HEALTHCARE OVERVIEW

AI: The Next Frontier for Healthcare Providers

DataRobot

Introduction

The pace of change in the healthcare industry is accelerating with new therapies promising cures to previously debilitating or deadly diseases. Aging populations, and public health crises, such as addiction to opioids, are putting pressure on provider workloads and increasing patient safety risk and negatively affecting patient experience.

Healthcare providers must rise to the challenges of delivering high quality care and improving patient outcomes while reducing costs, becoming more efficient, and harnessing the latest developments in drug therapy.

Investments in technology support tangible advances in healthcare while generating enormous volumes of data. Healthcare providers have the opportunity to put this data to work. Insights and intelligence (generated by AI and through machine learning) integrated into workflows enables healthcare systems, providers, and administrators make better decisions that improve healthcare delivery.

Trends in Healthcare

TREND 1: FROM SICKNESS TO HEALTH

Healthcare is changing. The emergence of value-based payment models and contracting is changing how providers engage with patients. With a greater focus on preventative medicine, healthcare professionals spend more time keeping people healthy rather than attending to patients only when they get ill. In the U.S., the Medicare Access and CHIP Reauthorization Act of 2015* (MACRA) is changing the way that Medicare rewards clinicians for value over volume.

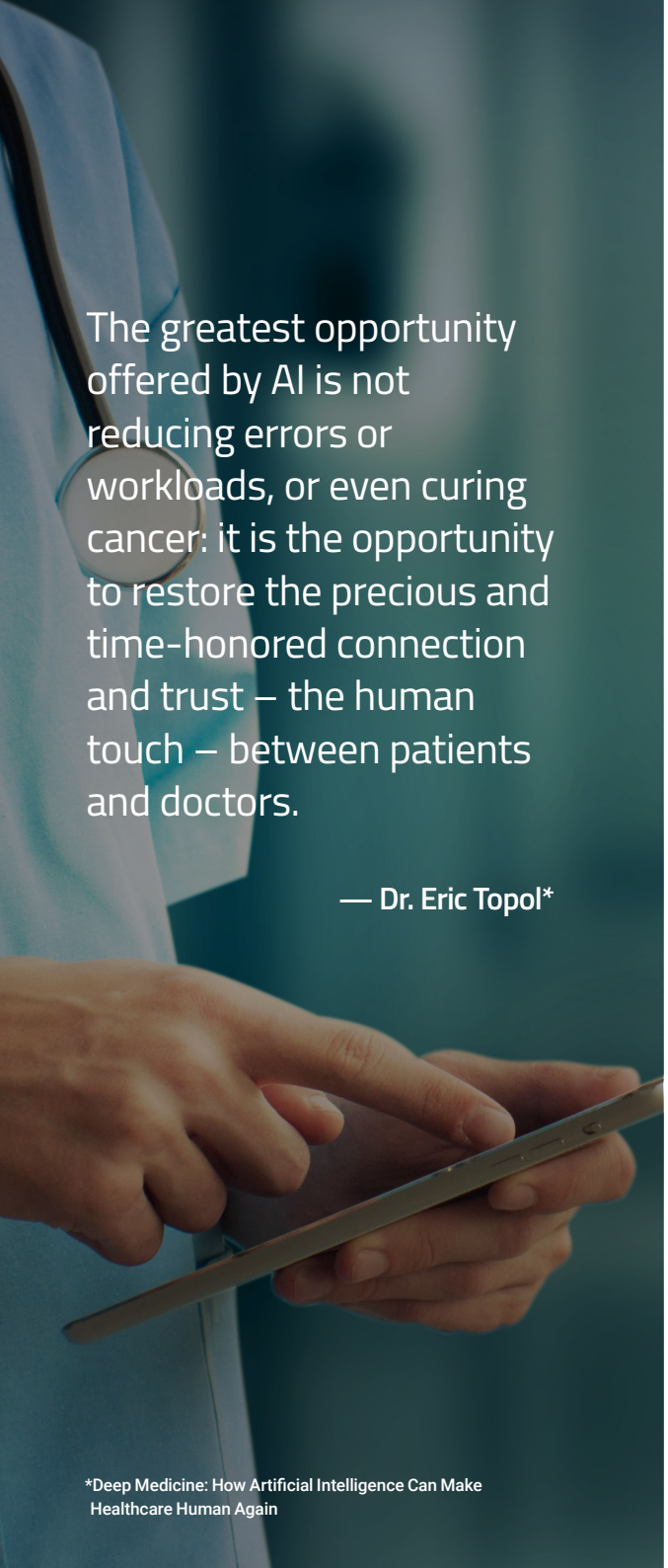
TREND 2: DIGITAL OPERATIONS IN HOSPITALS AND CLINICS

Healthcare providers increasingly rely on integrated networks of multiple information systems, including clinical information, electronic health records, digital imaging, physiological monitoring, laboratory information, revenue, and billing. The technologies have significantly advanced patient care, while at the same time creating new complexities and emerging care models that require us to move to a new age of augmented intelligence.

