



Enhanced Biomedical Concepts: A Design Perspective in OpenStudyBuilder Supporting CDISC 360i

Mikkel Traun, Principal Solution Architect Nicolas De Saint Jorre, Lead Product Architect Novo Nordisk A/S



Meet the Speakers

Mikkel Traun

Title: Principal Solution Architect

Organization: Novo Nordisk A/S

Mikkel is solution architect for the next generation study builder and data standards repository solution at Novo Nordisk. Mikkel is also an active member of the TransCelerate and CDISC Digital Dataflow project, and previously the CDISC 360 project. He has worked as a principal system developer supporting the clinical data warehouse solution and the CDISC implementation at Novo Nordisk. Previously he has worked on several projects in pre-clinical, clinical and outcome research.

Nicolas De Saint Jorre

Title: Lead Product Architect

Organization: Novo Nordisk A/S

With over 29 years of experience in the field of Data Management and Clinical Research, I have been working on electronic Case Report Forms (eCRFs) since 2000. From 2005 to 2023, I worked with EvidentIQ, a software publisher specializing in EDC systems. I actively participated in the CDISC 360 project, developing a prototype. Since 2019, I have been collaborating with Novo Nordisk on the OpenStudyBuilder. Since April 2023, I have served as the Lead Product Architect for OpenStudyBuilder at Novo Nordisk, directly connected with the TransCelerate group and the "Digital Data Flow" project.

I am now deeply involved in the CDISC 360i project, as a co-lead in the Build team.

Many Data Sources

MDR and SDR (Digital Protocol)

Dictionaries, unit conversion rules, objectives, endpoints, in-/exclusion criteria, schedule of activities, arms, interventions, etc

CTMS

External Standards CDISC CT. MedDRA. SNOMED CT.

WHO Drug, ISO

EDC

Study ID, sites, investigators, milestones, metrics, protocol deviations

IWRS/RTSM

Randomisation number and batch numbers

Informed consent obtained, subject status, demographics, medical history, concomitant medication, dose and compliance, adverse events, vital signs, body measurements, hypoglycaemic episodes, ECG interpretation, pregnancy test results, queries, etc.

Safety

SAE & pregnancy reporting

Laboratories

Biochemistry, hematology, glucose metabolism, antibodies, trial product concentrations, serology, drug tests, pregnancy test, proteomic and genomic sample tracking, etc.

CGM

Date, time, glucose, visit

eCOAs

Questionnaires e.g. SF36, CSSRS, PHQ9 Diaries e.g. dose/compliance, hypoglycaemic episode, AE, bleeding event, BG meter readings Sit and stand test

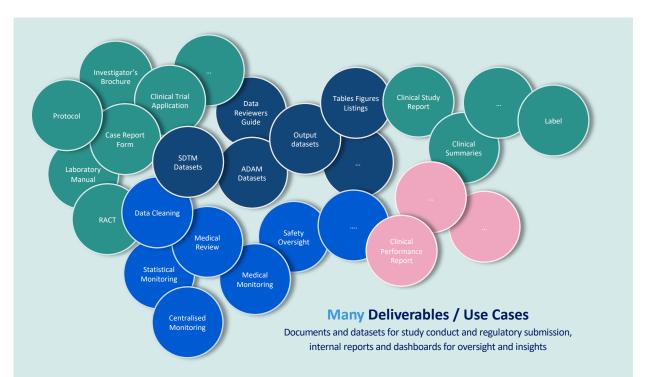
Imaging Dexa scan, X-ray, MR

Data Lakes Harmonized historic study data

Master Data Medicinal product data

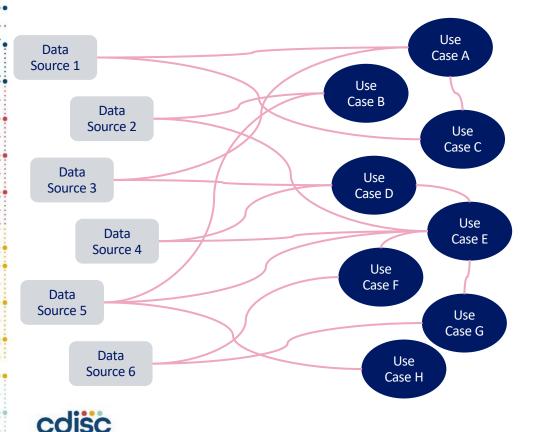
Other data

The data landscape is disconnected



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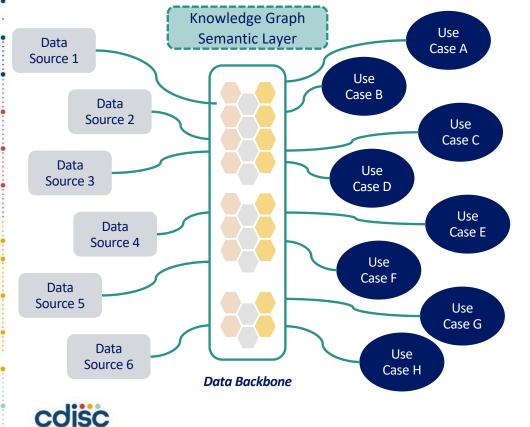
Today's **barrier** for efficiency and speed



