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Healthcare Concept Maps combined with a FHIR® accelerator

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Abstract

- BPM+ models are based on open standards that can be used to visually depict the structure and behavior of healthcare workflows and decisions.
- If these workflow and decision models are to completely model healthcare clinical guidelines, then they also need to orchestrate logical data structures of medical concepts and data in the electronic health record.

- In this session we will:
  - introduce two knowledge entity models of the most common medical conditions and observations
  - bind them to logical data structures based on FHIR, referred to the FHIR accelerator
  - demonstrate them in action.

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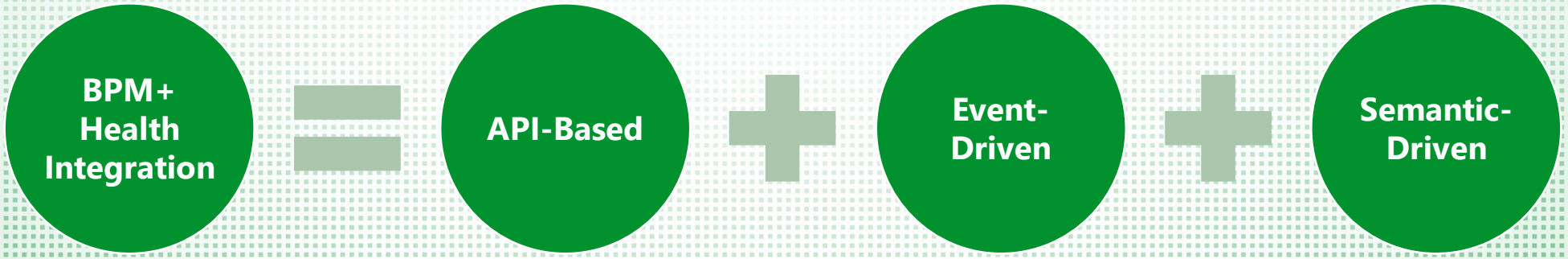
A modern Healthcare integration toolkit should support all kinds of integrations:



HEALTHCARE INTEROPERABILITY ACCELERATED

Trisotech BPM+ Healthcare Journey

Phase 1: Prove Viability

- Create BPM+ Health Executable Platform Independent Models (PIM)
- Create FHIR® Wrapper to obtain FHIR® enabled BPM+ services
- Generate CDS Hook end points on the fly

** What we are presenting today

Phase 2: Disambiguation

- Create Concept Models for the most commonly used Conditions and Observations
- Semantically disambiguated terms using coding
- Create a FHIR® Accelerator to accelerate FHIR® wrapper creation

Phase 3:

- Generate FHIR® enabled endpoints on the fly from BPM+ Health models using Concept Models and FHIR® Accelerator

PHASE 1 LESSONS LEARNED

Modeling in the Small vs Modeling in the Large

The Artist

When modeling in the Small, a BPM+ Health modeler may have a lot of liberty to creatively craft a few models. These models can be created for a specific organization, for a specific purpose, within a specific environment, using the specific vernacular of the organization and binded to the specific information infrastructure.

The Engineer

When modeling in the Large, a BPM+ Health modeler should apply separation of concerns, model with re-use in mind, use standardized concepts and data structures, ensure portability to various potential environments and information infrastructures.

