



Whitepaper

Insight to Impact

Transforming Patient
Experiences Through the
Synergy of Data and AI



Table of Contents

- Executive Summary
- Redefining Care Outcome
- The Personalization Imperative in the Patient Journey
- Data at the Heart of Patient Experience & Business Performance
- Data Challenges in Delivering Personalized Care
- Intelligent & Insight-Driven Care Continuum
- Empowering Life Sciences with Data Democratization and Interoperability
- Easy-To-Implement Defined Use Cases in Life Sciences
- Building a Connected, Empathetic Care of the Future
- Citations & References



Executive Summary

52% of consumers rate the U.S. healthcare system's performance, and 53% rate the quality of care experience, as average or below.

Despite significant investments in digital technology, healthcare lags in digital engagement and poor patient experiences and outcomes continue to plague the industry.

To unlock value from digital interventions, industry players need to rethink care delivery with the patient at its core.

- What does the patient journey look like from their perspective?
- Where are the friction points in this experience, and what steps can we take to resolve them?
- How can we tailor each interaction to enhance personalization and keep patients engaged throughout their journey?

These questions are increasingly being asked by healthcare and life sciences CXOs. However, this transformation cannot be achieved through individual organizational efforts alone; it requires the entire ecosystem to connect, communicate, and view each interaction through a patient-focused perspective.

The modern healthcare landscape needs innovative approaches led by data and artificial intelligence (AI) that can revolutionize patient journeys, enhancing both engagement and outcomes. We are talking about analyzing everything – from genomics to real-world evidence and initial diagnosis to treatment and follow-up – to drive unprecedented personalization, precision, and outcomes. AI can uncover insights that drive the creation of targeted treatments tailored to individual patient profiles. This precision medicine approach not only enhances treatment efficacy but also reduces the time and costs associated with bringing new therapies to market.

For instance, in the life sciences industry, data and AI can enable more precise and efficient drug development, clinical trials, and personalized therapies. In healthcare it can personalize care plans, predict potential health risks, and streamline communication between patients and providers.

Imagine a world where patients receive tailored recommendations based on their unique health profiles; where timely reminders for medication adherence and follow-up appointments are seamlessly integrated into their daily lives; where continuous data analysis ensures that patient feedback and health outcomes are monitored effectively, facilitating real-time adjustments to treatment protocols.

In this paper we explore this new reality of healthcare and life sciences, how it's being shaped by latest technologies and a patient-first, proactive approach to care, and what can organizations do to stay ahead of this curve.



Redefining Care Outcome

Putting clinical trial participants in control of their journey

Lisa is a 55-year-old cancer patient who is at a pivotal point in her care journey. After two years of intensive treatment, she hasn't seen any results. As the standard treatment wasn't working, her oncologist suggested she enrol in a clinical trial that could potentially improve her quality of life. Understandably, Lisa was skeptical. Managing the logistics alone seemed like a lot to handle. Fortunately for Lisa, this trial was digitally enabled.

Lisa was given access to a companion app that helped her learn about the trial, connect with other participants, consult with the principal investigator, and enroll into the trial from the comfort of her home. The trial kit was delivered to her doorstep, and her health was monitored through intelligent and connected devices that sent real-time updates to her care team. Each part of Lisa's experience was personalized, backed by data, and guided by AI, giving her the confidence and support she needed every step of the way. A host of digital concierge services were at Lisa's fingertips like pharmacy connect, doorstep diagnostics, smart groceries, nutrition check, smart travel to manage her daily activities, enabling her to cope with her condition.