TREND 3: PERSONAL HEALTH MONITORING

Healthcare is becoming more personal as individuals demand more convenient options as well as a more retail-like frictionless experience from their healthcare providers. Additionally, the rapid adoption and acceptance of commercial wearable devices has opened new opportunities for clinicians and researchers to leverage the biometric data streamed from these devices.

*https://www.cms.gov/Medicare/Quality-Initiatives-Patient-Assessment-Instruments/Value-Based-Programs/MACRA-MIPS-and-APMs/MACRA-MIPS-and-APMs.html



The greatest opportunity offered by AI is not reducing errors or workloads, or even curing cancer: it is the opportunity to restore the precious and time-honored connection and trust – the human touch – between patients and doctors.

— Dr. Eric Topol*

*Deep Medicine: How Artificial Intelligence Can Make Healthcare Human Again

Digital Healthcare Creates New Opportunities

Datasets generated in multiple information systems repay their cost of management when they drive artificial intelligence that creates better patient outcomes, elevates patient experiences, improves clinician experiences, and reduces costs.

Creating better patient outcomes: Promoting well-being, preventing disease and illness, and early intervention form three pillars of better outcomes. AI can identify for example, patient risk for HACs (hospital-acquired conditions); identify patients with a higher, recommend therapies and next best action to improve the likelihood of adherence and the desired outcomes.

While hospitals and clinics will continue as primary sites of care, virtual healthcare increasingly allows clinicians and secondary caregivers to engage when patients are at home and shift focus to keeping patients healthy and out of the hospital. Remote patient monitoring can identify which patients are less likely to follow prescribed drug regimes (medication adherence) or those susceptible to abusing opioids. AI can help create a more personalized virtual encounter for a better patient experience and increase engagement that leads to improved outcomes.

Elevating patient experiences: With AI, providers streamline emergency room triage or better coverage at peak times and for better coverage at peak times and lower wait times. Clinical encounters can be better informed by personalized insights that help ensure key challenges are addressed. Patients can return home after hospitalization or treatment wearing remote monitors that elevate new risks to the care team for patient safety.

Improving clinician experiences: Increasing demand for health services creates risk of burnout for doctors and nurses on the front line. AI allows providers to work smarter by streamlining workflows to reduce caseloads on clinicians. Additionally, using AI to understand the streams of data coming from digital equipment and generating accurate predictions frees clinicians to turn away from medical equipment and attend to people needing their help.

Reducing costs: Healthcare providers are under pressure to reduce costs. In 2011, there were approximately 3.3 million cases of readmissions in the U.S., costing hospitals $41.3 billion*. In 2017, Medicare reported* a 15.3% hospital-wide unplanned readmission rate. AI-driven insights can deliver savings and efficiencies when incorporated into the clinical and operations workflows. Use cases include identifying readmission risk using social determinants of health data, prediction of no shows, predicting optimal staffing levels, and optimal bed utilization.

*https://www.hcup-us.ahrq.gov/reports/statbriefs/sb172-Conditions-Readmissions-Payer.pdf
*https://data.medicare.gov/Hospital-Compare/Unplanned-Hospital-Visits-National/cvcs-xecj/data

AI Pays Dividends on Investments in Digital Healthcare

In their quest to improve outcomes and reduce costs, providers continue to invest in digital healthcare. In fact, the health technology sector sector is expected to reach USD $280 billion by 2021, at a CAGR of 15.9% between 2016 - 2021*. Deloitte identifies data as “the new health care currency.” The challenge for providers is learning to unlock the true value of billions of data points stored in digital systems and streaming from digital devices and to transform these into actionable insights that support the work of caregivers and administrators.

> The effective use of machine learning helps healthcare organizations extract the insights otherwise locked away in data to provide much-needed decision support for doctors and nurses.

