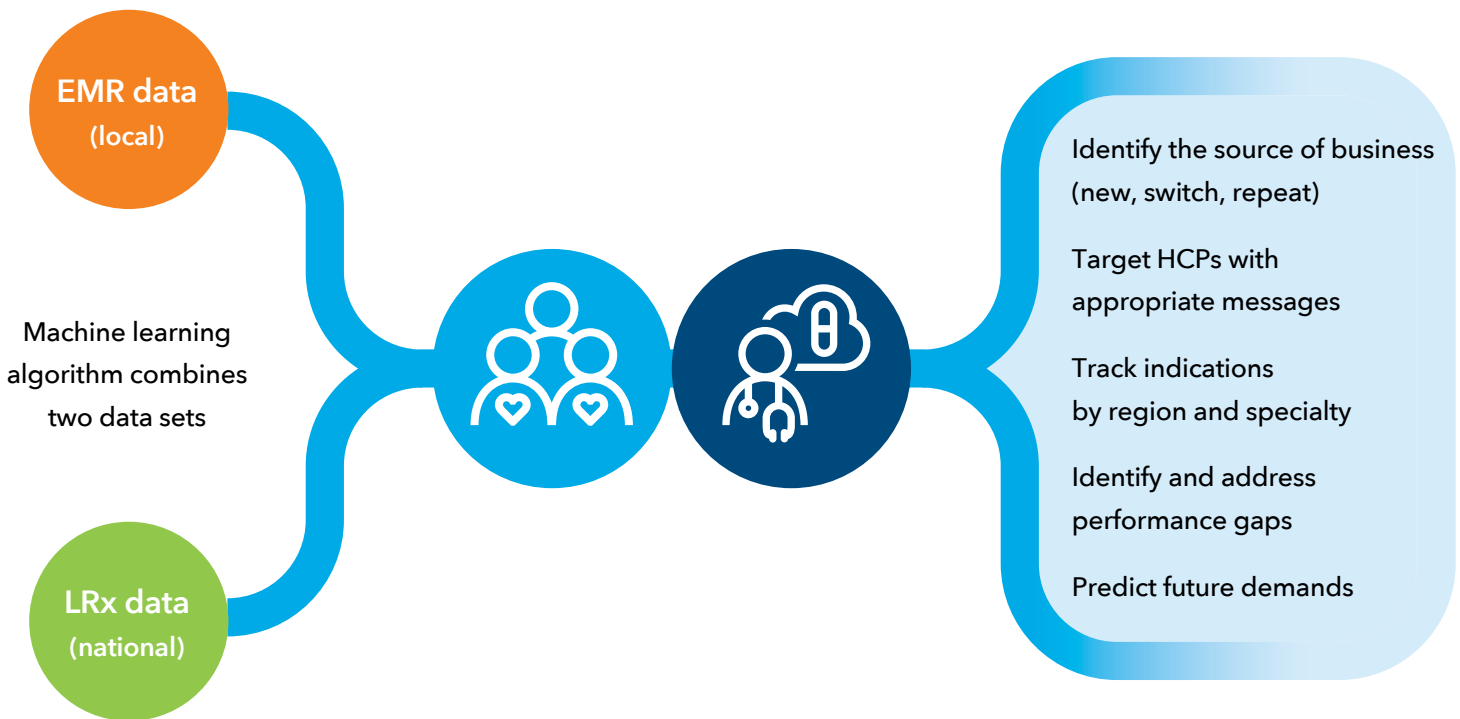
When a product is approved for multiple indications, understanding the specific condition an HCP prescribed the product for can contribute to successful brand management. However, many brand performance data assets only report total prescriptions over time and can't track at an indication level. In 2018, a global healthcare company deployed an AI & machine learning solution to understand how their brand performed across different indications and against to their competition. (Figure 1)

The IQVIA analytics team built an algorithm that combined two sets of patient data, pulling from the strengths of each:

- EMR data provided knowledge about indication and treatment on a local scale.
- Longitudinal prescription data (LRx) provided regional insights and trends across the entire country.

With this combined set of data, the algorithm predicted why the drug was being prescribed for particular patient profiles. These brand performance driver insights included the source of business (new, switch, repeat) at an indication level. With this knowledge, the commercial teams accurately targeted HCPs with messaging for the disease they were most likely to treat, tracked indications over time based on region and specialty, identified and addressed gaps in performance with enhanced resource planning, and better predicted future demands.

