



PHUSE EU Connect 2025 – DS02

Using CDISC USDM and BCs to select data from alternative data sources for regulatory purposes

Content

- Introduction
- CDISC USDM and Biomedical Concepts
- Eligibility Criteria and Data Selection
- Data lineage
- Conclusion

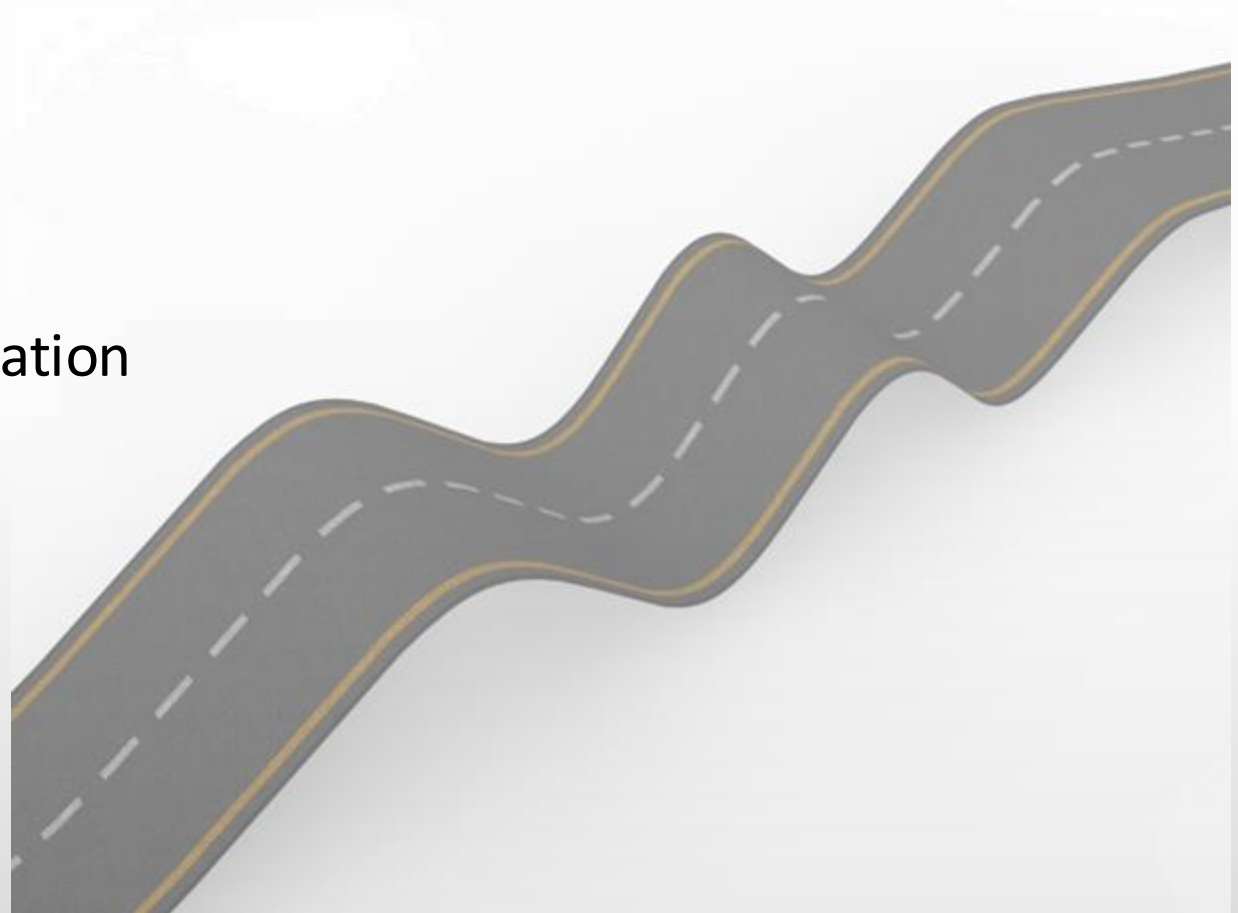
Introduction

- Alternative data sources
 - Electronic Health Records
 - Claims
 - Digital Health Technologies (DHT)
 - Other
- Trial types
 - Observational
 - External control arm
 - Pragmatic trials
 - Regular clinical trials



Introduction

- Improve efficiency
 - Assess study feasibility
 - Include less patients
 - Direct data flow
 - Direct insights through automation
- Some hurdles
 - Regulatory
 - Siloed processes
 - EDC thinking
 - Data validation