Patient journey: A new healthcare standard

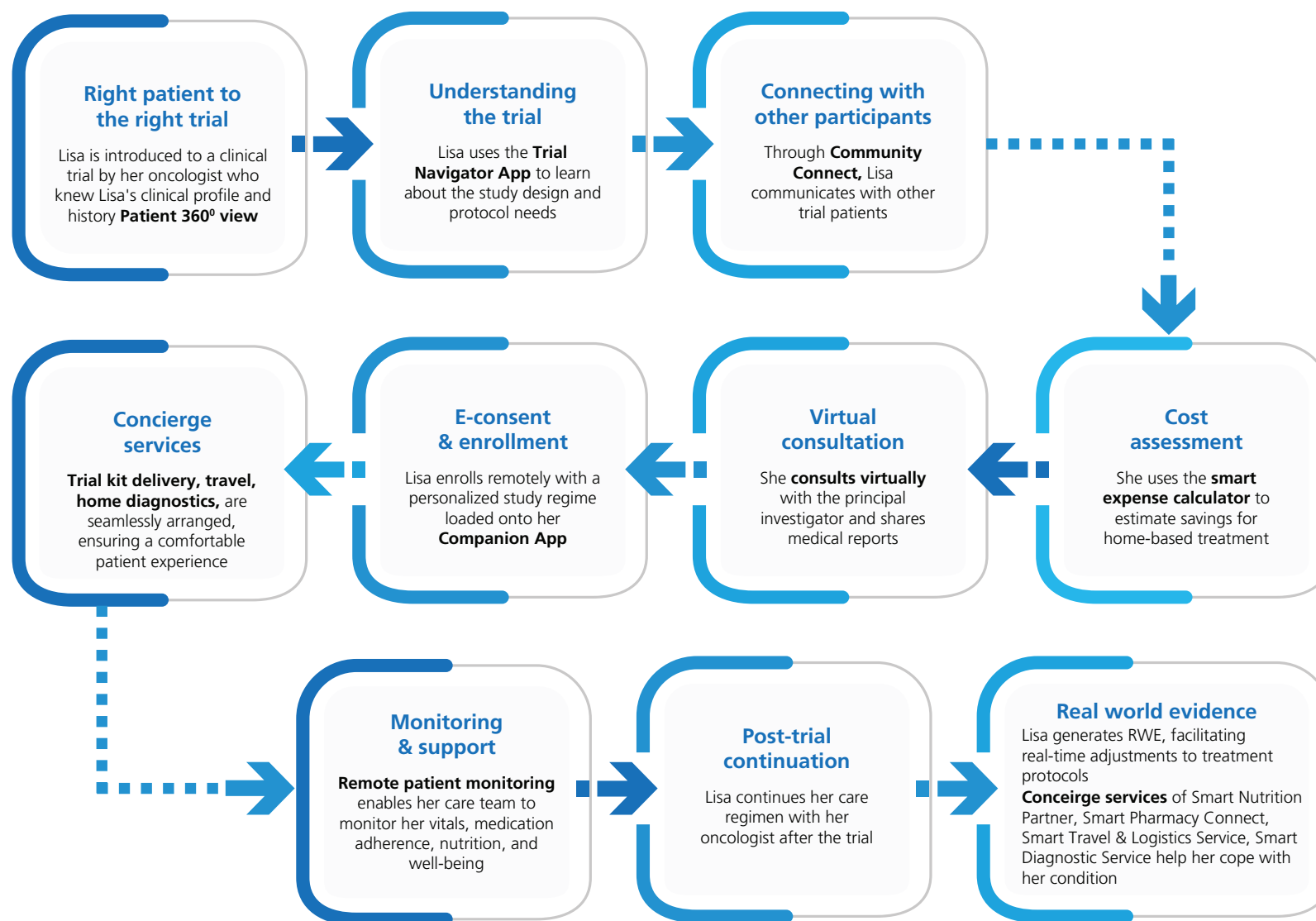


Fig 1: Lisa's journey — A new standard in healthcare

Digital health interventions made Lisa's cumbersome, anxiety-inducing process into a seamless journey. But what does it take to replicate this level of care on a broader scale?



The Personalization Imperative in the Patient Journey

Lisa's journey is a glimpse into the future of patient care — a connected care ecosystem that delivers positive clinical outcomes and superior patient experiences. Today, patients want more control over their health decisions, pushing for personalized care and flexible, on-demand access to medical services. Four out of ten consumers spend at least three hours per month managing their health and well-being online. In fact, patients who feel more in control of their healthcare decisions are more likely to adhere to treatment plans and report higher satisfaction levels.

When patients engage more with their treatment or trial experience, it reduces time-to-market, drives better outcomes, and improves trial retention.

However, the current healthcare and life sciences systems are not equipped to deliver this level of quality care and patient experiences (see fig 2). The first hurdle in the way is matching the 'right patient to the right trial.' In a disconnected system challenges of matching eligibility criteria and sharing or accessing patients' clinical profiles make it difficult to find the right trial. Post enrolment in a trial or during the treatment phases in provider settings, patients often find themselves frustrated with disjointed processes and lack of coordination. Studies show that nearly half (47%) would like to receive personalized information based on broad age, gender, and ethnicity groups, but only 34% get it today. The result? Dissatisfaction and non-adherence to treatment plans. Worse still, nearly 50% of clinical trial patients discontinue treatment due to insufficient guidance and support, leading to enormous financial and clinical losses.