PHASE 1 LESSONS LEARNED

We need to move from an Art Form to an Engineering Discipline

BPM+ Health Models: 1003

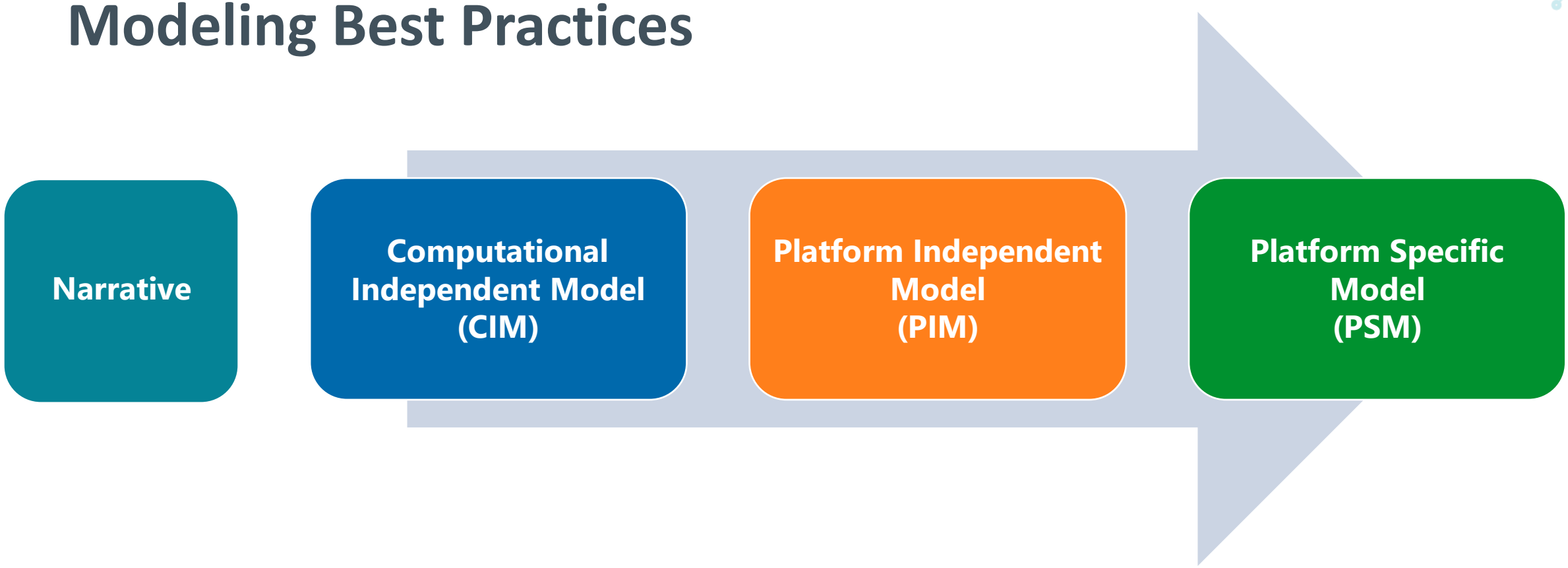
Published PIM BPM+ Health Services: 667

Categories: 138

Labeled Shapes: 8891

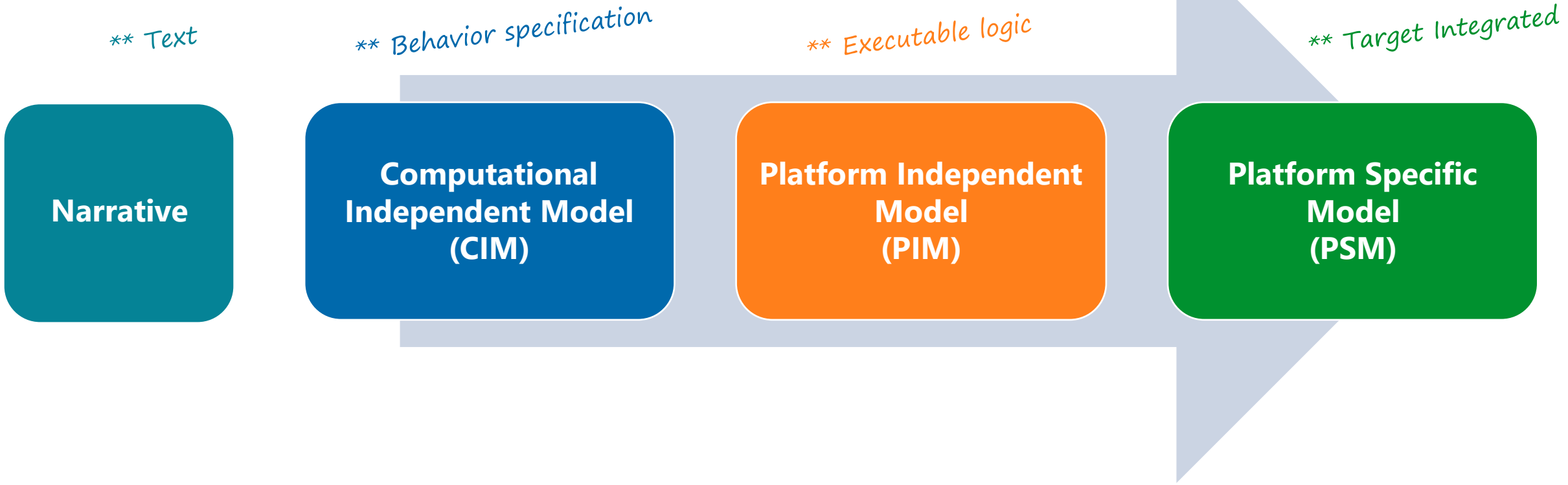
Unique Data Types: 1254

Modeling Best Practices



SEPARATION OF CONCERNS

Modeling Best Practices



MOVING FROM NARRATIVE TO BPM+ HEALTH MODELS ON FHIR

Modeling Best Practices

** Text

** Behavior specification

** Executable logic

** Target Integrated

Narrative

Computational Independent Model (CIM)

Platform Independent Model (PIM)

Platform Specific Model (PSM)