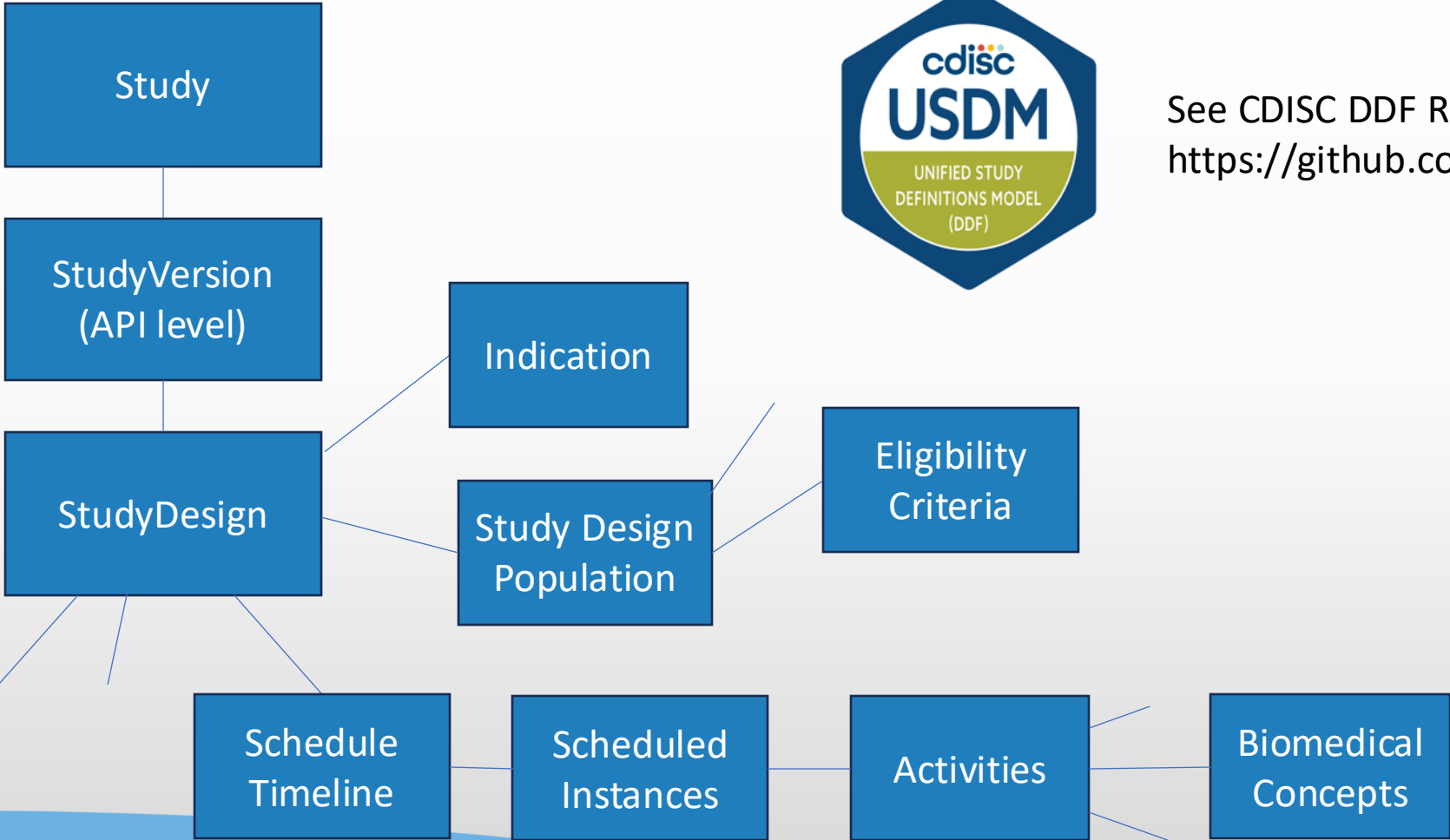
cdisc Unified Study Definition Model

- Holds full Study design in digitized format
- May hold the corresponding document with links to parameterized information (including M11)
- Includes model area's for
 - Population and eligibility criteria
 - Schedule of Activities (SoA and other timelines
 - Activities and corresponding procedures and assessments
 - And more...



