MEDIDATA

WHITE PAPER

Connecting Patient-level Clinical Trial Data to Real World Data

Unlocking new insights with Medidata Link

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Introduction

Accessing compelling and relevant evidence is crucial to drug development, safety monitoring, and improved patient outcomes. However, gaps between clinical trial data (CTD) and real world data (RWD) make it difficult to fully understand long-term outcomes and therapeutic efficacy.

THE COST OF EVIDENCE GAPS
86% of clinical trials are delayed by one to six months during pre-trial complex screening and baselining— costing time, money, and hindering patient data collection. On average, clinical trials have a 28% patient attrition rate and a two to three year wait to accumulate RWD.

Data linkage is a cutting-edge innovation that unlocks a new frontier of enhanced evidence generation by linking CTD and RWD at the patient level. While some clinical development teams have made progress toward data linkage, data privacy and accessibility pose major challenges. Some have attempted to link data in-house, but often struggle to ensure that their systems meet complicated security and privacy requirements. In-house data linkage also risks unblinding trials and re-identifying patients. Other organizations are developing custom solutions for specific trials, but face difficulties scaling across a sponsor's entire portfolio. Inability to scale leads to inefficiencies, greater costs, and increased patient and site burden.

Overview of Medidata Link

Medidata Link is the only centralized technology solution that works across multiple research sites to connect patient-level CTD) and RWD, powered by and fully integrated with the Medidata Clinical Cloud unified platform. The Medidata Acorn AI Labs team harmonizes and analyzes CTD and RWD with unrivaled data management and analytics expertise while also giving sponsors the flexibility to perform their own in-house analysis. Medidata Link helps sponsors gain a headstart in evidence generation, enhance data collection beyond a single trial, and enable efficient safety tracking while reducing burdensome follow-up visits.

LINKING CLINICAL TRIAL AND REAL WORLD DATA VIA TOKENIZATION

Medidata Link transforms patients' personally identifiable information (PII), or set of data that identifies a patient as a unique individual, into an encrypted de-identified "token." This "token" links to a broad, scalable, and centralized RWD ecosystem via Medidata's tokenization technology partnerships. In that way, a sponsor does not know the identity of a patient but does know all of their diagnoses and treatments over time: across multiple physicians, hospitals, pharmacies, labs, and even insurers. The researcher can then track what happens to an individual patient for long-term follow up.

Medidata Link provides access to a broad ecosystem of RWD through our tokenization technology partners, HealthVerity and Datavant. Our secure environment is privacy-certified and allows sponsors to maximize data collection with lowered risk of unblinding and re-identification.

How Does Medidata Link Work?

Patients enroll in a clinical trial and allow their data to be tokenized and connected to RWD. Consent can be captured using myMedidata portal or your existing third-party or paper process.

Trial data is captured and stored within Medidata's secure, compliant environment. The data can be integrated into your existing clinical workflows. PII (personally-identifiable information) can be collected or entered via any combination of:

Clinicians or Sites • **CROs or Vendors** • **Patient via myMedidata**

PII is de-identified.

Using de-identified tokens, RWD sets containing your patient population are returned.

Rave

Non-PII is collected and stored in Rave EDC.

Linked data undergoes third party privacy certification and is then made available for Acorn AI Labs or your in-house data science team to analyze.

Key Features of a Scalable Data Linkage Solution

CONSENT METHOD AGNOSTIC WITH FLEXIBLE PII COLLECTION

In order to create de-identified "tokens," patients must consent to have their study data linked with other sources. Medidata Link supports turnkey integration with myMedidata eConsent, third party eConsent, or paper consent, to enable flexible PII collection. This integration allows Medidata to centrally process PII through one-time site-based collection, patient entry, and file transfer— eliminating the need for site-based token creation or multiple PII-entry.

SEAMLESSLY WORKS ACROSS ANY TRIAL OR SITE

The traditional method for data linkage relies on one-off, custom-built solutions that force sponsors to start from scratch for each trial run by different research organizations. Medidata Link offers one centralized workflow for linkage across trials run by any organization. Our fully flexible approach makes the solution scalable across multiple trials.

CENTRALIZED WORKFLOW AND TOKEN PARTNER AGNOSTIC

Using a central environment to generate multiple "tokens" gives sponsors access to the largest pool of RWD to link to clinical trial patients, increasing the likelihood of finding matches. This centralized workflow allows sponsors and CROs to bypass the risky, costly, and time-consuming process of installing specific tokenization software at every site. Medidata partners with leading tokenization vendors to apply their de-identification software, produce patient tokens, and link trial patients to datasets in their RWD ecosystems.

Benefits to Patients, Sites, and Sponsors

FOR PATIENTS

Data linkage enhances safety monitoring, decreasing the need for burdensome patient follow-up visits and procedures. While the average patient attrition rate is 28%, Medidata Link can lessen patient burden by helping sponsors design smarter trials with less patient visits.

BUILDING PATIENT TRUST FOR DATA LINKAGE

De-identified patient data is already widely used to understand care in the real world. Extending data linkage to clinical trials can ensure that patients' invaluable contributions to research can continue after the trial itself has concluded. Patient education and communication are critical to alleviating concerns about data unblinding and re-identification. Frameworks must be put in place to ensure that the life science industry is working symbiotically with patient advocacy groups and educating patients about the benefits of data linkage and the guardrails in place to minimize re-identification risk.

Through Medidata's work with patient advocates in our Patient Design Studios, we validated that informed consent with clear and concise messaging is a crucial step in demonstrating the benefits of data linkage back to the patient. For instance, patients should be informed that by consenting to data linkage, they are helping researchers learn more about factors affecting disease states, as well as helping researchers monitor the safety and efficacy of therapies beyond the patient's clinical trial or registry participation.