DMN BPMN CMMN

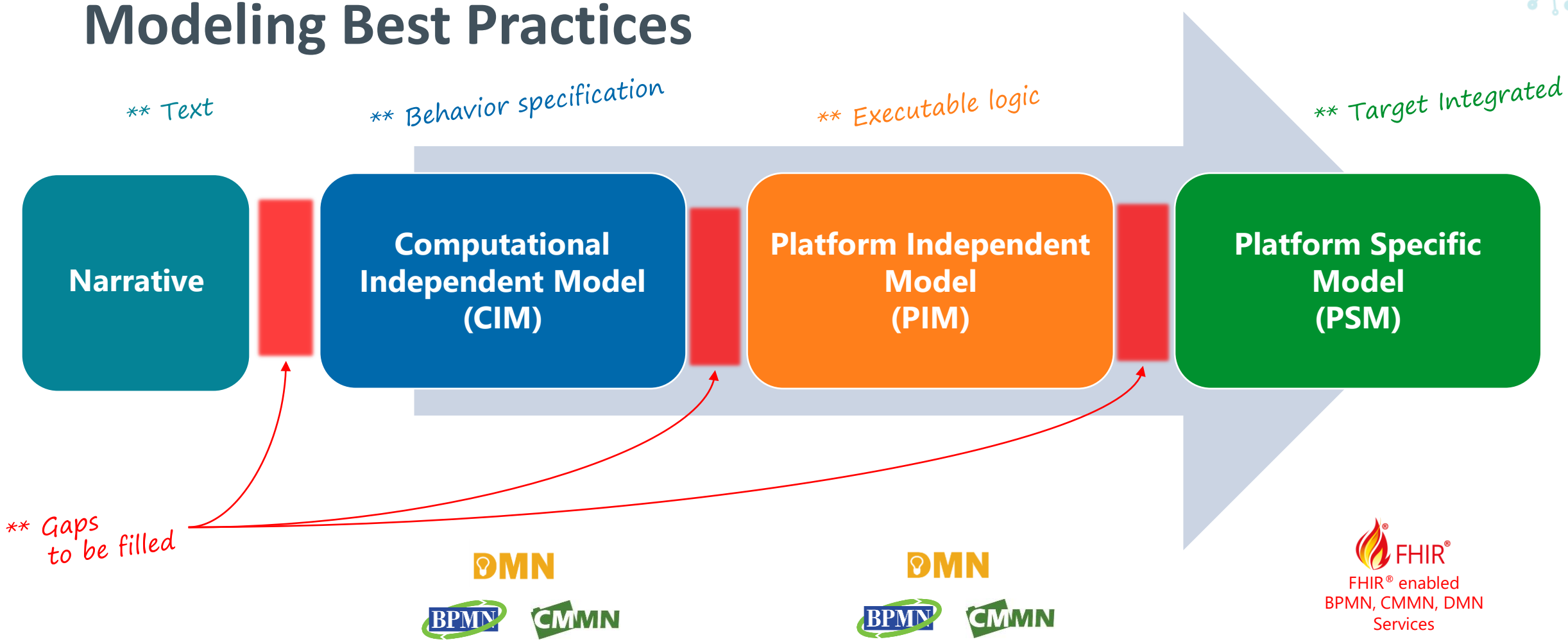
DMN BPMN CMMN

FHIR®

FHIR® enabled
BPMN, CMMN, DMN
Services

MIND THE GAP

Modeling Best Practices



FHIR®
FHIR® enabled
BPMN, CMMN, DMN
Services

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USE SUBJECT MATTER EXPERTS TO BRIDGE THE GAPS

Modeling Best Practices

** Text

** Behavior specification

** Executable logic

** Target Integrated

Narrative

Computational Independent Model (CIM)

Platform Independent Model (PIM)

Platform Specific Model (PSM)

SME

DMN

BPMN CMMN

DMN

BPMN CMMN

FHIR®

FHIR® enabled
BPMN, CMMN, DMN
Services

WHAT NEEDS TO BE DONE

Modeling Best Practices

** Text

** Behavior specification

** Executable logic

** Target Integrated

Narrative

Computational Independent Model (CIM)

Platform Independent Model (PIM)

Platform Specific Model (PSM)

SME

Capture Narrative into Models

DMN

BPMN

CMMN

Add data types and logical expressions

DMN

BPMN

CMMN

Add bindings to specific data source (Create FHIR wrapper)

FHIR®

FHIR® enabled BPMN, CMMN, DMN Services

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LESSON LEARNED

Skills Required for Creating Automatable BPM+ Health Modelers

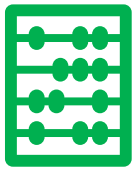
- Capture Narrative into BPM+ Models
  - Barrier to entry
  - BPM+ Field Guide
  - DMN, BPMN and CMMN Method and Style Training

- Add Data Types and Logical Expressions to BPM+ Models
  - A basic understanding of data structure (Item Definitions)
  - A good understating of Decision Table and the FEEL expression language

- Add Bindings to Specific Data Source (Create a FHIR® Wrapper)
  - A good understanding of Healthcare coding for disambiguation
  - A good understanding of FHIR® resources

Hypothesis 1

Healthcare Concepts (Conditions and Observations) used in BPM+ Health Models follow the Pareto Principle