Patient participation and retention challenges in clinical trials

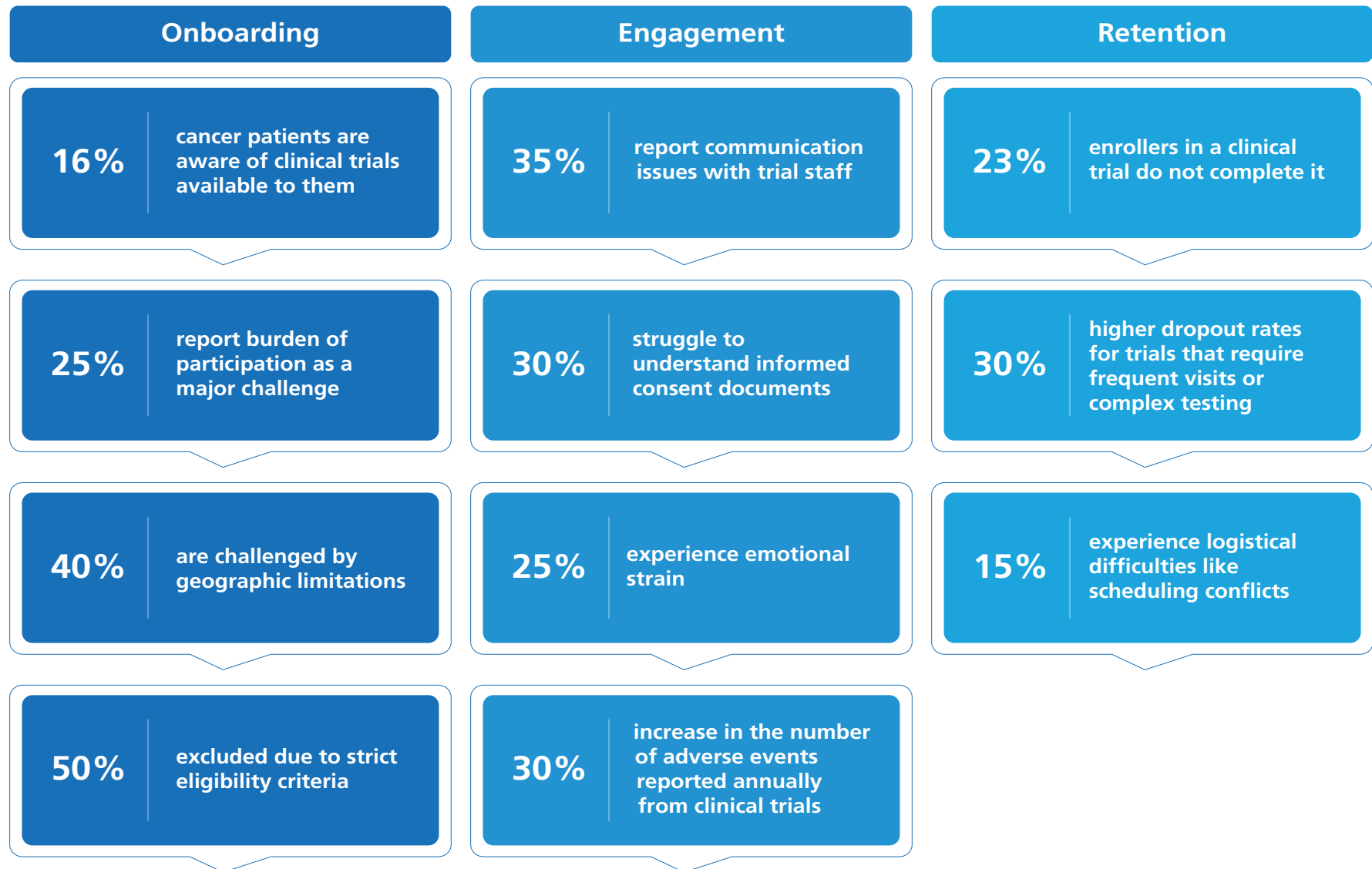


Fig 2: Patient participation and retention challenges in healthcare and clinical trials

Sources: JAMA Network Open | Journal of Clinical Research Best Practices | Clinical Trials Arena | Clinical Trials | The New England Journal of Medicine | The Clinical Trials Transformation Initiative | Patient Education and Counseling | Therapeutic Innovation & Regulatory Science