FIGURE 1: MULTI-INDICATION ANALYTICS CONTRIBUTE TO SUCCESSFUL BRAND MANAGEMENT

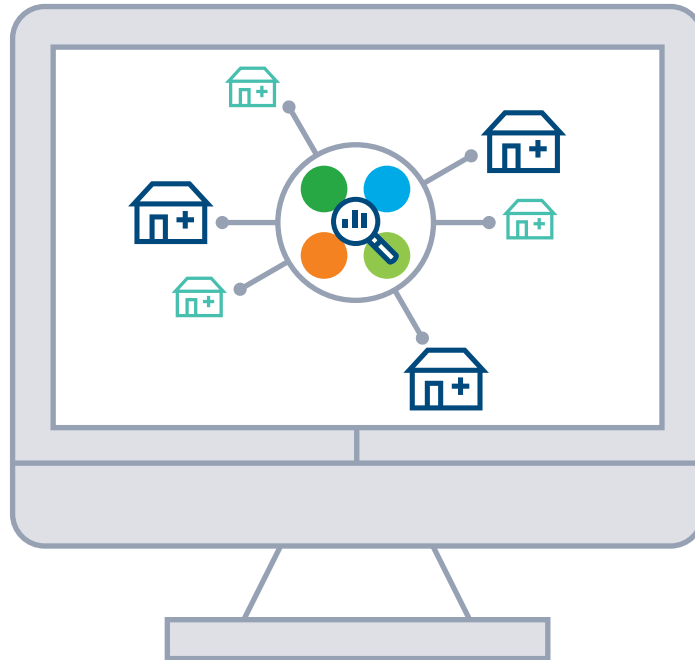


04: PHARMACY TARGETING

45% improvement in targeting accuracy

- anonymized pharmacy panel data
- location data
- sales activities
- socio-demographic information

- 01 Integrate and analyze data from multiple sources using machine learning algorithms
- 02 Determine sales potential of each pharmacy location
- 03 Prioritize locations and customize sales efforts



Every pharmacy caters to unique customer demographics. Healthcare companies must account for these differences to deliver the best sales results, considering the sales drivers, sales potential, and opportunities for upselling across demographics.

In 2018, a pharmaceutical company located in Europe used an AI & machine learning solution to understand the potential sales opportunities of specific pharmacies in high density markets. Their goal was to prioritize their marketing efforts and customize sales strategies.

To extract usable insights, the IQVIA analytics team developed an algorithm that combined and analyzed multiple data sources, including anonymized pharmacy panel data, sales activities, sociodemographic information and location data. From this, they were able to determine the brand/product basket potential of each pharmacy location. The commercial team then prioritized locations based on sales potential, and customized their efforts based on categories of interest (e.g. price sensitivity or responsiveness to promotional activities, etc.).

The AI & machine learning solution improved accuracy but also went further, gathering additional information beyond sales potential. With these insights the commercial team was empowered, targeting individual pharmacies with custom market strategies and allocating resources to maximize returns.

PART 4: THE RIGHT PARTNER

In today's dynamic European healthcare environment, healthcare companies cannot rely on technology consultants or off-the-shelf systems to deploy AI & machine learning solutions.

Many tech firms have attempted to create analytics platforms for the healthcare industry, but too often these platforms fall short. They lack access to robust yet granular industry data sets and the ability to transform them into large volumes of usable data. In addition, they don't have the industry expertise to navigate the complexities of the healthcare data privacy environment at both an EU and country level.

The volume and variety of data combined with significant regulatory requirements in the healthcare industry presents a challenge. However, if healthcare companies can successfully navigate this challenge, they face an unprecedented opportunity to answer complex questions about how to best position their products, craft messaging, and execute sales strategies that deliver commercial success.

Healthcare companies need experienced, informed partners on this journey. Partners that understand the pharmaceutical commercial space, the regulatory environment that governs it, and advanced healthcare analytics technology. These partners must have systems in place that protect patient privacy and adhere to global patient data safety laws.

When vetting partners, companies should assess all of the following characteristics:

DEEP PHARMACEUTICAL KNOWLEDGE AND EXPERTISE	This expertise includes understanding of the global regulatory environments, payer expectations, physician and patient behavior, and therapeutic knowledge.
SPECIFIC EXPERTISE IN GDPR, AND OTHER EU REGULATIONS GOVERNING DATA USE	Companies that fail to comply with GDPR – either accidentally or intentionally – face fines of up to €20 million or four percent of annual global revenue. Patient data is specifically targeted in this regulation. An effective partner must have experts who understand the laws, and how to use data effectively within their confines.
A STATE-OF-THE-SCIENCE AI & MACHINE LEARNING SOLUTION	Partners must be capable of mining anonymized patient level data from multiple sources with speed and scale, to identify high-level global and regional trends, as well as detailed physician and patient insights within the boundaries of the regulatory environment.
DATA EXPERTISE AND HUMAN DATA SCIENCE EXPERTS	It is critical that project teams include human data science experts skilled at both selecting the right country-level data and combining multiple data types. This makes it possible to use AI & machine learning capabilities on data at scale.
THE ABILITY TO INTEGRATE NON-TRADITIONAL DATA SETS	A lot of healthcare data is unstructured, including narrative formats, colloquial language or handwritten notes. These aren't easily analyzed. Partners must be capable of "cleaning" the data and integrating multiple sources. This is essential for algorithms to interpret results, translating them into actionable insights.