<https://www.cdisc.org/ddf>

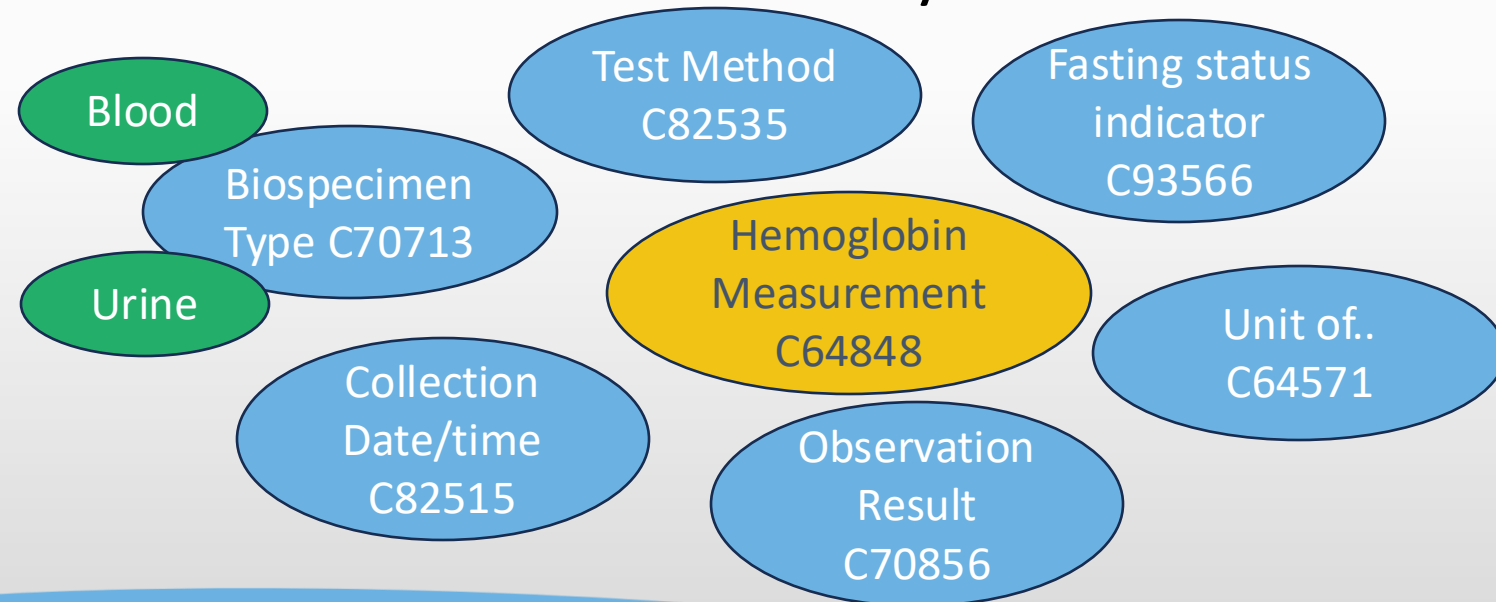
Basic USDM Features



See CDISC DDF RA GitHub:
<https://github.com/cdisc-org/DDF-RA>

cdisc Biomedical Concepts (BCs)

- Conceptual definitions of assessments with all its properties and corresponding standard response lists
- Instantiated for a study within USDM



<https://www.cdisc.org/cdisc-biomedical-concepts>

Eligibility Criteria and parameterization

2. Age of ≥ 18 years
3. Positive SARS-CoV-2 (2019-nCoV) test within 14 days prior to randomization
4. Hospitalized for SARS-CoV-2 (2019-nCoV)
5. Bilateral pneumonia on chest x-ray or CT
6. *[Original Criteria Deleted]*
7. At least one of the following within 7 days prior to randomization:
 - Ferritin > 500 ng/mL
 - CRP > 5 mg/dL
 - D-dimer $> 1,000$ ng/mL
 - LDH > 250 U/L
 - Fever - a measured temperature of at least 100.4 °F [38 °C]

OR

AI LLM needed

Timing information

Biomedical Concept

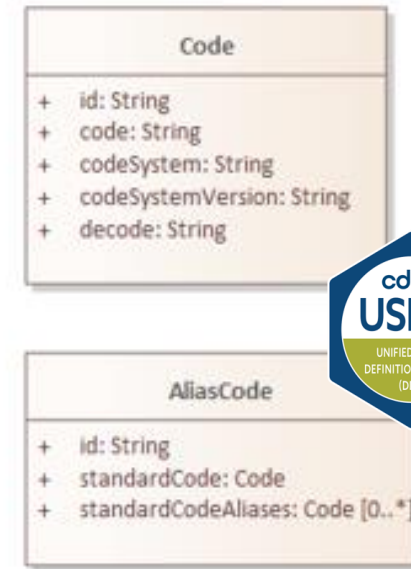
Expected result

https://cdn.clinicaltrials.gov/large-docs/69/NCT04447469/Prot_SAP_000.pdf

Data selection process

- Alias codes in expected response allows for downstream interoperability:
- standardCode
 - code="C16576",
 - decode="F",
 - codeSystem="https://www.cdisc.org"
 - codeSystemVersion="2025-09-26"