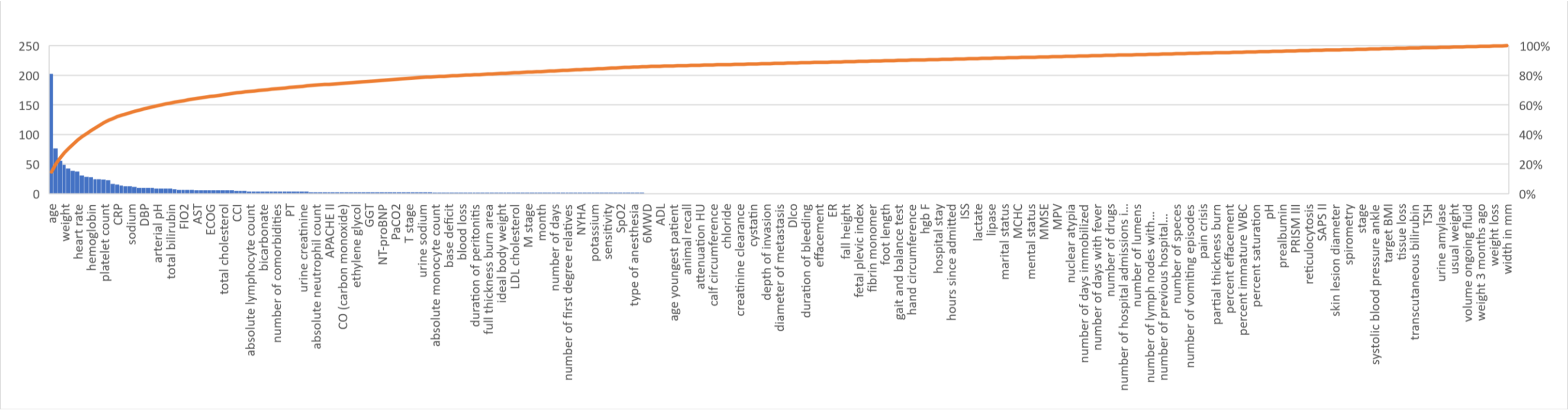


The Pareto principle states that for many outcomes, roughly 80% of consequences come from 20% of the causes (the “vital few”).

MODELS OF COMMON CONCEPTS – FHIR OBSERVATIONS

Based on review of 667 BPM+ Heath Clinical Services:

The 50 most frequently used observations represent 70% of FHIR requests (out of 1400).



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Concept Models of most Common Terms

for Observations and Conditions

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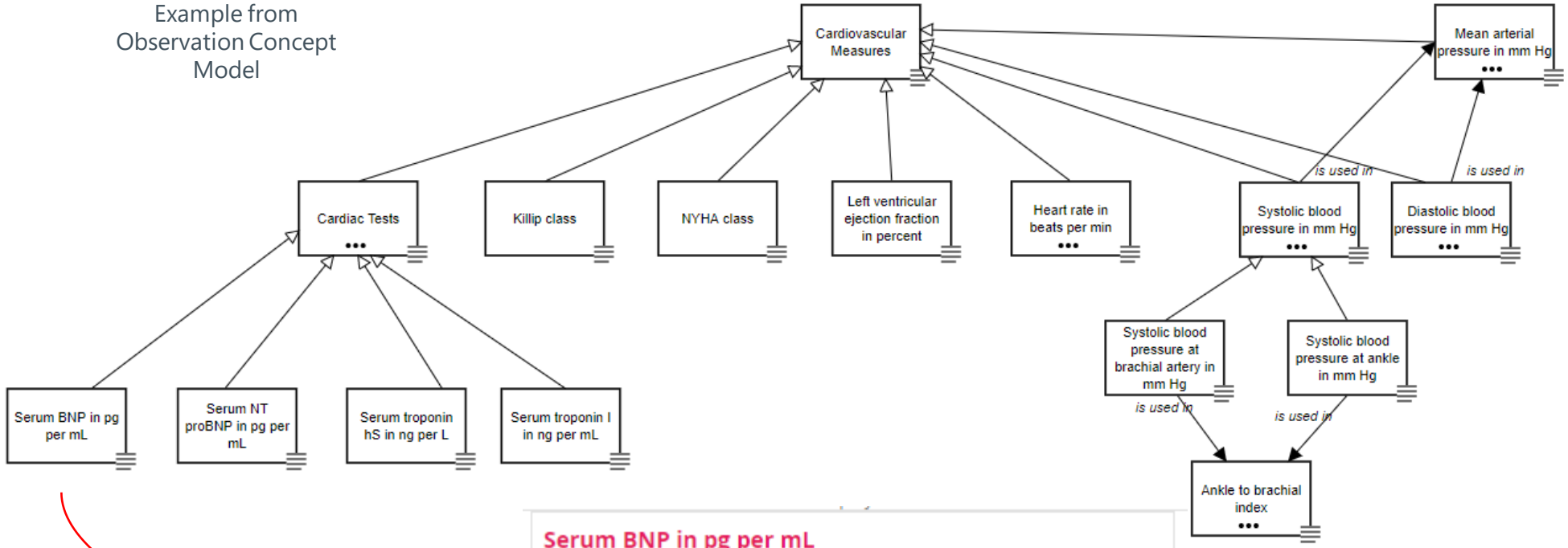
Example from Observation Concept Model