Many to Many to Many

- Limited overview and transparency
- High-risk of inconsistencies
- Inefficiency due to re-do rather than reuse
- Lag-time between data availability and data ready for use

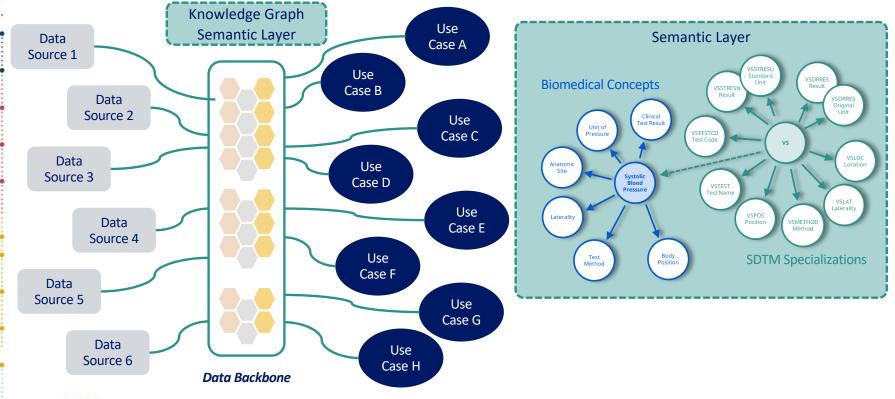
Tomorrow's **opportunity** for efficiency and speed



Many to One to Many

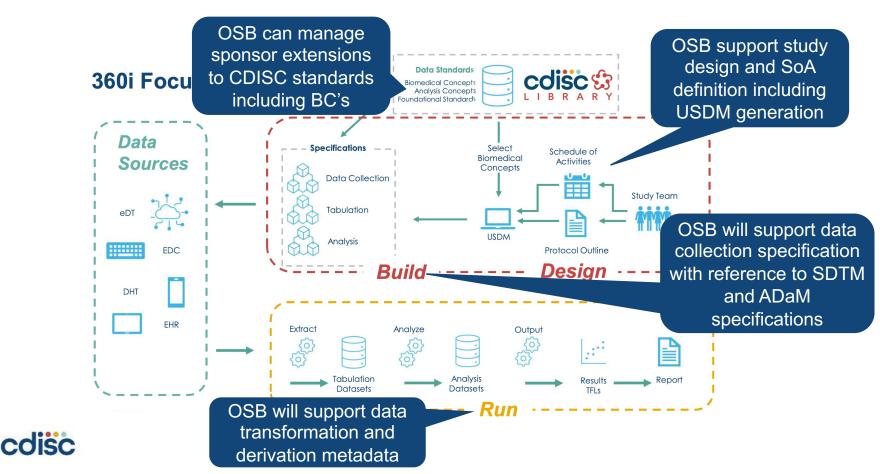
- Overview and transparency
- End-to-end consistency
- Efficiency through reuse
- Faster from data availability to data readiness

Tomorrow's opportunity for efficiency and speed



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How do OSB fit into 360i vision



What is the OpenStudyBuilder?...

A NEW APPROACH TO STUDY SPECIFICATION

- Compliance with external and internal standards
- Facilitates automation and content reuse
- Ensures a higher degree of end-to-end consistency

3 ELEMENTS OF OpenStudyBuilder

- Clinical Metadata Repository (clinical MDR) (central repository for all study specification data)
- OpenStudyBuilder application / Web UI
- API layer

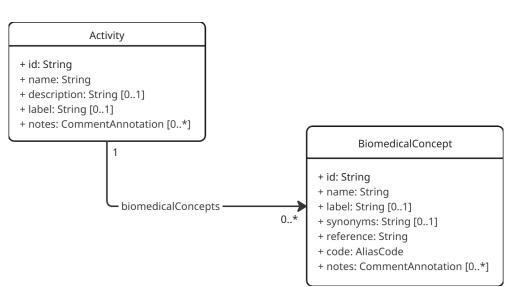
(allowing interoperability with other applications) (DDF API Endpoint – enabling DDF SDR Compatibility)