- standardCodeAliases.code
 - code="LA3-6",
 - decode="Female",
 - codeSystem="LOINC"
 - codeSystemVersion="2.80"



https://github.com/cdisc-org/DDF-RA/blob/main/Deliverables/UML/USDM_UML.png

Data selection process

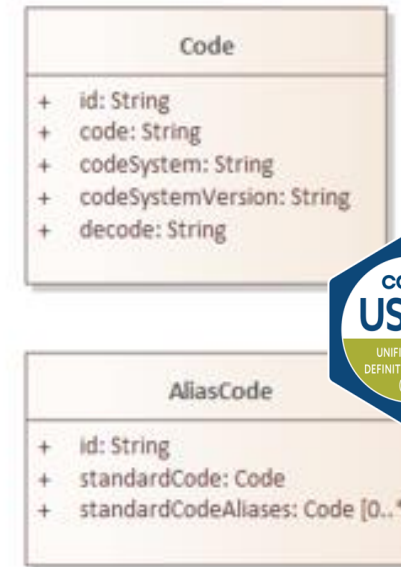
- Alias codes in expected response allows for downstream interoperability:

- standardCode

- code="C16576",
- decode="F",
- codeSystem="https://www.cdisc.org"
- codeSystemVersion="2025-09-26"

- standardCodeAliases.code

- code="248152002",
- decode="Female",
- codeSystem="SNOMED"
- codeSystemVersion="2025-02-01"



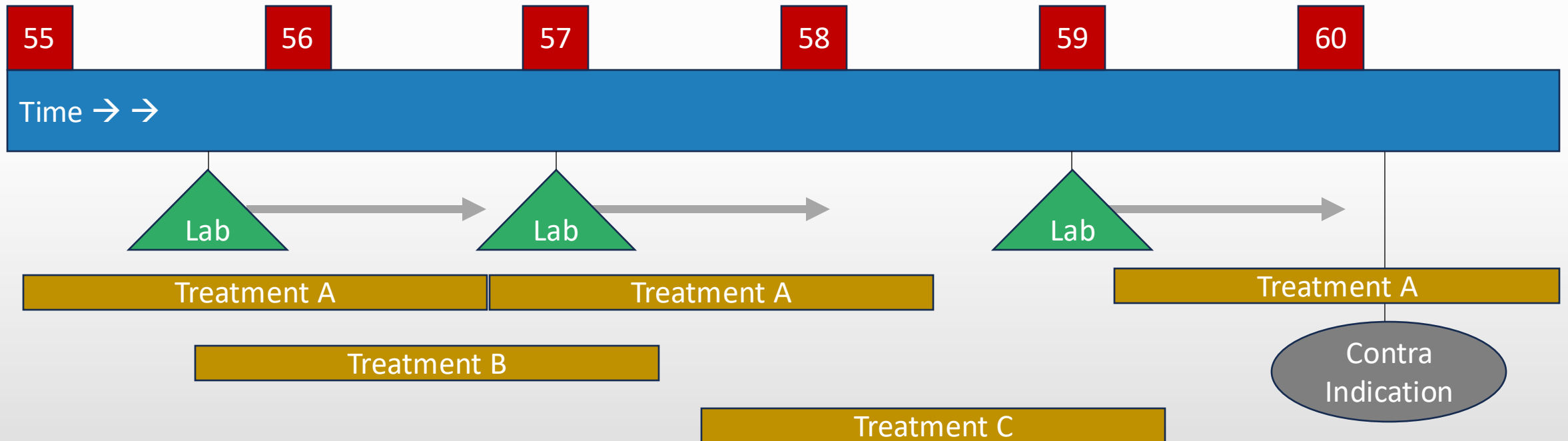
https://github.com/cdisc-org/DDF-RA/blob/main/Deliverables/UML/USDM_UML.png

Connect to the (EHR) data source

- Select patients based on indication
- Get relevant information for feasibility assessment
 - Age
 - Events like indications and medications start and stop
 - Measurements and observations like:
 - Lab values
 - Scores
 - Vital signs
- Order all information based on timing

Perform eligibility assessment

The first time a patient is eligible is usually the index date of a study.



