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Healthcareâ??s AI Ambitions Are Colliding With a Data Wall

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Fragmented systems, inconsistent data standards and poor interoperability are holding back AI-driven healthcare innovation, precision medicine and the scalability of advanced therapies.

Healthcare is generating more data than ever, yet much of its potential remains locked within disconnected systems. As artificial intelligence reshapes clinical decision-making and accelerates precision medicine, the real challenge is no longer simply collecting information but transforming it into trusted, actionable intelligence. **In a thought-provoking conversation with BioSpectrum Asia, Jonathan Wofford, Chief Commercial Officer, Title21 Health Solutions,** explores why healthcare's fragmented data landscape continues to constrain innovation, how standardisation and contextualisation can unlock meaningful insights, and why connected data ecosystems are critical to advancing cell and gene therapies and enabling a more intelligent, collaborative healthcare future.

Why is so much healthcare data still inaccessible despite investment in digital health and AI?

Despite the significant investment that has been made by hospitals and physician practices in electronic health records, interoperability, and now AI, a large percentage of healthcare data remains inaccessible and siloed due to a fragmented foundation. Hospitals, clinics, laboratories, pharmacies, and insurers often use different data systems, data models, standards, and data governance frameworks. Even when system integration is possible, there are several reasons why data cannot be moved including the use of proprietary platforms, lack of a uniform data structure or format, static documentation (e.g., PDFs), and inconsistent terminology or data definitions. While AI can extract and interpret information, it cannot solve poorly structured or defined source data. Furthermore, health information privacy regulations and security concerns can lead to institutional policies keeping data in-house and further restricting sharing. The challenge across healthcare is not just a lack of digital data, it is the lack of consistent and universally defined data standards, shared definitions, and the data integrity needed to make information understandable, comparable, and trustworthy across systems and institutions.

How do fragmented systems and poor interoperability limit AI-driven innovation and decision-making?

Across healthcare, many organizations are using fragmented systems for data management that might include paper records, Excel spreadsheets or Access databases, homegrown systems, and third-part products. This fragmentation results in significant barriers to effectively using AI. Due to system fragmentation, data is often siloed and inconsistently

defined and structured, limiting AI's ability to access a complete picture of the patient, disease, procedures, and therapies. Poor interoperability also makes it difficult to combine data at scale. When data cannot be reliably connected across systems, organizations are often left with small, incomplete, and heterogeneous datasets that likely lack the record volume and consistency required to train, validate, and continuously improve AI models or agents. This limits the ability to identify meaningful patterns, establish reliable benchmarks, and generalize insights across patient populations and therapies.

What separates organisations that turn data into actionable insight from those that don't?

Organizations that have been successful in making data actionable distinguish themselves by how effectively they connect, standardize, govern, and operationalize their data. These organizations establish common data standards and definitions, maintain high levels of data integrity, integrate information across clinical, operational, and financial systems, and aggregate sufficiently large, representative data sets to support advanced analytics and AI. The ultimate differentiator is an organization's ability to move from a fragmented data environment to a platform that drives trusted information, meaningful insights, informed actions, and measurable outcomes.

How critical are contextualisation and standardisation for scaling precision medicine and collaboration?

For precision medicine, cell and gene therapies, and other advanced therapies, standardization and contextualization are essential to scaling treatment safely and effectively. Standardization allows for the creation of common definitions and data formats so clinical, treatment, manufacturing, and outcomes data can be consistently captured and analyzed across providers, protocols/trials, and treatment centers. Contextualization adds the clinical and operational meaning necessary to interpret the data and connecting the right patient, treatment, circumstances, and outcomes. If we use CAR-T therapy as an example, a raw data point might be "cytokine release syndrome – yes". Contextualization connects the event to the factors that make it clinically meaningful such as patient age, specific CAR-T product and dose, timing and severity of cytokine release syndrome relative to infusion, etc. Without standardization and contextualization, healthcare organizations struggle to combine data into sufficiently large, reliable datasets, identify meaningful patient-treatment relationships, reproduce successful outcomes, and generate evidence that can support broader therapy adoption.

What key shifts are needed to move from data generation to true data-driven transformation?

True data-driven transformation demands moving beyond data accumulation and generation toward an environment where data is standardized, connected, contextualized, and continuously driving action. This requires the creation of common data definitions, trusted data foundations, removing organizational and technology silos, and integrating information across the full patient journey. This transformation must also result in a shift from retrospective reporting to continuous learning and real-time insights, where sufficiently large and representative datasets generate intelligence that can be validated, applied, and refined over time. For example, in CGT, connecting patient characteristics, disease data, manufacturing variables, treatment details, and outcomes creates a longitudinal evidence base. That foundation can enable AI to identify patterns in a treatment response or adverse events, improve patient selection, and protocols, and continuously learn from real-world experience. Imagine the impact that the ability to communicate in a consistent language across entities in the CGT space could have on accelerating the development and delivery of therapies for rare diseases – where a single institution's dataset is not large enough to drive meaningful insights and advances.