

INTRODUCTION Reporting serious adverse events (SAEs) to regulatory authorities is a vital and time-intensive aspect of the clinical development of investigational drugs. Understanding the relationships between adverse events and the drug is of highest priority to ensure the safety of trial participants. Preparing the DSUR raises questions about how the safety information is gathered, its origins, and

how it is utilized during and after the reporting process. Data is often sourced from multiple, disconnected systems, making it difficult to get a comprehensive understanding and to explore further.

Optimizing adverse event management by leveraging a graph database offers a more effective solution. An interface facilitates seamless integra-

tion of diverse data sources, intuitive visualization of complex relationships, and flexible querying capabilities. This approach not only simplifies and streamlines adverse event management but also provides a robust foundation for DSUR creation. Moreover, it enables deeper exploration of the data, both before and after the report is generated, fostering improved decision-making and enhanced safety oversight.

GRAPH DATABASE In a property graph database data is organized similar to a mind-map, where nodes store the data and edges form the relationships between the nodes. A web-based interface for a graph database provides great flexibility in how data can be explored and visualized. Accessing curated and integrated data, extended possibilities for data exploration arise.

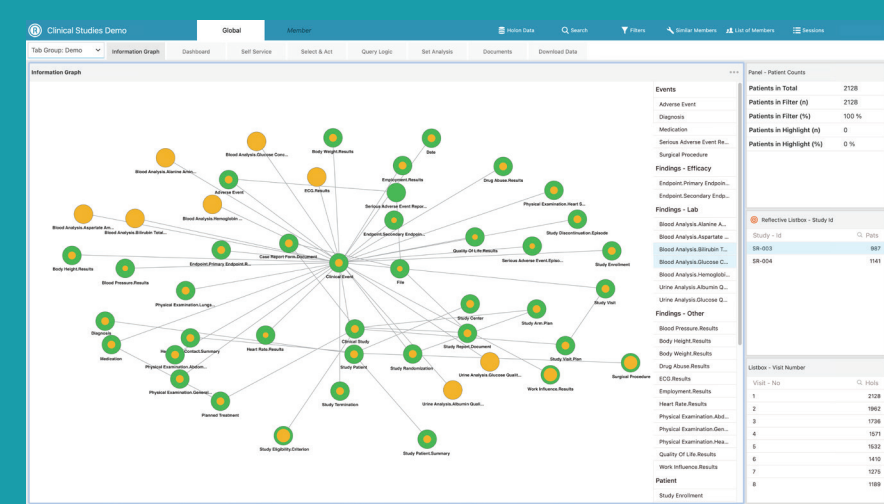


Figure 1: An example of an interface in a graph database.

APPENDIX 1: LINE LISTING OF SERIOUS ADVERSE REACTIONS

Study ID	Subject ID	Event	Severity	Outcome	Comments
11111111	00000001	Headache	Grade 1	Resolved	Subject reported mild headache, resolved with over-the-counter painkillers.
11111111	00000002	Nausea	Grade 2	Ongoing	Subject reported moderate nausea, ongoing since Day 15 of treatment.
11111111	00000003	Diarrhea	Grade 3	Resolved	Subject reported severe watery diarrhea, resolved after 48 hours of treatment.
11111111	00000004	Fatigue	Grade 1	Resolved	Subject reported mild fatigue, resolved after 24 hours of rest.
11111111	00000005	Joint Pain	Grade 2	Ongoing	Subject reported moderate joint pain in the knees, ongoing since Day 10 of treatment.

Figure 2: Fictional document for illustrative purposes only. https://database.ich.org/sites/default/files/ESF_Example_Commercial_DSUR.pdf

DSUR is an annual report prepared by a sponsor to update the regulatory authorities. It is a yearly summary of SAEs and ADRs (adverse drug reactions) that have been reported during the clinical development of a drug. The DSUR creation process is a collaboration of expert teams from different departments, which often involves integration between safety data and clinical trials data.

THE MAGIC BOX IS A GOLDMINE

The graph database works like a magic box – once start exploring the data, the desire to dig deeper grows, revealing endless possibilities for discovery. Compared to relational databases, graph databases allow for faster, deeper and more intuitive exploration of interconnected data, especially for use cases involving complex relationships, evolving data structures, and advanced analytics like safety signal detection.

BENEFITS

Storing all data from an ongoing study or multiple completed studies in a graph database, where queries can be seamlessly run across the entire dataset, offers significant advantages for the teams.

Simplified Data Exploration: Makes it easier to work with complex and multi-dimensional datasets.

Informed Decision-Making: Provides actionable insights through semantic linking and visualization.