Addressing data sources

Table rows: 18614 | Columns: 21 of 26 | Rows 18401 to 18600

Enter expression

	@ i	@ s	@ new_patno	@ date	@ source_value	@ value_...	@ unit_sourc...	@ Age1	@ BCEvalUnit	@ BC1	@ BC2	@ BC3	@ BC4	@ BC5
18552	49	F	2159	2018-03-25	Creatinine [Mass/volum...	3.1037	mg/dL	0	Micromole per Liter	.	1	.	0	.
18553	49	F	2159	2018-03-25	Calcium [Mass/volume] i...	9.37	mg/dL	0	Millimole per Liter	.	1	.	0	.
18554	49	F	2159	2018-08-04	Familial Alzheimer's dis...	.		0		.	1	.	0	.
18555	49	F	2159	2018-08-04	Total score [MMSE]	24.716		0		0	1	.	0	.
18556	49	F	2159	2018-08-04	Creatinine [Mass/volum...	1.14	mg/dL	0	Micromole per Liter	0	1	.	0	.
18557	49	F	2159	2018-08-04	Calcium [Mass/volume] i...	8.88	mg/dL	0	Millimole per Liter	0	1	.	0	.
18558	50	F	2159	2019-02-02	Creatinine [Mass/volum...	0.82	mg/dL	1	Micromole per Liter	0	1	.	0	.
18559	50	F	2159	2019-02-02	Calcium [Mass/volume] i...	9.79	mg/dL	1	Millimole per Liter	0	1	.	0	.
18560	50	F	2159	2019-03-25	Aspartate aminotransfer...	35.592	U/L	1	Microkatal per Liter	0	1	.	0	.
18561	50	F	2159	2019-03-25	Alanine aminotransferas...	20.573	U/L	1	Microkatal per Liter	0	1	.	1	.
18562	50	F	2159	2019-03-25	Creatinine [Mass/volum...	2.8363	mg/dL	1	Micromole per Liter	0	1	.	1	.
18563	50	F	2159	2019-03-25	Calcium [Mass/volume] i...	8.9	mg/dL	1	Millimole per Liter	0	1	.	1	.
18564	50	F	2159	2019-06-24	Total score [MMSE]	15.634		1		1	1	.	1	.
18565	51	F	2159	2020-02-08	Creatinine [Mass/volum...	0.81	mg/dL	1	Micromole per Liter	1	1	.	1	.
18566	51	F	2159	2020-02-08	Calcium [Mass/volume] i...	9.71	mg/dL	1	Millimole per Liter	1	1	.	1	.
18567	51	F	2159	2020-03-24	Aspartate aminotransfer...	9.5298	U/L	1	Microkatal per Liter	1	1	.	1	.
18568	51	F	2159	2020-03-24	Alanine aminotransferas...	28.77	U/L	1	Microkatal per Liter	1	1	.	1	.
18569	51	F	2159	2020-03-24	Creatinine [Mass/volum...	3.1922	mg/dL	1	Micromole per Liter	1	1	.	1	.
18570	51	F	2159	2020-03-24	Calcium [Mass/volume] i...	9.02	mg/dL	1	Millimole per Liter	1	1	.	1	.
18571	51	F	2159	2020-05-01	Aspartate aminotransfer...	26.252	U/L	1	Microkatal per Liter	1	1	.	1	.
18572	51	F	2159	2020-05-01	Alanine aminotransferas...	49.013	U/L	1	Microkatal per Liter	1	1	.	1	.

Addressing data sources

Summary for Attrition Report (Page 1 of 1)