Serum BNP in pg per mL

Type: Number

concentration of brain natriuretic peptide in the serum

- Serum BNP in pg per mL *is a* Cardiac Tests

Alternatives

brain natriuretic peptide

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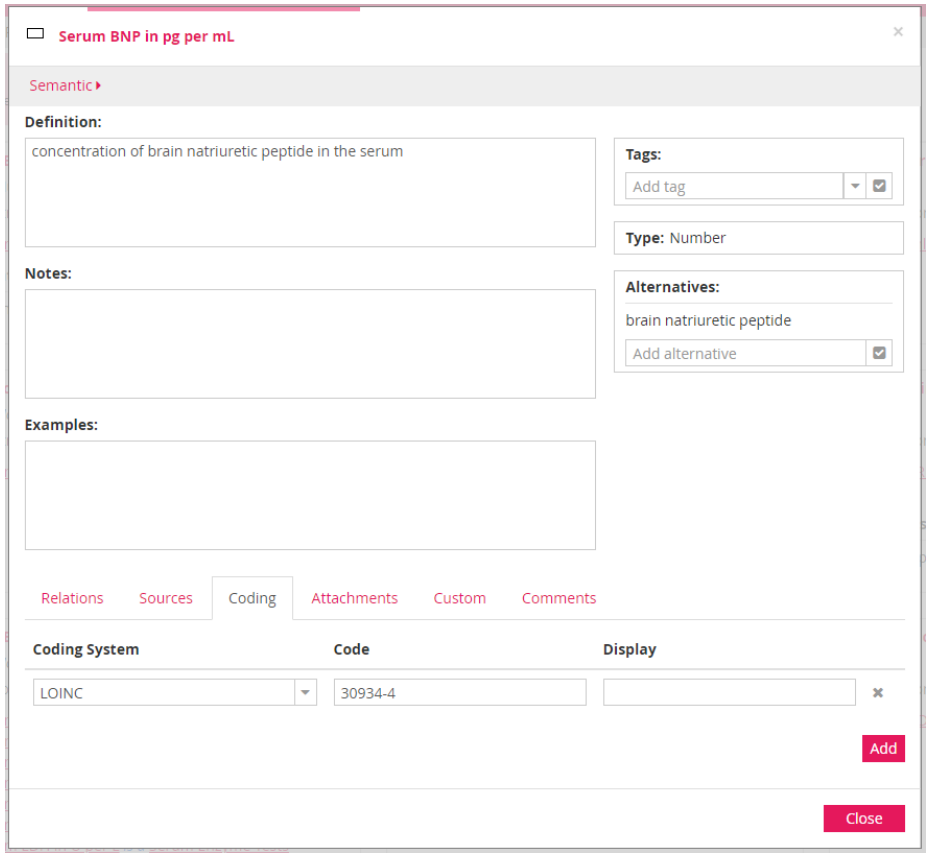
Concept Models including Disambiguated Logical Structures (Types)

Logical Structure

Disambiguated Term via Coding



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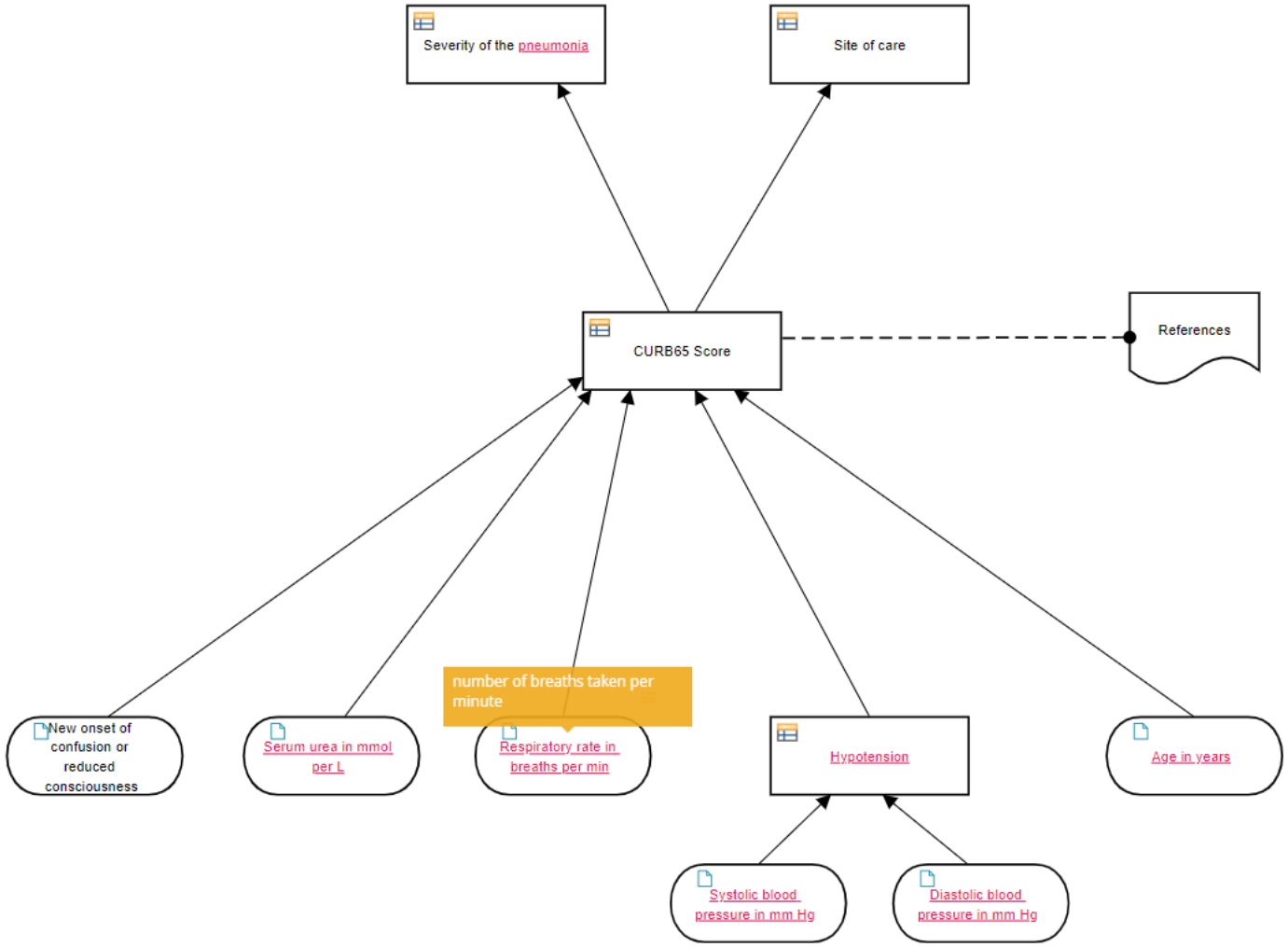