CDISC BCs and Activities in USDM

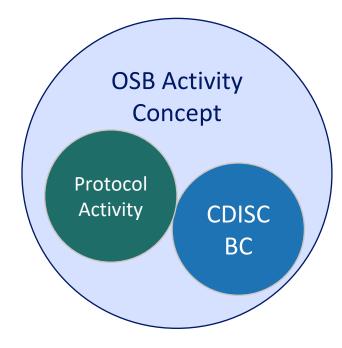
- **CDISC BCs** cover the semantic definition and SDTM specialisation
 - But do not cover the representation in the protocol nor the Activity in USDM
- Activities in USDM is represented as text with study level relationship to BCs
 - i.e. the Activities are not referred to as standard elements
- CDISC BCs are defined very broadly
 - But is in reality covering Activities (Clinical Procedures and Assessments)





OSB BCs and Activities

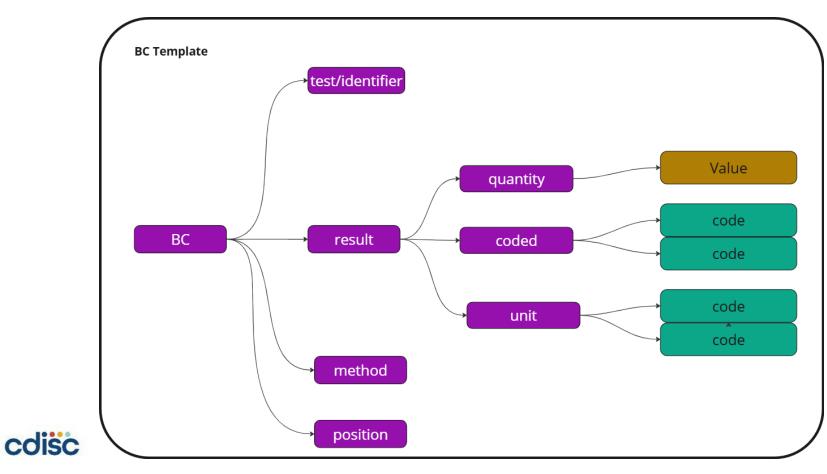
- OSB BCs include the semantic definition and SDTM specialisation linked to a CDISC BC including NCI.gov term identifiers
- OSB BC can be sponsor defined
- OSB BC include library sponsor definition of the Activity name used in protocol including valid Activity Groupings
- OSB BC := Activity Concepts



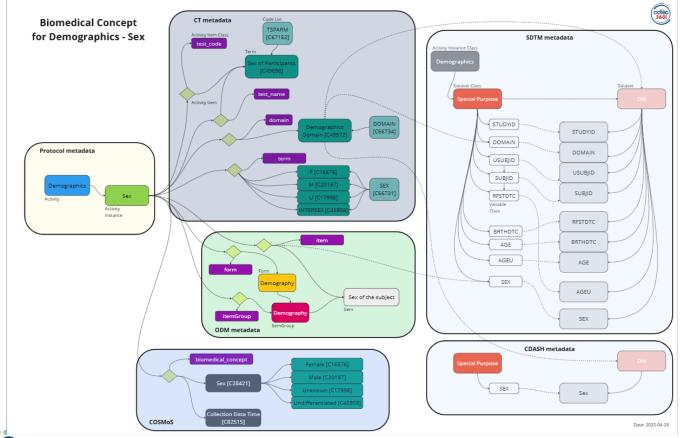


BC idea

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BC vision in OSB



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Activity Concept (AC) data model in StudyBuilder

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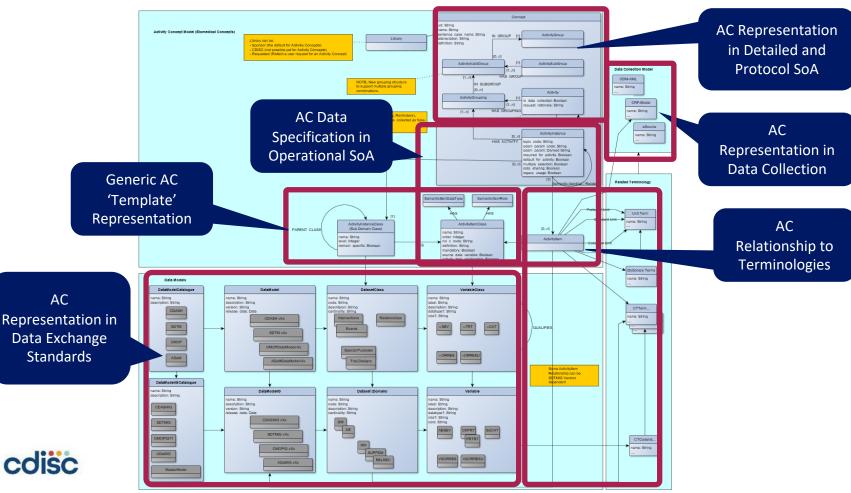
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OpenStudyBuilder Activity Concept data model (BC)