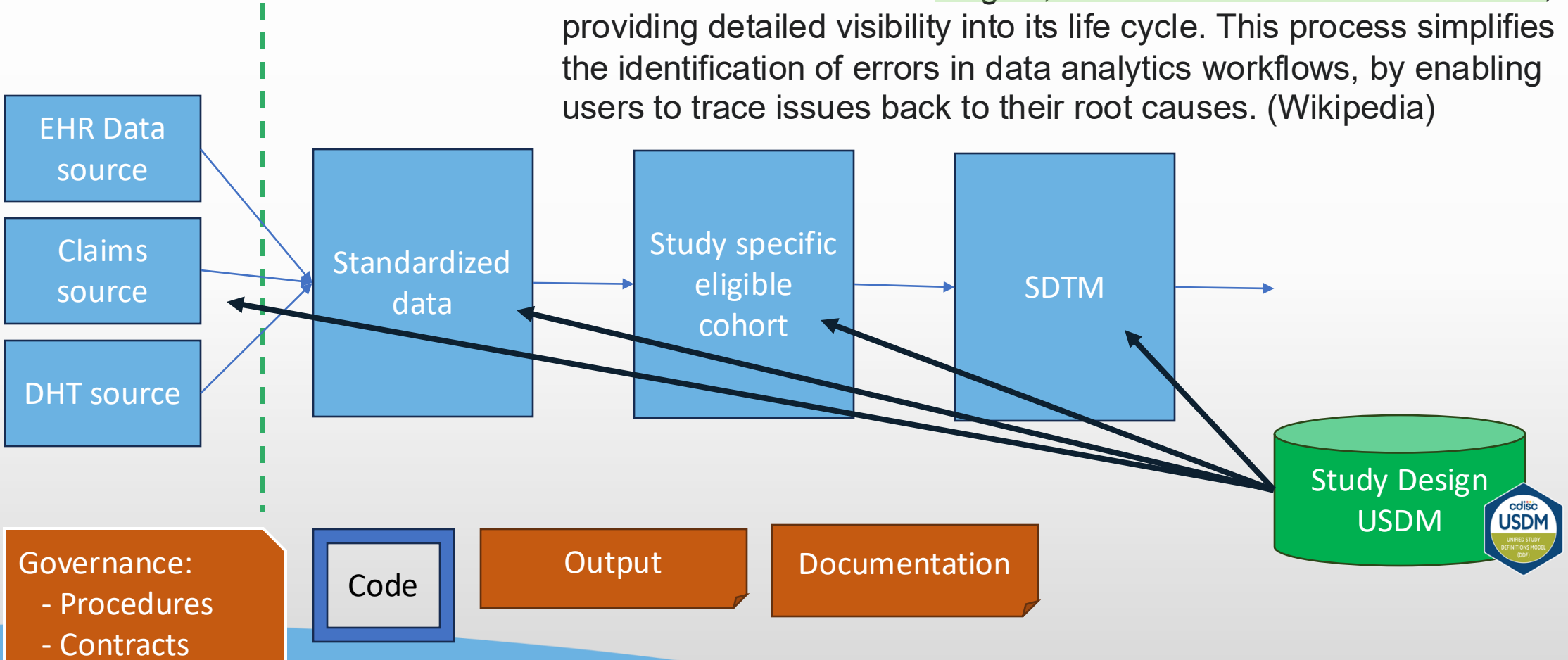
Category	Criteria	Number of Patients
Inclusion	Patients with Alzheimer's Diagnosis	159
Inclusion	Patients with Age \leq 50	147
Inclusion	Patients with MMSE within accepted values (inclusion criteria)	108
Exclusion	Patients with SGOT not outside accepted values (exclusion criteria, Female specific)	108
Exclusion	Patients with SGOT not outside accepted values (exclusion criteria, Male specific)	108
Exclusion	Patients with Alanine Aminotransferase Concentration in Serum/Plasma not outside accepted values (exclusion criteria, Female specific)	105
Exclusion	Patients with Alanine Aminotransferase Concentration in Serum/Plasma not outside accepted values (exclusion criteria, Male specific)	105
Exclusion	Patients with Creatinine not outside accepted values (exclusion criteria, Female specific)	105
Exclusion	Patients with Creatinine not outside accepted values (exclusion criteria, Male specific)	105
Exclusion	Patients with hemoglobin not outside accepted values (exclusion criteria, Female specific)	103
Exclusion	Patients with hemoglobin not outside accepted values (exclusion criteria, Male specific)	97
Exclusion	Patients with potassium not outside accepted values (exclusion criteria)	85
Exclusion	Patients with sodium not outside accepted values (exclusion criteria)	85
Exclusion	Patients with calcium not outside accepted values (exclusion criteria)	85
	Total patients Eligible	85

Summary for Attrition Report (Page 1 of 1)

Category	Criteria	Number of Patients
Inclusion	Patients with Alzheimer's Diagnosis	159
Inclusion	Patients with Age \leq 60	90
Inclusion	Patients with MMSE within accepted values (inclusion criteria)	56
Exclusion	Patients with SGOT not outside accepted values (exclusion criteria, Female specific)	56
Exclusion	Patients with SGOT not outside accepted values (exclusion criteria, Male specific)	56
Exclusion	Patients with Alanine Aminotransferase Concentration in Serum/Plasma not outside accepted values (exclusion criteria, Female specific)	53
Exclusion	Patients with Alanine Aminotransferase Concentration in Serum/Plasma not outside accepted values (exclusion criteria, Male specific)	53
Exclusion	Patients with Creatinine not outside accepted values (exclusion criteria, Female specific)	53
Exclusion	Patients with Creatinine not outside accepted values (exclusion criteria, Male specific)	53
Exclusion	Patients with hemoglobin not outside accepted values (exclusion criteria, Female specific)	53
Exclusion	Patients with hemoglobin not outside accepted values (exclusion criteria, Male specific)	49
Exclusion	Patients with potassium not outside accepted values (exclusion criteria)	43
Exclusion	Patients with sodium not outside accepted values (exclusion criteria)	43
Exclusion	Patients with calcium not outside accepted values (exclusion criteria)	43
	Total patients Eligible	43