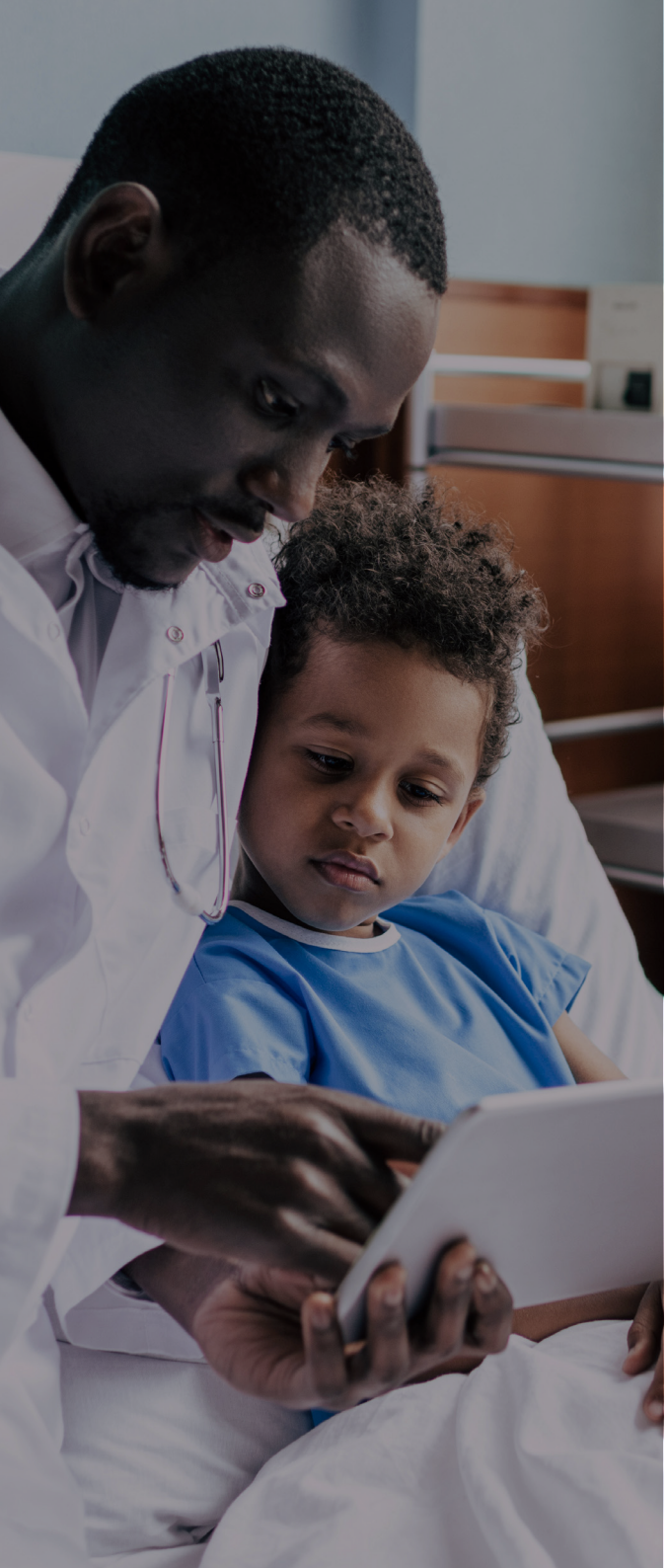
Machine learning is key to enabling the AI-driven healthcare organization. However, healthcare providers can struggle with deploying machine learning effectively. Many provider systems do not have the skills, tools, or time to develop and deploy conventional machine learning solutions. Compounding this, most healthcare organizations lack the IT resources necessary to deploy and maintain conventional machine learning tools.

The DataRobot enterprise AI platform makes advanced machine learning and predictive analytics more accessible by reducing barriers to creating and using AI. DataRobot improves the productivity of data scientists while empowering data analysts in clinics, hospitals, and elsewhere to develop highly accurate machine learning models without requiring statistical or data science coding knowledge. DataRobot also offers simple methods for deploying and maintaining models, allowing overworked IT departments to quickly integrate these advanced models into production systems (e.g., electronic health records, practice management systems, BI tools).