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	ActivityGroup ActivitySubgroup	CDISC BC: Seem to be similar a parent BC at a high level. Often demoed as a CRF form name. OSB AC: Grouping of activities. The activity group or subgroup level can be what you decide to show in the protocol schedule of activities. May be like a CRF form names, but not necessarily, the clinical term relevant to show in the protocol.
	Activity	 CDISC BC: An action, undertaking, or event, which is anticipated to be performed or observed, or was performed or observed, according to the study protocol during the execution of the study. OSB AC: If relating to data collection, resulting in a semantic logical observation, this can depend on context and qualifiers have different identifications. If not related to data collection, then to a semantic specific activity. At the most detailed level as needed in protocol SoA
	ActivityInstance	<i>CDISC BC:</i> Similar to a SDTM specialisation (but for an ADaM PARAM). <i>OSB AC:</i> The specific identification of the semantic logical observation, this includes reference to context and qualifier values. Primary identification is for ADaM BDS PARAM/PARAMCD or column name in ADSL. Also include internal uid identification as well as internal topic code.
	ActivityItem	CDISC BC: Similar to SDTM Variable but can be connected to any data exchange standards. OSB AC: Linking to related data model variables as well as terminology codes.

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			NCI Concept ID						
			ADaM parameter code	SYSBP	Topic code	BP_SYSTOLIC			

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Overview OSB Yaml	COSMoS Yaml							
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Name	Diastolic Blood Pressure	Sentence case name	diastolic blood pressure	Ver	rsion	1.0 🔻	Status	
Topic code	BP_DIASTOLIC	ADaM parameter code	DIABP	Sta	art date Oc	: 7, 2024, 3:17 AM	End date	None
Activity instance class	NumericFinding	NCI concept ID	None					

Default selected for activity No

Activity

Legacy usage No

Definition None

Abbreviation None Required for activity No

Data sharing Yes

Activity groupings

Activity group	Activity subgroup
Vital signs	Vital signs

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Final

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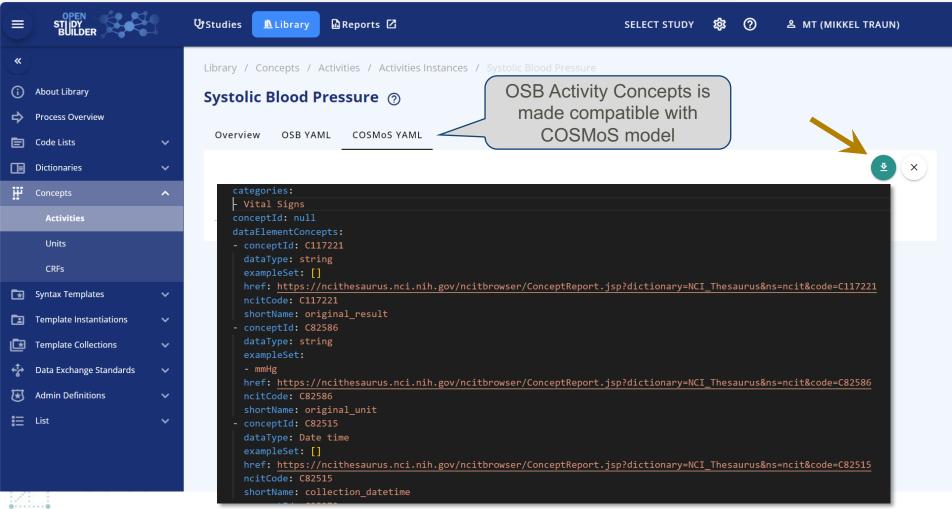
	Library	Name	Definition	Version	Status
Activity items	Sponsor	Vital signs	None	1.0	Final
Activity items					