Patient care challenges in healthcare

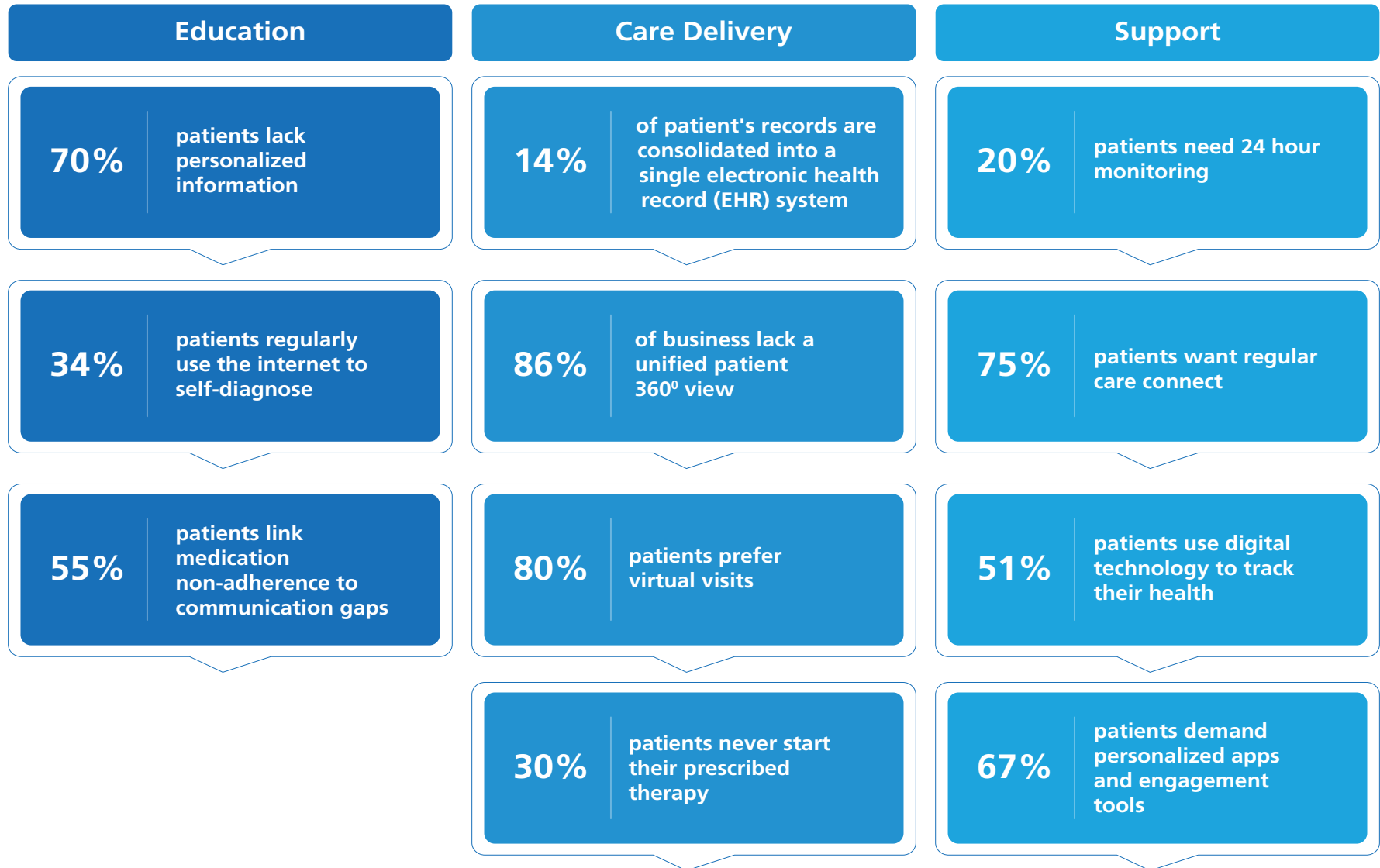


Fig 3: Healthcare challenges that drive poor engagement across awareness, care delivery and support

Sources: TechTarget | AMA | NIH | Healthit.gov | The Pharmaceutical Journal



Data at the Heart of Patient Experience & Business Performance

Enhancing patient outcomes and driving business performance

Data and digital innovations hold the key to making patients more active participants in their own healthcare journey — in ways that were previously unimaginable. For instance, during Lisa's journey, wearable technology provided her care team with critical data on her health status, treatment adherence, and mental well-being. With this information, clinicians were able to adjust her care plan before complications arose.

Similar digital and data strategies can enable proactive, rather than reactive care across the health ecosystem. Healthcare and life sciences companies can monitor patient behavior, flag the severity of pain points, and predictively intervene with thoughtful deployment of digital service orchestration. In turn, this strengthens financial performance through increased loyalty, enhanced reputation, and higher service utilization.

While the benefits of data-driven care are clear, implementing it across the healthcare system is no easy feat. The ecosystem remains fragmented, with various stakeholders — hospitals, insurers, pharma, medtech and life sciences companies, and clinicians — often working in isolation. Democratizing data to create a predictive ecosystem where care can be delivered anytime for anywhere remains a struggle.



Data Challenges in Delivering Personalized Care

While the vision of a connected, personalized healthcare experience is compelling, the reality of life sciences and healthcare companies is far more complex. Delivering this seamless experience requires overcoming several structural and technological challenges.

