

# What is Clinical Data Science? **Overview of Clinical Data Science (CDS)**

Clinical Data Science uses statistics, analytics, and computational methods to interpret clinical trial data and extract meaningful insights that guide medical decisions.

## Why is CDS Important?

- Transforms data into evidence for safe and effective treatments.
- Detects patterns and trends that may not be obvious.
- Supports personalized medicine by understanding patient subgroups.
- Accelerates drug development using AI/ML models.

## Key CDS Activities

- Statistical Analysis – testing the hypothesis using statistical models.
- Data Visualization – creating charts, dashboards, and infographics.
- Predictive Modeling – using AI/ML to forecast trial outcomes.
- Signal Detection – identifying safety issues or efficacy trends early.
- Real-World Data Integration – combining trial data with real-world evidence.

## Skills Needed in CDS

- Strong foundation in statistics & biostatistics.
- Data analytics & programming (SAS, R, Python). Knowledge of machine learning techniques.
- Understanding of clinical trial design & regulatory context.

## CDM + CDS in the Clinical Trial

- Clinical Trial Conduct → Data captured (CDM ensures quality).
- Data Analysis → Insights generated (CDS ensures meaning).
- Regulatory Submission → Evidence for approvals.
- Post-Marketing Surveillance → Ongoing safety & efficacy checks.