*Deloitte 2019 Global Health Care Outlook

By simplifying AI and accelerating adoption, DataRobot brings hundreds of use cases into reach for healthcare providers. Examples of how AI can be used to inform and support clinical staff include:

- Risk stratification of patient populations
- Medication adherence prediction (PDC)
- Disease propensity
- Patient hospital-acquired conditions risk
- Clinical pathway predictions
- Treatment effectiveness
- Outcomes prediction (based on treatment)
- Patient outcomes prediction (based on social determinants)
- Acute vs. chronic episodic care forecasting
- Early disease detection
- Non-adherent patient prediction
- Error propensity (clinical or medication)
- Adverse event prediction
- Procedure complication prediction
- Sepsis, A-Fib, CHF, NICU, transplant cases prediction
- Infection rate prediction
- Bed sores risk

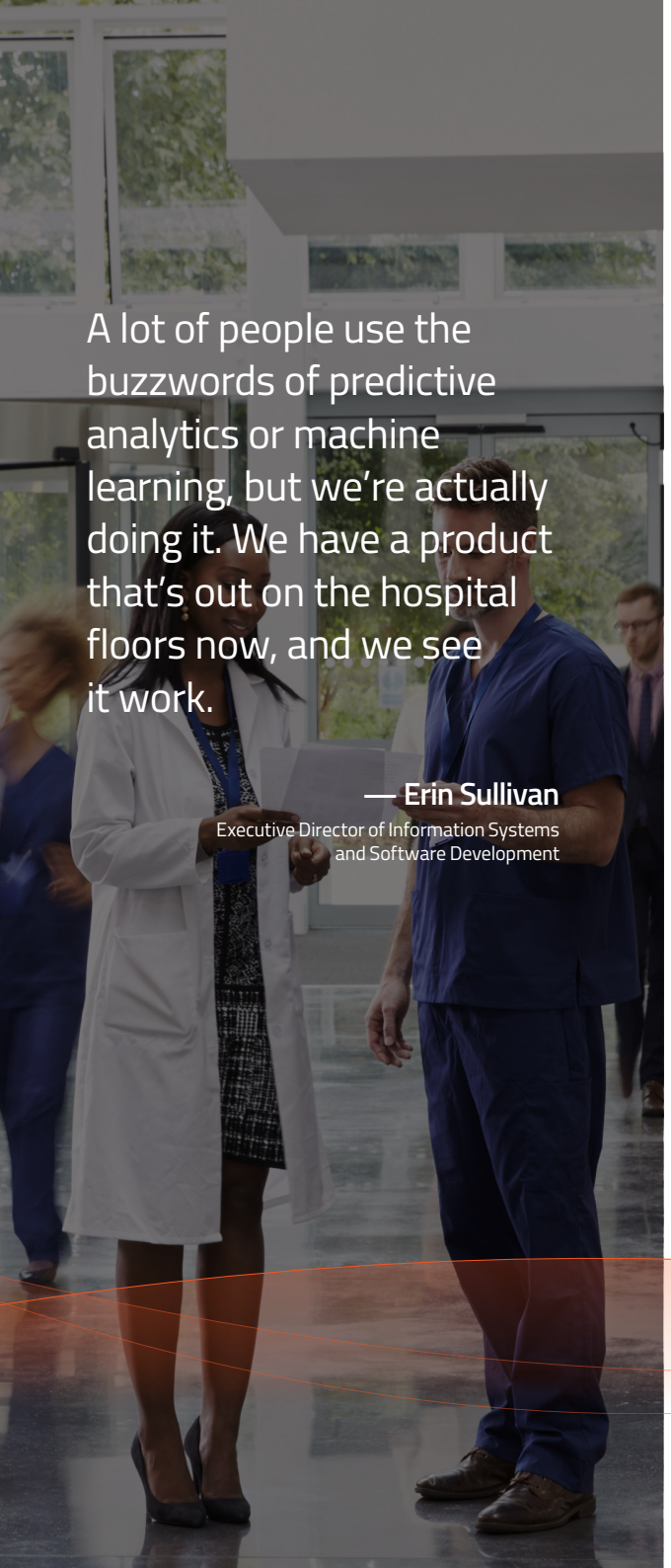


The Advent of Automated Machine Learning and Enterprise AI

Automated machine learning, pioneered by DataRobot, can address many of your most pressing business challenges across your healthcare organization, from clinical through to financial and operations.