Healthcare data explosion

The healthcare system, including patients generates enormous amounts of data. Take, for instance, medical imaging. Across the globe, over three billion medical imaging examinations are conducted annually – that's a lot of patient specific data. In the U.S. alone, the Vaccine Adverse Event Reporting System (VAERS) has recorded 1.7 million reports since the COVID-19 vaccine rollout. This data is a goldmine for personalized insights. However, most healthcare and life sciences companies lack the infrastructure to integrate and analyze these diverse data sources.

Lack of integration and interoperability

Data fragmentation is a very real challenge for healthcare delivery and global lifesciences industry. Despite the wealth of information, the inability to share it in real-time due to siloed systems is a significant barrier to effective decision-making.

With 75% of U.S. hospitals managing more than 10 EHRs & 64% of IT leaders citing legacy infrastructure, processes, and tools as a top barrier to transformation; it is evident that obtaining a 360-degree view of the patient journey is challenging. This problem is compounded by the volume of data being generated. For example, clinical trials now rely on thousands of endpoints, which have drastically increased the complexity of trial design and operations.

Data quality, trust, and compliance issues

Digital interventions can't work optimally without the right data. Yet, poor data quality costs the US economy \$3.1 trillion every year, and healthcare is no exception.

Adding to this, healthcare and life sciences companies face growing challenges in safeguarding data — highlighted by a recent breach that exposed 100 million patient records, one of the largest in U.S. history.

As the complexities of the healthcare system continue to evolve, the quality of data will remain crucial in delivering optimal patient care and advancing medical knowledge. Key challenges such as inconsistent data formats, incomplete data, data accuracy, timeliness, security and privacy concerns, as well as data integration and governance, will shape the future of healthcare. Moreover, fostering a culture of data quality among consumers and healthcare professionals alike will be essential to ensure effective, reliable, and secure healthcare delivery

To earn patient trust in data sharing, industry stakeholders must navigate a complex and evolving regulatory landscape safeguarding sensitive patient information while ensuring compliance with global standards such as GDPR, HIPAA, and FDA guidelines.



Intelligent & Insight-Driven Care Continuum

Democratizing data

To overcome these challenges, healthcare and life sciences companies must rethink how they structure and manage data. The future lies in building an intelligent, insights-driven data architecture that harmonizes data from multiple sources – clinical, real-world evidence, and patient-reported outcomes – into a single, cohesive system which empathizes with patient needs. Engaging key stakeholders across the ecosystem is important to deliver seamless experiences. These include coming together of life sciences/healthcare providers/payors/ medtech industries, specialized caregivers, specific disease areas, multiple channels and tools, patient communities, and geographical nuances.

The future lies in building an intelligent, insights-driven data architecture that harmonizes data from multiple sources – clinical, real-world evidence, and patient-reported outcomes – into a single, cohesive system which empathizes with patient needs.



Empowering Life Sciences with Data Democratization and Interoperability

A complete 360° view of Lisa in a connected universe will enable all stakeholders in the care system to know what her journey has been like in the past years. It will share insights on her health condition including comorbidities, the number of hospital visits, various episodes of therapy sessions, hospitalizations, readmissions including her claims history. Democratization and sharing data in a regulated and compliant environment will enable care teams across hospitals, geographies and timelines address Lisa's needs even while she is travelling or relocating to a different city. This data enabled view of EHRs, EMRs, LIMS, claims data, RPM data, trials data coupled with her day-to-day engagements on various digital channels like social media, ecommerce, entertainment platforms will help generate meaningful insights of Lisa's journey while she is coping with cancer. This access to real-time patient journeys will enable several healthcare and life sciences businesses in acquiring patients with the right set of communication and collaboration services. Companion digital therapeutics (DTx) and remote patient monitoring will transform those moments of frustration and anxiety into evidence-based moments of joy and truth with personalized insights with 'next best actions' to the patient and her care teams.