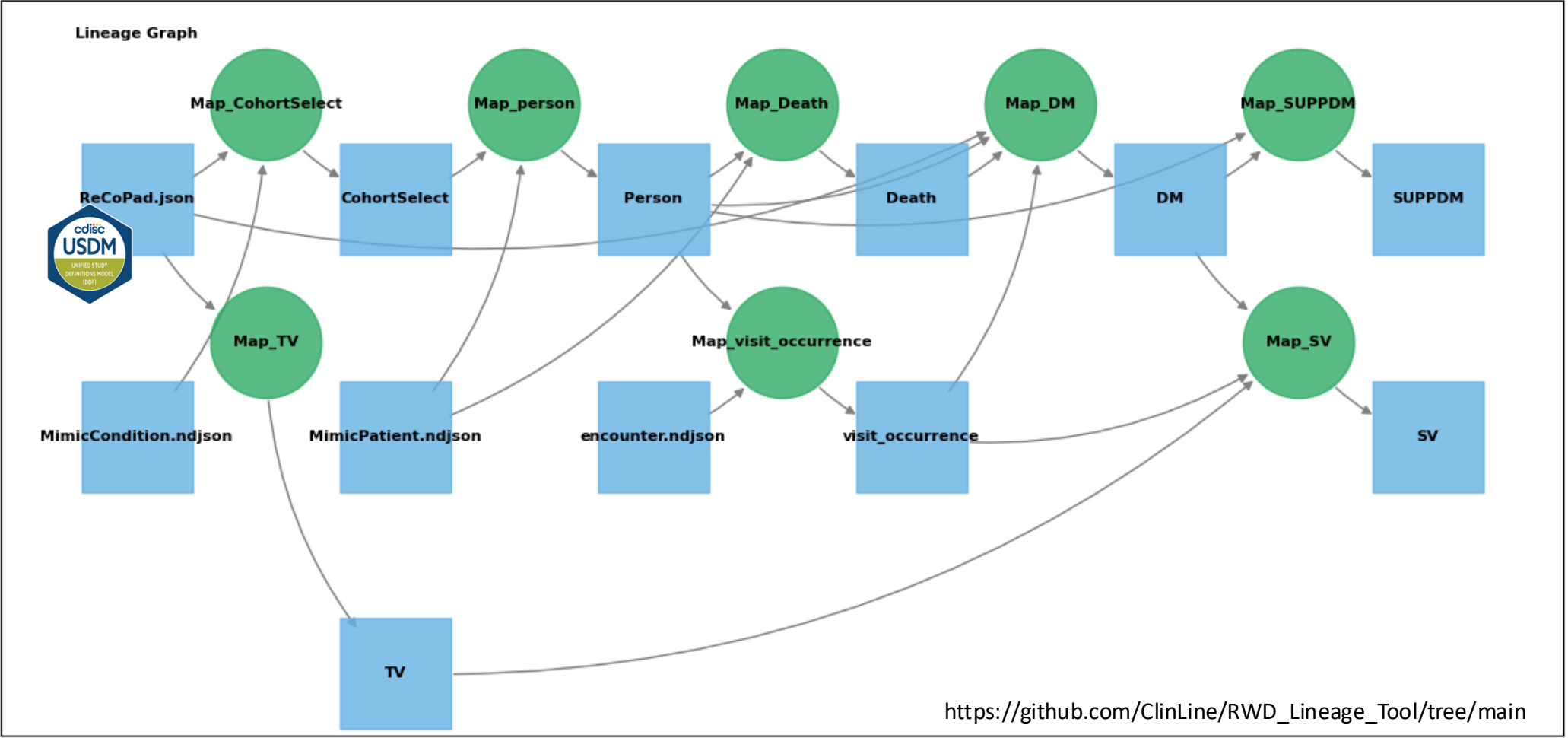
Data lineage

Data lineage refers to the process of tracking how data is generated, transformed, transmitted and used across a system over time. It documents data's origins, transformations and movements, providing detailed visibility into its life cycle. This process simplifies the identification of errors in data analytics workflows, by enabling users to trace issues back to their root causes. (Wikipedia)