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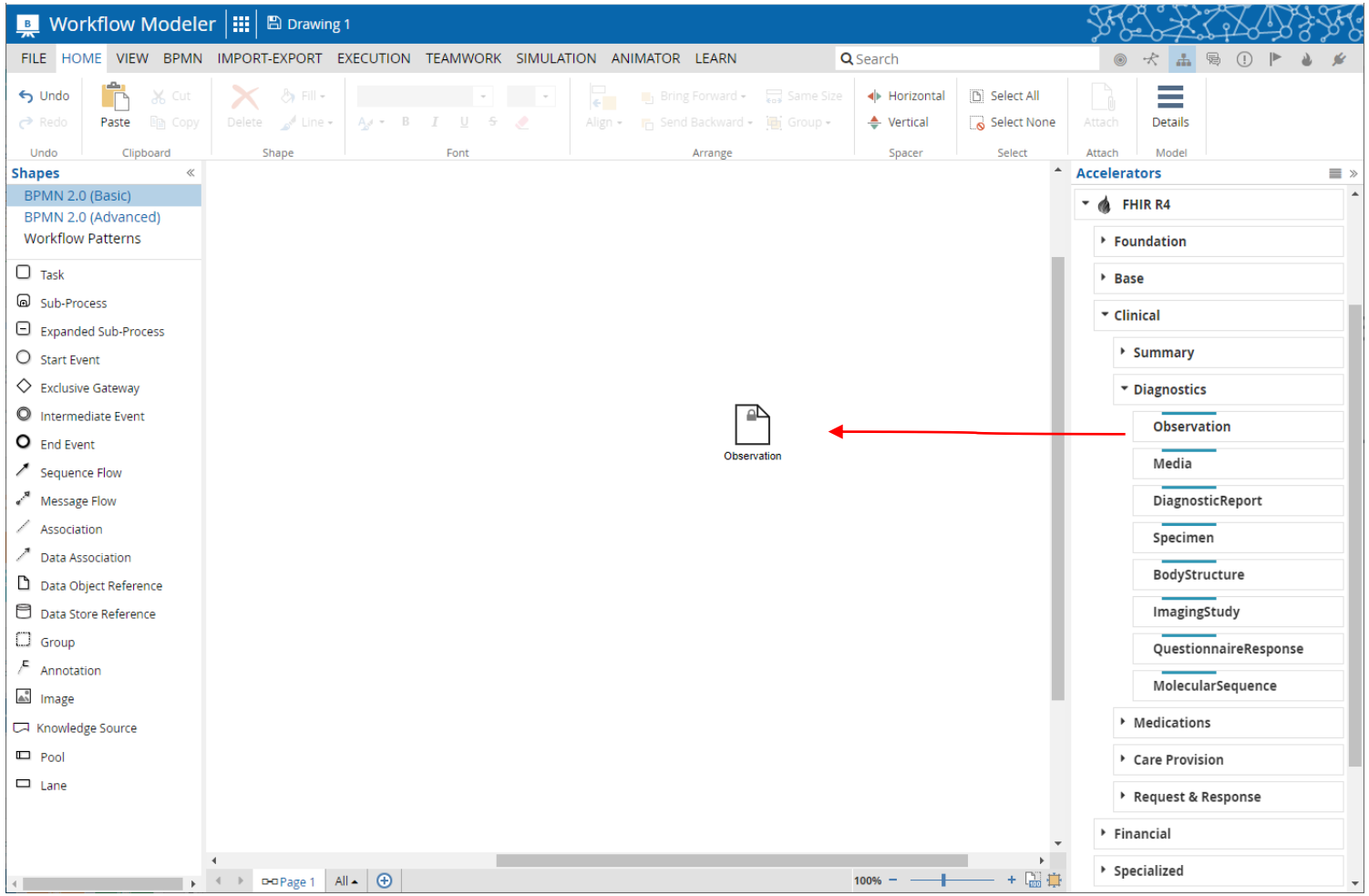
Hypothesis 2

