

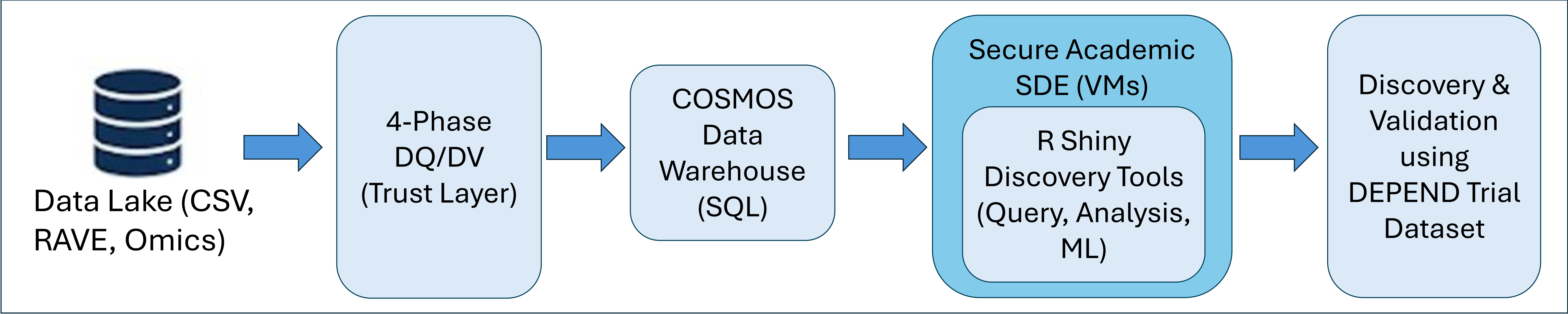
Driving Translation: Validating the COSMOS R Shiny Pipeline for Accessible, High-Quality Integrated Cancer Research

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COSMOS: From Data Lake to Discovery Workflow

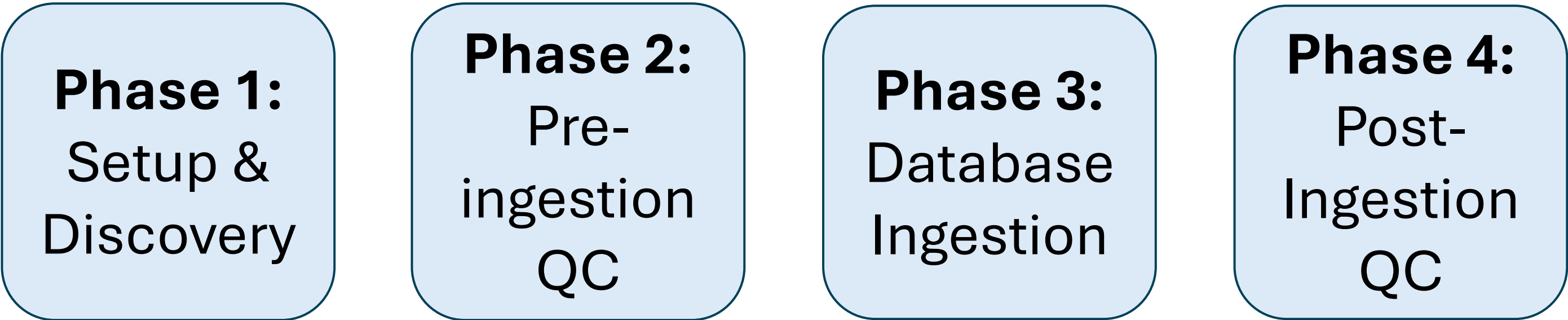


The Foundation (Trust & Governance)