	Activity item class	Name	Value	Role [CTCodelist_xxxxx]	Data type [CTCodelist_xxxxx]	CRF metadata	Data collection	Tabulation
:	Unit dimension [unit_dimension]	Pressure			CT term			
:	Original result [original_result]	Diastolic Blood Pressure		Result Qualifier	Value	Systolic blood pressure [I_DIASBP]	VS1.SYSBP VS2.SYSBP	ORRES
:	Original unit [original_unit]	Original unit	mmHg*BPM kPa mmHg Pa	Variable Qualifier	Unit definition	Systolic blood pressure unit [I_DIASBP]	VS1.SYSBPU VS2.SYSBPU	
:	Test name [test_name]	Diastolic Blood Pressure		Synonym Qualifier	CT term			TEST
:	Test code [test_code]	Diastolic Blood Pressure			CT term			TESTCD
:	Standard unit [standard_unit]	Standard unit	mmHg	Variable Qualifier	Unit definition			ORRESU
:	Domain [domain]	Vital Signs Domain		Identifier	CT term			VS
:	Location [location]	Location	Arm	Record Qualifier	CT term	Arm location [I_ARM]	VS1.ARM VS2.ARM	LOC
:	Position [position]	Position	Sitting Standing	Record Qualifier	CT term	Position [I_POS]	VS1.POS VS2.POS	POS
:	Laterality [laterality]	Laterality	Left Right	Record Qualifier	CT term	Laterality [I_LAT]	VS1.LAT VS2.LAT	LAT
:	Collection datetime [collection_datetime]	Collection datetime		Timing	Datetime	Visit date [I_VISIDATE]		DTC

NeoDash reports to view Activity to SDTM Variables

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Laboratory Assessments	Biochemistry	Alanine	ALAP	SELECT	SDTMIG v3.3	3 CDISC Version 3.3 (v3.3) Study Data Tabulation Model Implementation Guide for Human Clinical Triats (SDTMIG) is intended to guide t 2018-11-20	3.3	
AE Requiring Additional Data	Laboratory Assessment	Alanine Aminotransferase	ALT	SELECT	SDTMIG v3.2	2 CDISC Version 3.2 (V3.2) Study Data Tabulation Model Implementation Guide for Human Clinical Trials (SDTMIG) is intended to guide + 2013-11-26	3.2	
Laboratory Assessments	Biochemistry	Alanine Aminotransferase	ALTS	SELECT	SDTMIG v3.1	CDISC Version 3.1.3 (V3.1.3) Study Data Tabulation Model Implementation Guide for Human Clinical Trials (SDTMIG) is intended to gu 2012-07-16	3.1.3	
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Schedule of Activities (SoA) at multiple levels



Protocol SoA

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- For the high level SoA in protocol section 1.2
- Main purpose is for the investigator and site staff to get an overview of the operational schedule

 Specifying the semantic data observations to be collected in the study – but not specific to representation in ADaM, SDTM or data collection

Detailed SoA

Will be part of protocol section 8 and appendixes or other supplementary documents

Operational SoA

- The data specification to support data collection specification
- Correspond to our existing legacy BCs (Topic Codes)
- Will also related to specific ADaM PARAM/PARAMCD

Data Capture / Collection Specification

- How data is to be collected in the study and when
- What is pre-set, what is collected and how

Activity Concepts := Biomedical Concepts

Can be linked to from:

- Objectives
- Endpoints
- Criteria
- Analysis Concepts

• Will link to

- Protocol representation
- Data Specification
- Data Collection Specification

Will support automation in

- Protocol Document Generation
- Data Collection system setup
- Data ingestion verification
- SDTM generation
- ADaM generation



USDM and M11 as an export format

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SDTM Study Design Datasets	"label": "Xanomeline (LY246708)",	SDTM Study Design Datasets	evident what the trial is investigating and on whom, and to allow retrieval from literature or internet searches. CDISC DEV-0000
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	"code": "C98388_INTERVENTIONAL",		Enter the amendment number. If this is the original instance of the protocol, indicate Not Applicable.
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	b		Novo Nordiak A/S Novo Allé, 2880 Bagsvaerd Denmark Tel: +45 4444 8888 [Sponsor Name]
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	"id": "CDISC DEV-0000", "text": "".		
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	"instanceType": "StudyIdentifier"		



USDM and M11 as an export format - with SoA

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Plans for OSB in CDISC 360i

Sponsor end-to-end Standards

- Import from CDISC Library
- Extensions, including sponsor BC's
- Share Sponsor BC's to CDISC curation

Build

- ODM.XML data collection specification including SDTM annotations
- Lab data specifications

Design

- Define Study Design and SoA
- Generate USDM
- Preview structured study design content in ICH M11 template

Run

- SDTM and ADaM data metadata specifications
- Data transformation and derivation metadata specification









Questions or need more information

Mikkel Traun, <u>mt@novonordisk.com</u> Nicolas De Saint Jorre, <u>ndjz@novonordisk.com</u> OpenStudyBuilder contact: <u>OpenStudyBuilder@gmail.com</u>