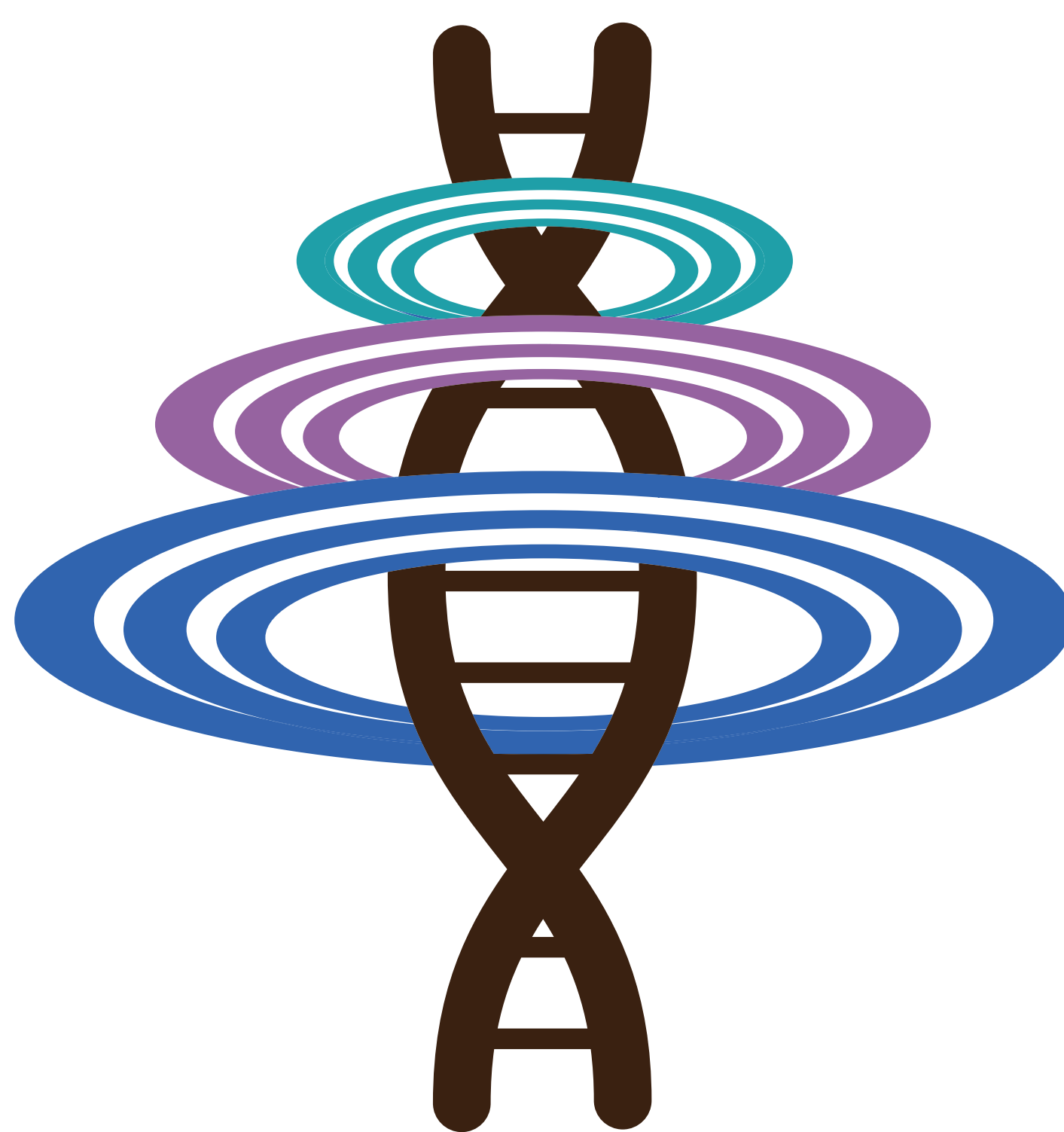
Regulatory Compliance: Speeds up the process of preparing regulatory reports with high-quality data summaries.

Collaboration: Facilitates data sharing and collaboration among teams.

ADVANCED QUERYING

FMQs (FDA Medical Queries) and SMQs (Standardized MedDRA Queries) are different AE groupings, serving specific roles in safety monitoring. Working with FMQs/SMQs iteratively throughout a trial will increase the knowledge and understanding of safety issues, contributing to decision-making and protect patient safety.

STRUCTURE
INNOVATE
COLLABORATE



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DIG DEEPER

When creating a DSUR you want to understand the correlation between the adverse event and the drug. You may want to compare:

- Different patient cohorts.
- Different pre-dispositions.

But also investigate:

- When during the study AES/ADRs occur.
- Efficacy, patient reported outcomes and other safety parameters.

Digging deeper into the data becomes essential when preparing for questions from the authorities. You may want to:

- Highlight selection.
- Drill down to site or patient level.
- Identify and explore outliers.
- Explore all fields and values.
- Search for similar patients.
- Download data for further processing.

This not only improves the depth of data exploration but also allows users to share findings and collaborate effectively with colleagues.

CONCLUSION

A powerful interface based on a graph database can simplify and enhance the management of adverse events, providing a solid foundation both before, during, and after writing a report, like a DSUR. The database empowers the user to find facts and correlations that could be important for the clinical trial/development. Collaboration efficiency increases when the data is accessible to everyone.