AN ENTERPRISE AI APPLICATION:

- Builds and ranks dozens of predictive models so you can quickly evaluate and select the model best suited to your particular problem.
- Provides transparency telling you not just which features in the data had the most impact to the predictive power of each model, but also explains individual predictions down to specific data features and their values.
- Provides tools for understanding model accuracy and making tradeoff decisions (e.g., between speed and accuracy, positive versus negative predictive value, when and where additional models may be cost justifiable).
- Automatically creates documentation required for model validation and model risk management — reducing the opportunity cost of time spent on lower value activities that typically consume data scientists.
- Reduces the cost, difficulty, and risk of deploying models into your production environment by providing minimally invasive deployment options, such as scoring code generation, prediction APIs, and deployment to Hadoop.
- Makes it easier to monitor model performance and detect drift or performance degradation over time, alerting modelers to the need for retraining or creation of challenger models.
- Makes retraining models on new data and redeploying models into production simple, fast, and low risk.



A lot of people use the buzzwords of predictive analytics or machine learning, but we're actually doing it. We have a product that's out on the hospital floors now, and we see it work.

— Erin Sullivan
Executive Director of Information Systems and Software Development

Healthcare Providers Succeeding with AI

STEWARD HEALTH CARE

Challenge. Steward Health Care, the largest private, tax-paying, physician-led healthcare network in the United States, operates 37 highly-awarded hospitals in the United States and in Malta. Five thousand physicians engaged across 800 communities are involved in more than 12 million patient encounters each year. Ensuring that the appropriate team of doctors and nurses is scheduled to attend every interaction with patients is critical to providing high quality care while managing costs, but getting this forecast correct is difficult.

Solution. Working with DataRobot, Steward Health Care used AI-driven forecasting on multiple years of data to predict how many people will be occupying beds in three different types of specialist units at various time horizons stretching from one to eight days forward. Results from the AI-driven forecasts populate business intelligence dashboards used by nursing managers to create staffing schedules that more accurately matched the needs of each specialty unit.

Result. Using DataRobot, Steward Health Care was able to optimize emergency room staffing, reducing registered nurse hours by 1%. Having rolled out the program to eight of 38 hospitals, Steward has generated annual savings of $2M. By reducing patient length of stay by 0.1%, the company saves over $10 million per year.

Explainability is key in healthcare, and DataRobot's platform makes it easy for our clinicians to understand DataRobot's predictions and take action on those insights.

— **Nathan Patrick Taylor**
Symphony CIO

SYMPHONY CARE NETWORK

Challenge. While sometimes inevitable, readmissions are distressing for patients and expensive for providers. Discharging a patient too early can put patients at risk of complications such as sepsis, while keeping a patient in a ward when they could safely return home puts them at risk of hospital-acquired infections. With each readmission costing the company $13,500, the challenge for Symphony Care Network is to maximize the quality of care, while minimizing costs.

Solution. A Customer-Facing Data Scientist from DataRobot joined with a Data Analyst from Symphony to form an AI SWAT team. By leveraging DataRobot's visually interactive and automated AI platform, this team of two were able to do the work that otherwise would have required an army of data scientists. They quickly built the right models and got these into production.

Result. With DataRobot, Symphony reduced readmission rates by 3% saving $5 million annually. Using their existing dashboards, 250 nurses across Symphony's network regularly access DataRobot's predictions.

Conclusion

With the urgent need to drive down costs, the emergence of complex, value-based care models, and a renewed focus on a more personalized, frictionless, and convenient patient experience, it is imperative that providers adopt AI across the enterprise. Widespread implementation of AI will enable healthcare organizations to address these challenges as the healthcare industry continues to transform.

DataRobot's trusted enterprise AI platform and AI Success teams help healthcare systems quickly and efficiently deploy AI across their organizations, extracting significant value from the data and maximizing their AI investments. DataRobot offers AI with ROI, AI with Trust, and AI you own.

Let our team of healthcare industry experts show you how you can achieve your AI transformation goals. For more information on DataRobot, or to schedule a demo, visit www.datarobot.com

DataRobot

DataRobot helps enterprises embrace artificial intelligence (AI). Invented by DataRobot, automated machine learning enables organizations to build predictive models that unlock value in data, making machine learning accessible to business analysts and allowing data scientists to accomplish more faster. With DataRobot, organizations become AI-driven and are enabled to automate processes, optimize outcomes, and extract deeper insights.

Sign up for a free trial today to find out how DataRobot can help your organization at **datarobot.com**