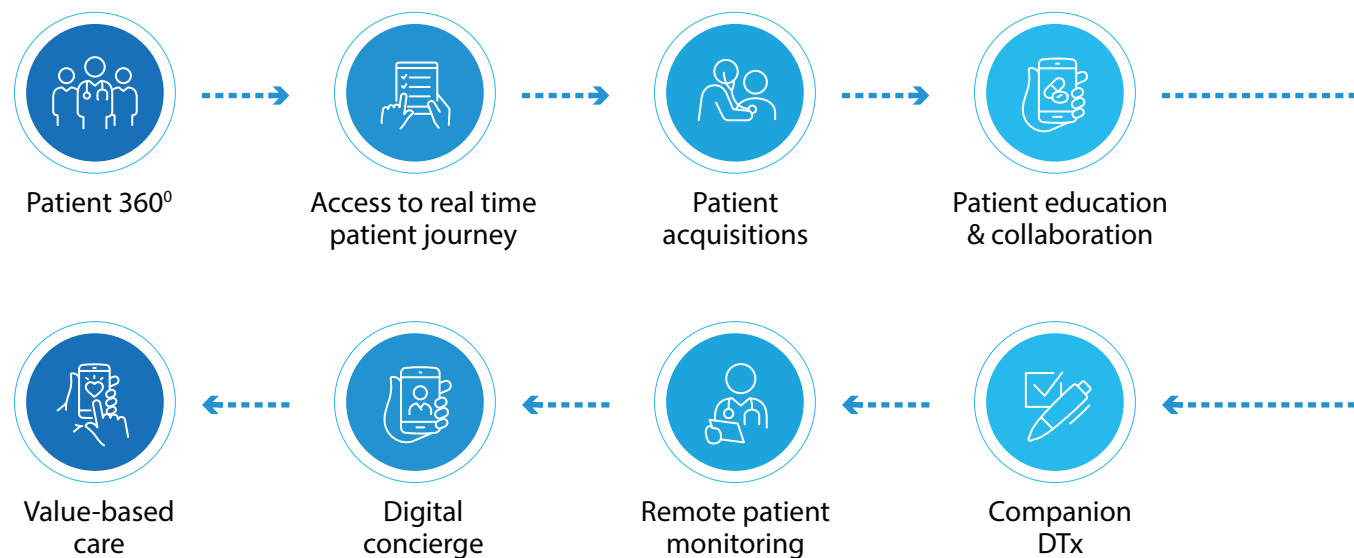


Fig 4: Key tenets of patient engagement powered by data democracy

Today hospitals focus on complex care; shifting non-complex care to home-based setting. The possibility of Lisa’s decentralized care delivery will enable providers to offload more care to home-based settings utilizing digital capabilities in smart and intelligent home care devices, personalized services, and closed loop delivery of medication therapy. This new care setting is urging care delivery organizations to tune their businesses to provide connected operations that are intelligent and resilient and optimize clinical workflows for better decision making.

However, democratizing data across the healthcare and life sciences complex ecosystem requires breaking down silos. This is possible with platforms that enable seamless data exchange between stakeholders. These cloud-based solutions can integrate data from multiple touchpoints — EHRs, wearables, clinical trials, etc.— into one accessible system to power multiple use cases (see fig 5). Getting comprehensive view of patient health requires:

- Identifying the right data sets to be ingested, integrated, harmonized, and utilized to drive actionable insights.
- Innovating on APIs that automatically pull structured and unstructured data.
- Integration with data warehousing and extract, transform, and load (ETL) processes.
- Data harmonization using standardized codes and data mapping and tagging of clinical and non-clinical data.
- Training data models with the right engineering features and training algorithms by applying the right rules for accurate insights.
- AI and Gen AI to summarize reports and respond to queries that patients and other stakeholders consume.
- Personalized and predictive visualization and reporting dashboards.
- Feedback loops to refine the predictions and insights over time, keeping the human in the loop.