It is possible to create a simple Drag and Drop tool from the FHIR® Resources Schemas

DRAG AND DROP FHIR RESOURCES

FHIR® Accelerator



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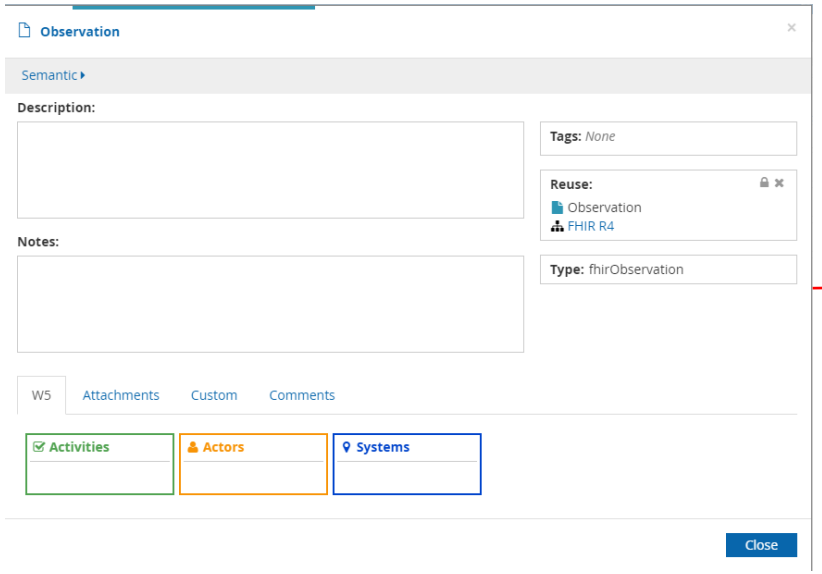
DRAG AND DROP FHIR RESOURCES