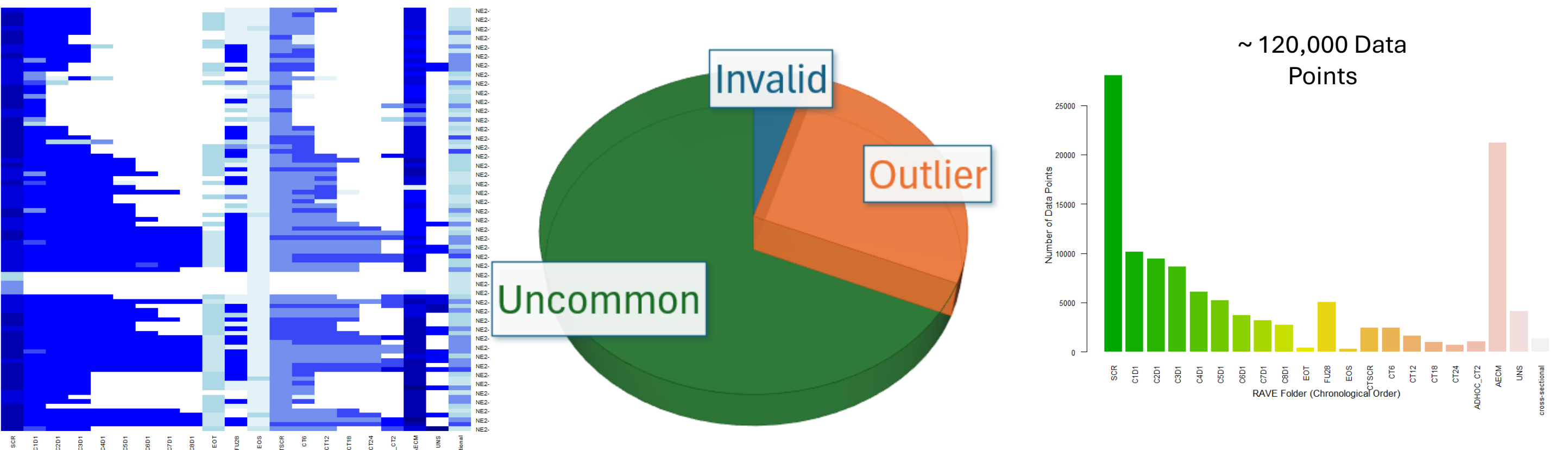
1. Background & Aims

- **Data Lakes**
 - Trial data (Clinical & Translational) often resides in an unstructured data lake.
- **Vision**
 - FAIR aligned Data Warehouse.
 - Democratize secure discovery.

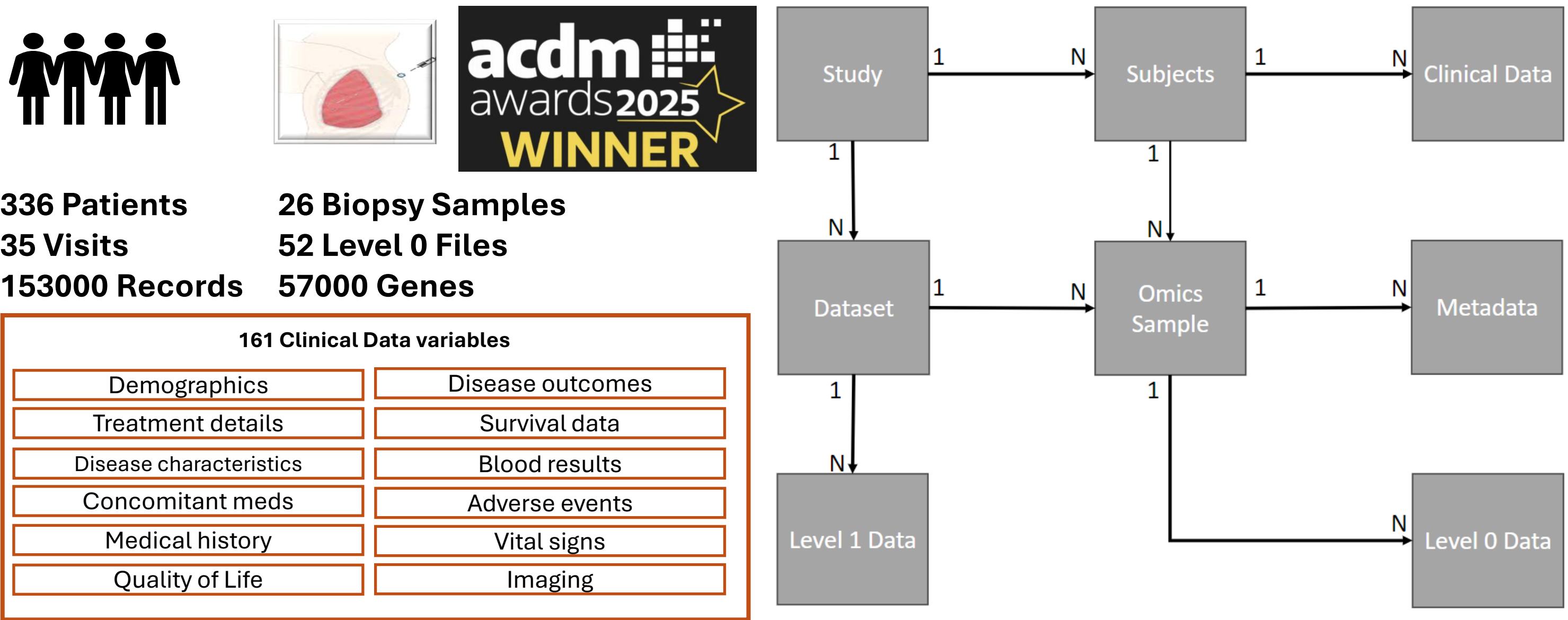
2. The COSMOS Trust Layer



1. Data Dictionary, identify Critical Data Elements (CDE).
2. Scheduled visit by subject data density.
3. Individual data checks e.g. Invalid, Uncommon factors or Outliers.
4. Query database for random set of values for manual comparison with source.