FOR SITES

Medidata Link enables sites to strengthen safety surveillance activities and patient follow-up outside of normal clinical confines. This can reduce administrative burden and patient attrition rates while seamlessly fitting into existing clinical workflows. Medidata Link supports the flexible creation of multiple tokens without installing specific tokenization software at every site, thereby eliminating the risk of site PII entry.

FOR SPONSORS

Sponsors can begin collecting real-world patient-level data during their trial to jump-start evidence generation and patient insights. For completed trials, linked RWD rapidly bolsters individual patient data, rather than waiting for general RWD to accumulate after launch.

With Medidata Link, sponsors can future-proof their studies by tracking longer-term patient outcomes, safety, and insights not captured within the finite period of the clinical trial. This will help generate evidence to support payor and provider discussions, fill gaps for unanticipated questions, and provide a better understanding of patient outcomes lost to follow-up.

> "I anticipate that as we move towards a learning healthcare system, we should get smarter about embedding even clinical development and clinical trials into our healthcare delivery process."
> - **Amy Abernethy, MD, PhD (Former FDA Principal Deputy Commissioner, Acting CIO)**

Data Linkage Use Cases

PATIENTS LOST TO FOLLOW-UP

Within the clinical trial lifecycle, there is a gap in understanding what happens to patients lost to follow-up. Linking CTD and RWD can address this challenge by tracking outcomes of patients after they drop out. Sponsors and CROs can use this data to inform their trial design, ultimately leading to higher success rates.

This is especially relevant in the oncological diagnostic space, where Medidata Link can evaluate the performance of an experimental therapy against current standards of care by tracking patients who would've otherwise been lost to follow-up over the course of the trial.

POST-MARKET SAFETY SURVEILLANCE AND LONG-TERM EFFICACY TRACKING

Post-authorization safety monitoring and post-market surveillance are critical to fully understanding the efficacy and safety profile of therapies. This often involves burdensome follow-up visits for patients and investigators. Linked CTD and RWD address this challenge by enabling enhanced monitoring and earlier capture of safety signals. Faster and more robust evidence generation is a key factor for several regulatory scenarios such as Emergency Use Authorizations, Accelerated Approvals, or Breakthrough Therapy Designations.

For example, post-market safety and efficacy tracking are especially relevant for shorter-duration COVID-19 trials where the confines of the study prevent longer-term monitoring of safety and efficacy. CTD and RWD linkage can help sponsors meet regulatory requirements by tracking long-term efficacy, safety surveillance, durability, and subpopulation analysis for COVID-19 therapies. This allows investigators to monitor unexpected signals as they happen and dimensionalize efficacy.

Medidata Link can also help sponsors meet the regulatory requirements for long-term monitoring and safety surveillance critical for vaccine development without increased patient and site burden. This may also be applicable for therapies that require long-term patient follow up to better understand the long-term safety profile, such as gene therapy or CAR-T.

LONG-TERM HEALTH RESOURCE UTILIZATION TRACKING

Long-term patient outcomes or health resource utilization variables are crucial endpoints to support payor or provider discussions. However, sponsors are often unable to capture these values within the finite period of the clinical trial. Using real world datasets, sponsors can bolster their understanding of patient-level data to support payor and provider discussions rather than waiting for the industry standard of one to three years for general RWD to accumulate.

For example, osteoarthritis and rheumatoid arthritis trials often have short timelines with an increased focus on patient-reported outcomes and structural endpoints. Analyzing real world data from patients post-trial can allow investigators to understand outcomes on patient functionality and activity levels, such as delay of joint replacements, hospitalization, long-term activity levels, and longer-term medication usage. This gives the sponsor a fuller picture to support payor and provider discussions.

Summary

Medidata Link offers a significant opportunity to better understand a patient population and therapeutic outcomes before, during, and after the trial. By connecting patients participating in a trial to RWD, drug developers can save years by not having to wait until the trial concludes to start generating real-world evidence (RWE) that can inform medical and future pipeline decisions. Unrivaled in analytics, clinical and commercial expertise, Medidata Link allows sponsors and CROs to generate the best evidence and insights from their connected data:

- **Gain a headstart in evidence generation:** Begin collecting RWD within the trial and jump-start evidence generation and patient insights. And, for completed trials, use RWD sets to bolster patient-level data about your specific participants, rather than waiting for general RWD to accumulate after launch.

- **Enhance data collection beyond a single trial:** Track longer-term patient outcomes, insights and health resource utilization variables not captured within the finite period of the clinical trial, to generate evidence to support payor and provider discussions.

- **Enable efficient safety-tracking:** Enhance safety monitoring using RWD, allowing sponsors and CROs to reduce burdensome followup visits, lowering costs and patient attrition rates. And, use RWD to fill gaps and understand outcomes for patients lost to follow-up.

Footnotes

1. Subject recruitment and retention: Barriers to success. Applied Clinical Trials (2004).

2. Hui, D., Glitza, I., Chisholm, G., Yennu, S. & Bruera, E. Attrition rates, reasons, and predictive factors in supportive care and palliative oncology clinical trials. (2013).

3. Real world evidence studies: Getting started. IQVIA (2020).

4. Hui, D., Glitza, I., Chisholm, G., Yennu, S. & Bruera, E. Attrition rates, reasons, and predictive factors in supportive care and palliative oncology clinical trials. (2013).

5. Real world evidence studies: Getting started. IQVIA (2020).