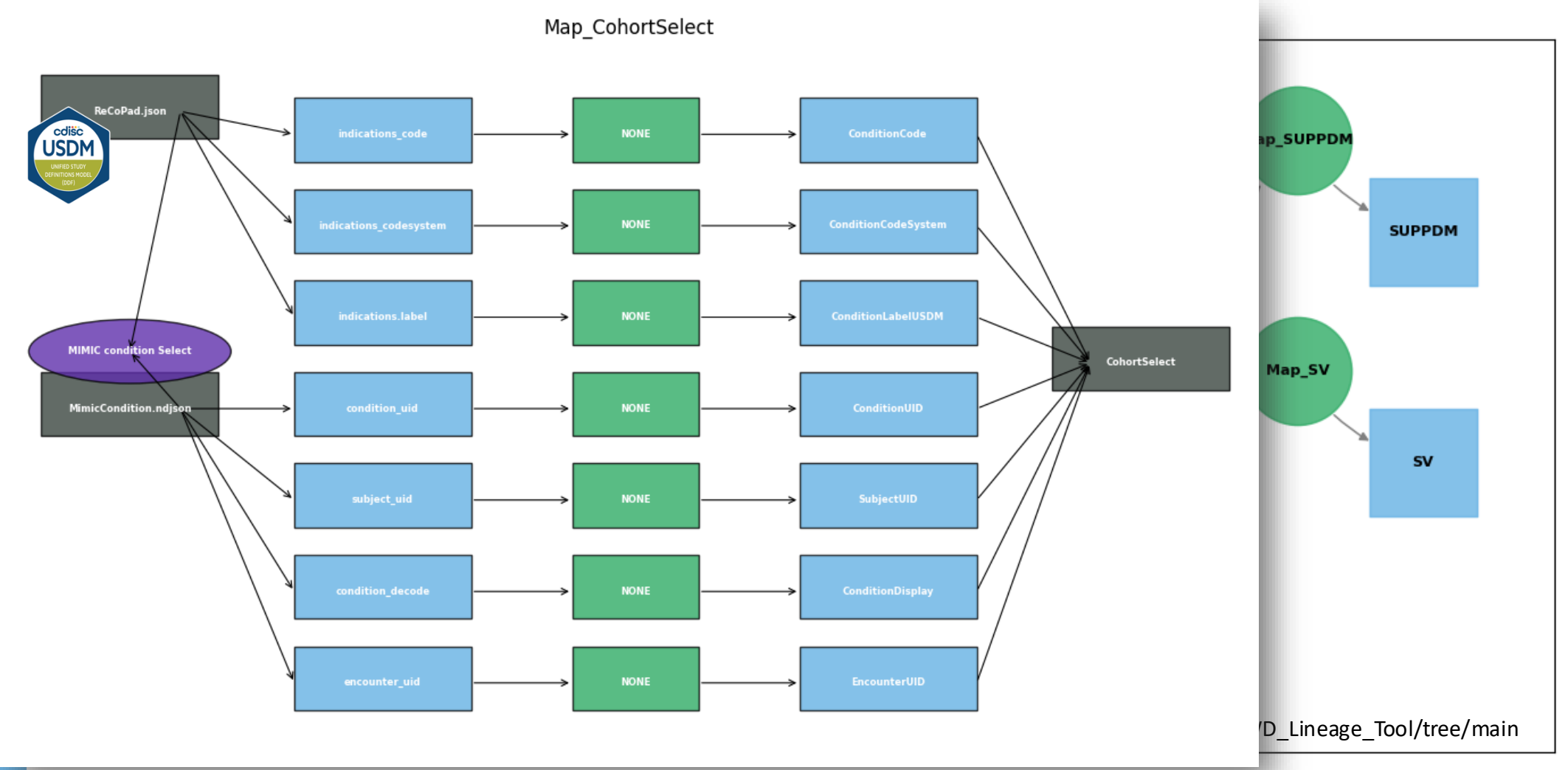


Use case – data lineage

Mapping Concepts and Datasets (Click a mapping node for more details)



Use case – data lineage



Implementation considerations

- Solutions needed
- Allow for variation within and between
 - Sources
 - Therapeutic areas
 - Companies
- Step by step implementation
 - Highest need first
 - Learn from success and failure
- Re-usable libraries needed based on standards

Advantages of USDM

- Logical structure
- Industry standard
- Aligned with M11
- Links unstructured content to structured content
- Facilitates automated selection of source data
- Facilitates full feasibility assessments
- Alias codes allow for semantic interoperability
- Part of the data lineage landscape



Questions and contact

- Questions?
- Like to learn more?
 - Berber Snoeijer, ClinLine: b.snoeijer@clinline.eu