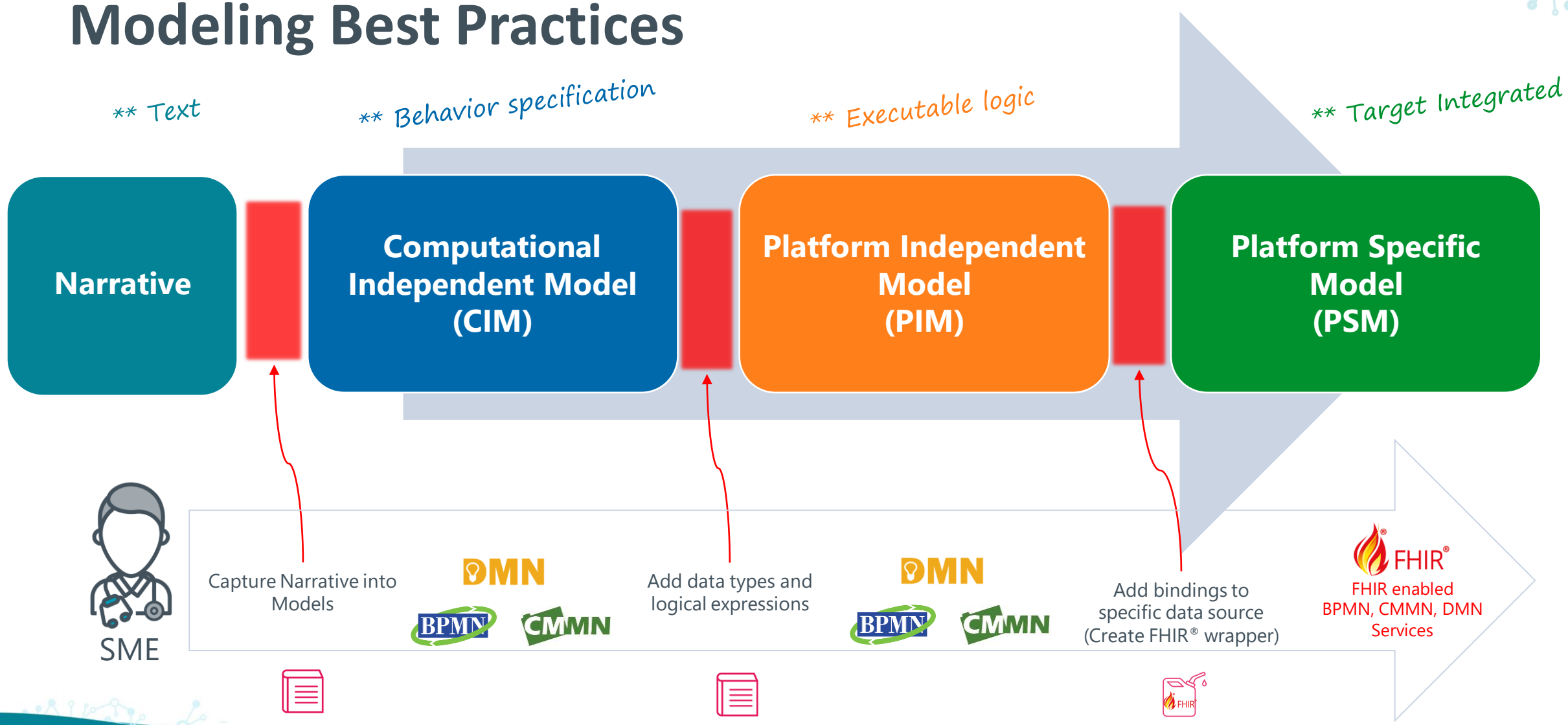
FHIR® Accelerator



fhirObservation	code	fhirCodeableConcept »	
	subject	fhirReference »	
	focus III	fhirReference »	
	encounter	fhirReference »	
	effectiveDateTime	Date and time	
	effectivePeriod	fhirPeriod »	
	effectiveTiming	fhirTiming »	
	effectiveInstant	Text	
	issued	Text	
	performer III	fhirReference »	
	valueQuantity *fhirQuantity*	id	Text
		extension III	fhirExtension »
		value	Number
		comparator	Text "<", "<=", ">=", ">"
		unit	Text
		system	Text
		code	Text
	valueCodeableConcept	fhirCodeableConcept »	
	valueString	Text	
	valueBoolean	Boolean	
	valueInteger	Number	
	valueRange	fhirRange »	
	valueRatio	fhirRatio »	
	valueSampledData	fhirSampledData »	
	valueTime	Text	
	valueDateTime	Date and time	
	valuePeriod	fhirPeriod »	

CLOSING THE SKILLS GAP

Modeling Best Practices



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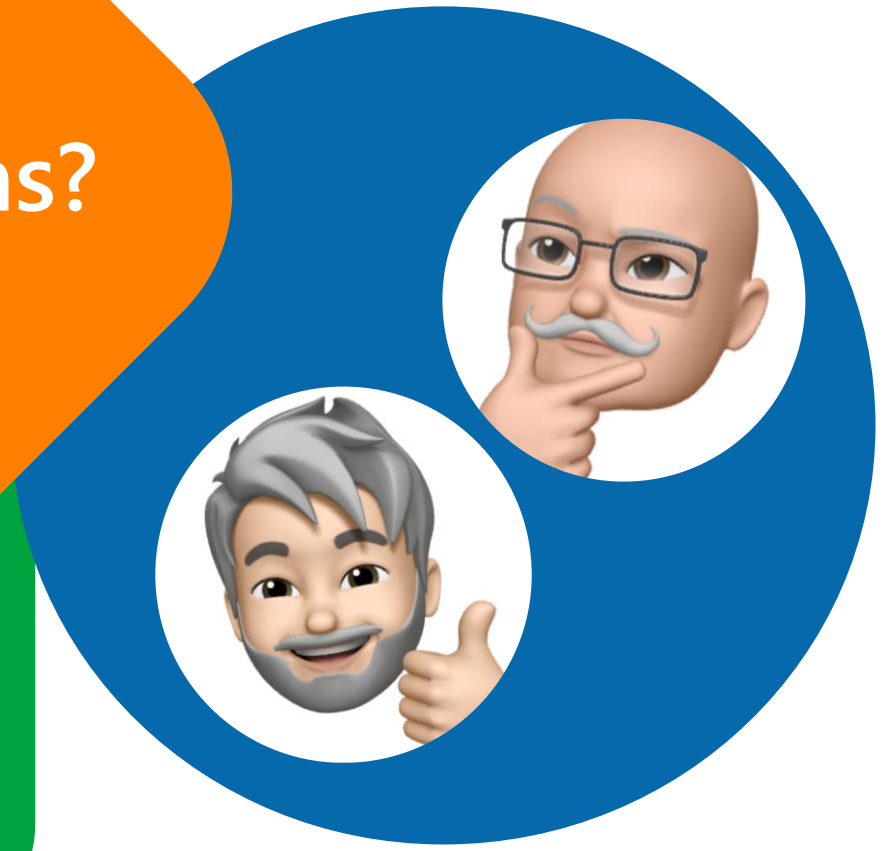
CLOSING THE SKILLS GAP

- Add Data Types and Logical Expressions to BPM+ Models
- Add Bindings to Specific Data Source

Healthcare Concept Maps combined with a FHIR® accelerator

Any questions?



THANKS!