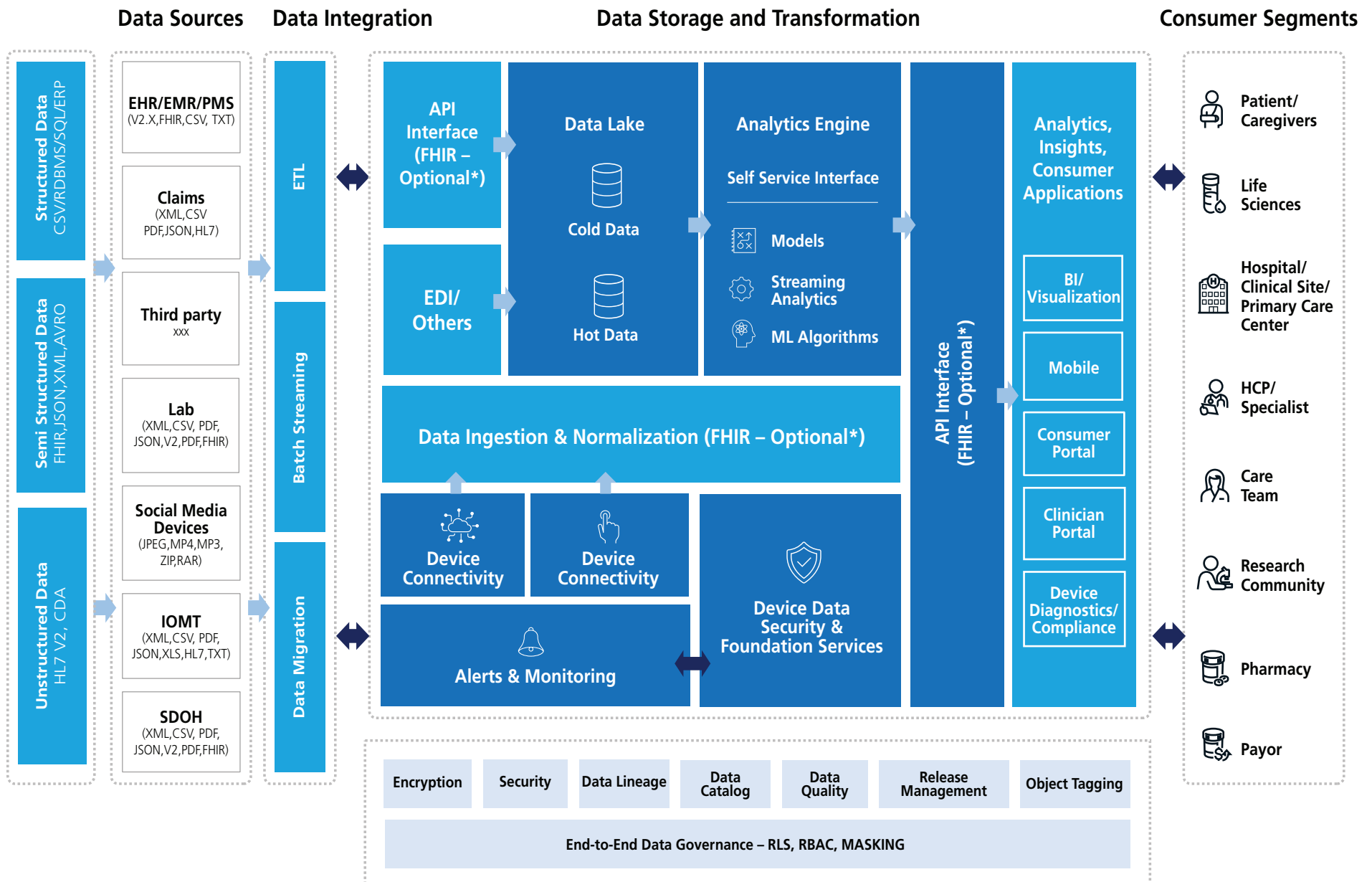


Fig 5: Reference of an intelligent data architecture in a regulatory-compliant environment



Easy-to-Implement Defined Use Cases in Life Sciences

Use Case – 01

Data-driven clinical decision-making with a remote patient monitoring (RPM) suite

A remote patient monitoring (RPM) suite with connected devices, a companion app, and a care team portal can extend continuous care beyond clinical settings, supporting proactive management of chronic conditions. Patients — particularly elderly individuals who require home-based care — can use wearable devices to track their vital signs, while care teams and physicians monitor this data remotely in real time. Such solutions also enhance patient engagement and enable a more personalized, connected care journey through timely insights and interventions.

AI-driven analytics for real-time decision making

AI can analyze vast datasets, uncovering trends and patterns that are invisible to the human eye. These insights allow for real-time decision making, ensuring that patient needs are met instantly. For instance, analyzing patient medication adherence data in real time can help flag potential dropouts in clinical trials. Reaching out to these patients with digital solutions for medication dispensing, pill reminders etc. can improve adherence. This not only improves trial retention rates but also accelerates time-to-market for life-saving drugs.



Easy-to-Implement Defined Use Cases in Life Sciences

Use Case – 02

Decentralized clinical trials

A decentralized clinical trial platform can streamline patient recruitment and engagement. Using this platform, patients can access trial information, provide e-consent, and receive reminders through companion app, all while staying connected to their care team. The platform has connected 2200 participants connected from 1800 clinical trials across 70 countries.

Scaling personalized care in life sciences

Finally, with the right data infrastructure in place, healthcare and life sciences companies can predict patient behavior, optimize treatment plans, and ensure that care is delivered at the right time, in the right way.

Results

1800+

virtual
clinical sites

70+

countries
implemented

2200+

participants

14+

therapeutic areas
covered



Easy-to-Implement Defined Use Cases in Life Sciences

Use Case – 03

Digital therapeutics (DTx)

Healthcare informatics has revolutionized sleep data management over the past decade, expanding from 200,000 devices to 18 million patients globally and scaling data processing from hundreds of thousands of daily records to over a billion.

Cloud-native platforms enabled real-time insights, while advanced analytics improved patient outcomes, device compliance, and billing efficiency. This innovation powered connected care and digital therapeutics, driving personalized treatments through various platforms.