Beyond meeting all of these criteria, companies should look for partners who can advise commercial teams on how to best leverage these capabilities throughout the entire life of a product, from early planning to loss-of-exclusivity. That includes providing guidance on:

- Which data sets to analyze to answer key questions
- How to use data access to determine which markets to target and in what order
- What questions/algorithms will deliver the most valuable insights
- How to customize the AI & machine learning-powered strategy to accommodate additional regulations in each market
- Change management to implement the strategy

When AI & machine learning is a recognized part of commercial planning, and an effective solution is deployed with specific commercial goals in mind, these technologies have proven to deliver measurable outcomes.

CONCLUSION: MEASURABLE VALUE DELIVERED

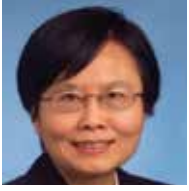
AI & machine learning can deliver previously inaccessible insights that positively impact commercial campaigns. And it can inform how companies deploy precision strategies for the best possible returns with the right balance of resources, with speed and at scale.

The regulatory landscape for data privacy across countries in the EU is complex and risky. Failing to comply, even accidentally, can lead to significant fines. However, these risks can be managed when companies have partners who bring deep technical, regulatory, and pharmaceutical expertise to the table. And the payoff is considerable. These solutions make it possible for sales and marketing teams to quantify physician potential, use existing data to optimize MCM, conduct brand diagnostics, and more succinctly target specific physicians based on geography, patients, and prescribing behavior.

AI & machine learning methods consistently deliver more accurate outcomes in less time than conventional assessments. In the short term, that translates into competitive advantage and better sales results. Over time these automated solutions deliver extended value by continuously monitoring trends and optimizing results as new data is generated.

For more information about IQVIA's AI & machine learning powered platforms and solutions, or to learn more about how these capabilities can transform your commercial strategies, please contact iqvia.com/contactus.

ABOUT THE AUTHORS



YILIAN YUAN, PhD, MBA

Senior Vice President,
Global Data Science and
Advanced Analytics, IQVIA

Dr. Yilian Yuan leads a high performing global data science and Advanced Analytics team at IQVIA with a culture of innovation and collaboration. Dr. Yuan has a sharp solutions focus and strong track record in designing and delivering innovative analytic solutions powered by AI & machine learning for life sciences clients, to drive business performance and to improve patient care globally.

Dr. Yuan earned a PhD in Applied Statistics from The University of Memphis and an MBA in Pharmaceutical Marketing from St. Joseph's University in Philadelphia.



FRANK WARTENBERG, PhD

President,
Central Europe, IQVIA

Dr. Frank Wartenberg has been President, Central Europe since 2011 and IQVIA's representative in Germany since the merger of Quintiles and IMS Health in 2016.

Dr. Wartenberg regularly shares his opinions with board members and senior management of the pharmaceutical industry in invited presentations, workshops and private discussions. He is a regular speaker at conferences on industry trends and publishes in international and national journals. Since April 2018, he has been chairman of the Federal Commission for Digital Health of the Economic Council ("Wirtschaftsrat") in Germany. Also, effective June 2018, he was appointed to the EMEA Regional Advisory Committee of DIA, a global research network.

Dr. Wartenberg's academic background includes a diploma in management science and operations research and a doctorate in economics from the University of Karlsruhe, Germany.



AGNIESZKA WOLK, PhD, MSc

Senior Director,
Data Science, IQVIA

Dr. Agnieszka Wolk leads the Advanced Analytics team in Europe. She has worked on multiple international consulting engagements within commercial effectiveness areas including multi-channel market optimization studies, physician networks, pharmacy and hospital targeting, segmentation, and pricing. Additionally, she's worked on developing patient-level insights offerings across several countries. And she has developed multiple advanced econometric models providing solutions to a range of different business problems.

Dr. Wolk holds an MSc in Economics from Poznan University of Economics (Poland), an MSc in Marketing from Tilburg University (Netherlands) as well as a PhD in Economics from Frankfurt University (Germany).



YASEMIN ILGIN, PhD, MSc

Director,
Data Science, IQVIA

Dr. Yasemin Ilgin has over 11 years working experience in the pharmaceutical industry with in-depth knowledge of advanced analytics and oncology offerings. Most recently, she's focused on offering development using advanced analytics for EMR, hospital and pharmacy data with a specific responsibility for Germany.

Dr. Ilgin holds MSc degrees in Economics and Psychology, a PhD in Economics with focus on Health Economics and is a certified Systemic Business Coach.

CONTACT US

iqvia.com/contactus