3. COSMOS Data Warehouse



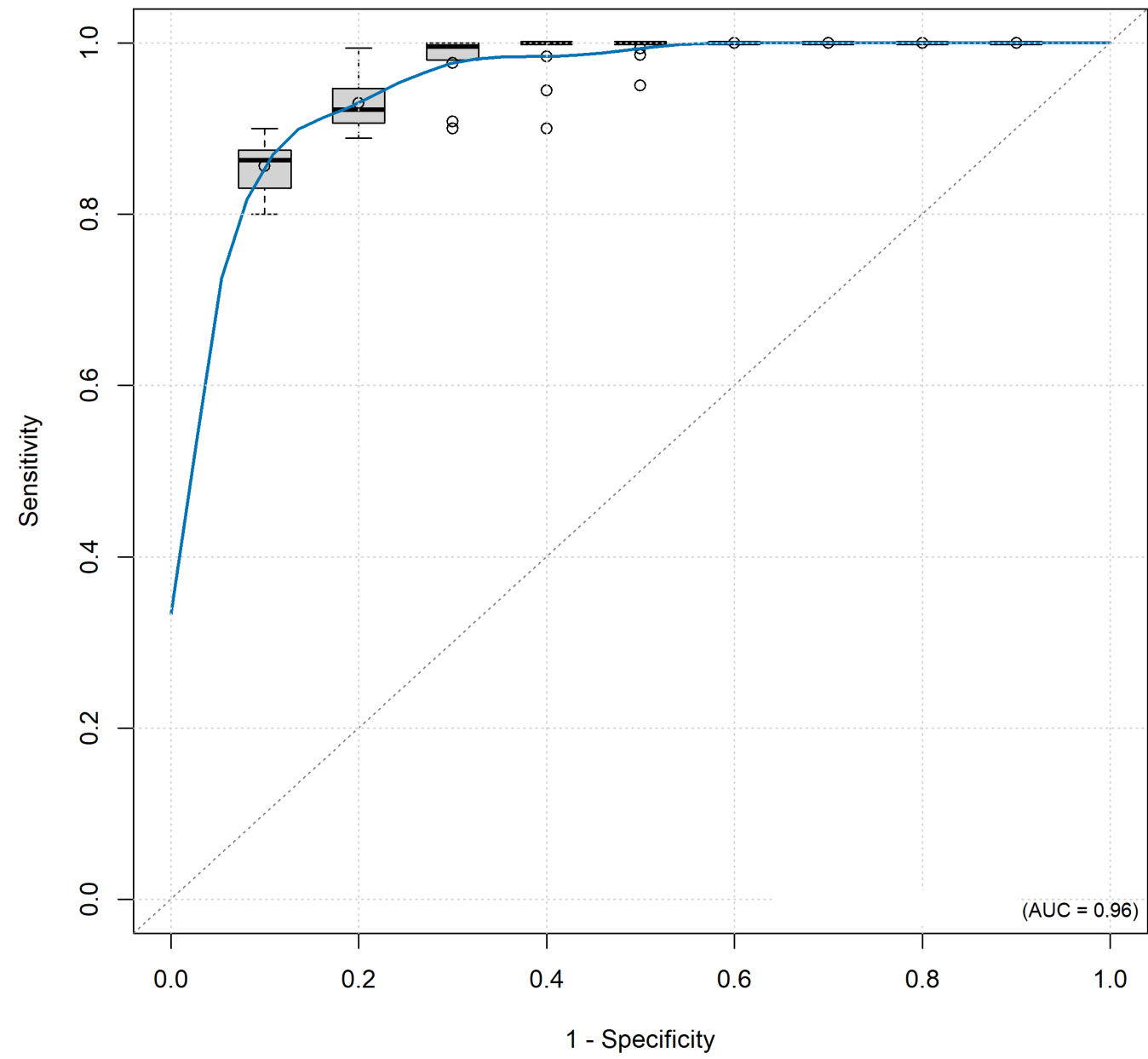
Discovery Engine (The Tool)

4. Democratising Access: R Shiny

- **The Academic SDE**
 - Virtual Machine (VM) hosting.
 - Secure, VPN-authenticated access.
 - Analyse data "behind the glass" without raw data extraction.
- **FAIR Implementation**
 - **Findable:** Structured SQL metadata.
 - **Accessible:** Secure VM interface.
 - **Interoperable:** Merged clinical & omics datasets.
 - **Reusable:** Data Provenance.

5. Validation: DEPEND Trial

- **DEPEND trial (CRUK C45617/A29908)**
 - 47 samples (24 HV and 23 PDAC)
 - Match “no code” with “expert analysis”.



0.96
AUC

6. Conclusions & Impact

- **Cost Efficiency**
 - 4 Cores 32 GB RAM ~ £200/year
- **Empowering Personalised Medicine**
 - Accelerated discovery timeline.
 - Integration into new clinical trial bids.

7. References & Acknowledgments

1. Niazi U, et al. SQL database schema for integrated data. Clin Trials. 2025;22(3).
2. McDonnell D, et al. Metabolite Changes in Resectable PDAC. Cancers (Basel). 2025;17(7).

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