Results

18M

patients served globally

40%

increase in adoption rates

50%

reduction in peak time inquiry

1B+

sleep records processed



Building a Connected, Empathetic Care of the Future

The future of healthcare is all about creating personalized, seamless experiences powered by data, AI, and immersive tech — blended with human touch and empathy. For healthcare and life sciences companies, the pressure is on: USD17 billion in readmission costs, USD2.6 billion on average to bring a new drug to market, rising trial expenses, and growing patient dissatisfaction show that the traditional approaches are no longer viable.

The future of life sciences is all about creating personalized, seamless experiences powered by data, AI, and immersive tech — blended with human touch and empathy.

By embracing real-time data, AI-driven analytics, and the power of generative AI companies can move from focusing on products to create a future where patient journeys are personalized, predictive, and frictionless.

As we have seen from Lisa's journey, technology can simplify, personalize, and improve healthcare experiences. But it can't succeed in isolation. A multi-disciplinary systems thinking approach needs to be embraced by healthcare and life sciences business stakeholders, policy makers, consultants, experience designers, data scientists, clinicians, tech partners, and specialized subject matter experts who would collaborate to build a connected system where patients are empowered, data flows freely, and care is personalized.



Citations & References

- *Global Consumer Health Survey: Global findings and highlights*, EY, June 2023:
<https://www.ey.com/content/dam/ey-unified-site/ey-com/en-gl/insights/health/document/s/ey-global-consumer-health-survey-23-global-findings-and-highlights-v2.pdf>
- *Consumers rule: Driving healthcare growth with a consumer-led strategy*, McKinsey & Company, 2023:
<https://www.mckinsey.com/industries/healthcare/our-insights/consumers-rule-driving-healthcare-growth-with-a-consumer-led-strategy>
- *Factors influencing patient involvement in decision-making in the management of low back pain: A qualitative study*. National Center for Biotechnology Information, Ferguson, R. J., 2011:
<https://pmc.ncbi.nlm.nih.gov/articles/PMC3068890/>
- *The true cost of bad data and how it can hinder the benefits of AI*, Forbes Technology Council, September 2023:
<https://www.forbes.com/councils/forbestechcouncil/2023/09/01/the-true-cost-of-bad-data-and-how-it-can-hinder-the-benefits-of-ai/>
- *100 million Americans' medical records exposed in massive data breach*, Daniel, L., Forbes, October 2024:
<https://www.forbes.com/sites/larsdaniel/2024/10/28/100-million-americans-medical-records-exposed-in-massive-data-breach/>
- *Emergence of GenAI in the healthcare industry: A point of view*, LTIMindtree, 2024:
<https://www.ltimindtree.com/wp-content/uploads/2024/01/Emergence-of-GenAI-in-the-Healthcare-Industry-POV.pdf?pdf=download>
- *Patient participation in decision-making about disease modifying anti-rheumatic drugs in patients with rheumatoid arthritis: The role of the health care provider*. National Center for Biotechnology Information, Patients' participation in decision making, 2014:
[https://pmc.ncbi.nlm.nih.gov/articles/PMC3964421/#:~:text=Patients'%20participation%20in%20decision%20making,would%20be%20provided%20\(11\).](https://pmc.ncbi.nlm.nih.gov/articles/PMC3964421/#:~:text=Patients'%20participation%20in%20decision%20making,would%20be%20provided%20(11).)



About the Author

Arpita Banerjee brings over 23 years of industry experience with close to 10 patents in medical device design, clinical trials optimization, patient engagement strategies, remote patient monitoring, and digital therapeutic interventions—enabling care teams to deliver smarter, data-driven care while empowering patients to take charge of their complex health journeys.

She collaborates closely with physicians, patients, and healthcare stakeholders to craft innovative, user-centric solutions across clinical domains and therapeutic areas. Leveraging deep research methodologies, Arpita identifies and interprets unmet needs to create impactful business model innovations, service designs, and product solutions that enhance clinical outcomes, elevate customer experiences, and drive business growth.

At LTIMindtree she drives the life sciences consulting services across clinical and medtech, R&D, commercial & patient engagement.

Getting to the
Future. Faster.
Together.

LTIMindtree is a global technology consulting and digital solutions company that enables enterprises across industries to reimagine business models, accelerate innovation, and maximize growth by harnessing digital technologies. As a digital transformation partner to more than 700 clients, LTIMindtree brings extensive domain and technology expertise to help drive superior competitive differentiation, customer experiences, and business outcomes in a converging world. Powered by 86,000+ talented and entrepreneurial professionals across more than 40 countries, LTIMindtree — a Larsen & Toubro Group company — solves the most complex business challenges and delivers transformation at scale. For more information, please visit <https://www.ltimindtree.com/>.