

Constraining terminology at runtime through contextual information using the SNOMED CT concept model

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Louise Pape-Haugaard

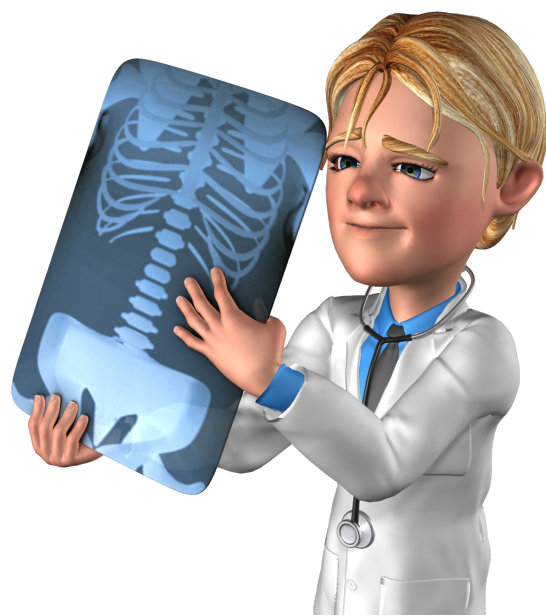
Agenda

- Case – Radiology department orders procedures
- Contextual information
- Leveraging context with SNOMED CT
- Demonstration
- How to
- Reduction of concepts leveraging the contextual information

Case: Radiology department orders procedures

Oncology department

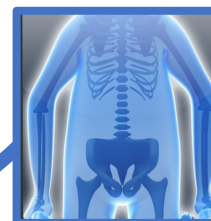
Radiology department



Personnel responsible for the order	
Area: Radiology/Ordering:	Ref: _____
Ordering:	U. 2021 / U. 2022
A. Description of the procedure	
Ordering 1:	U. 2021 / U. 2022
Ordering 2:	U. 2021 / U. 2022
Ordering 3:	U. 2021 / U. 2022
Ordering 4:	U. 2021 / U. 2022
Ordering 5:	U. 2021 / U. 2022
Ordering 6:	U. 2021 / U. 2022
Ordering 7:	U. 2021 / U. 2022
Ordering 8:	U. 2021 / U. 2022
Ordering 9:	U. 2021 / U. 2022
Ordering 10:	U. 2021 / U. 2022
Ordering 11:	U. 2021 / U. 2022
Ordering 12:	U. 2021 / U. 2022
Ordering 13:	U. 2021 / U. 2022
Ordering 14:	U. 2021 / U. 2022
Ordering 15:	U. 2021 / U. 2022
Ordering 16:	U. 2021 / U. 2022
Ordering 17:	U. 2021 / U. 2022
Ordering 18:	U. 2021 / U. 2022
Ordering 19:	U. 2021 / U. 2022
Ordering 20:	U. 2021 / U. 2022
Ordering 21:	U. 2021 / U. 2022
Ordering 22:	U. 2021 / U. 2022
Ordering 23:	U. 2021 / U. 2022
Ordering 24:	U. 2021 / U. 2022
Ordering 25:	U. 2021 / U. 2022
Ordering 26:	U. 2021 / U. 2022
Ordering 27:	U. 2021 / U. 2022
Ordering 28:	U. 2021 / U. 2022
Ordering 29:	U. 2021 / U. 2022
Ordering 30:	U. 2021 / U. 2022
Ordering 31:	U. 2021 / U. 2022
Ordering 32:	U. 2021 / U. 2022
Ordering 33:	U. 2021 / U. 2022
Ordering 34:	U. 2021 / U. 2022
Ordering 35:	U. 2021 / U. 2022
Ordering 36:	U. 2021 / U. 2022
Ordering 37:	U. 2021 / U. 2022
Ordering 38:	U. 2021 / U. 2022
Ordering 39:	U. 2021 / U. 2022
Ordering 40:	U. 2021 / U. 2022
Ordering 41:	U. 2021 / U. 2022
Ordering 42:	U. 2021 / U. 2022
Ordering 43:	U. 2021 / U. 2022
Ordering 44:	U. 2021 / U. 2022
Ordering 45:	U. 2021 / U. 2022
Ordering 46:	U. 2021 / U. 2022
Ordering 47:	U. 2021 / U. 2022
Ordering 48:	U. 2021 / U. 2022
Ordering 49:	U. 2021 / U. 2022
Ordering 50:	U. 2021 / U. 2022
Ordering 51:	U. 2021 / U. 2022
Ordering 52:	U. 2021 / U. 2022
Ordering 53:	U. 2021 / U. 2022
Ordering 54:	U. 2021 / U. 2022
Ordering 55:	U. 2021 / U. 2022
Ordering 56:	U. 2021 / U. 2022
Ordering 57:	U. 2021 / U. 2022
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Ordering 59:	U. 2021 / U. 2022
Ordering 60:	U. 2021 / U. 2022
Ordering 61:	U. 2021 / U. 2022
Ordering 62:	U. 2021 / U. 2022
Ordering 63:	U. 2021 / U. 2022
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Ordering 65:	U. 2021 / U. 2022
Ordering 66:	U. 2021 / U. 2022
Ordering 67:	U. 2021 / U. 2022
Ordering 68:	U. 2021 / U. 2022
Ordering 69:	U. 2021 / U. 2022
Ordering 70:	U. 2021 / U. 2022
Ordering 71:	U. 2021 / U. 2022
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Ordering 73:	U. 2021 / U. 2022
Ordering 74:	U. 2021 / U. 2022
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Ordering 77:	U. 2021 / U. 2022
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Ordering 81:	U. 2021 / U. 2022
Ordering 82:	U. 2021 / U. 2022
Ordering 83:	U. 2021 / U. 2022
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Ordering 94:	U. 2021 / U. 2022
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Ordering 97:	U. 2021 / U. 2022
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Ordering 99:	U. 2021 / U. 2022
Ordering 100:	U. 2021 / U. 2022

Order

Analysis / image

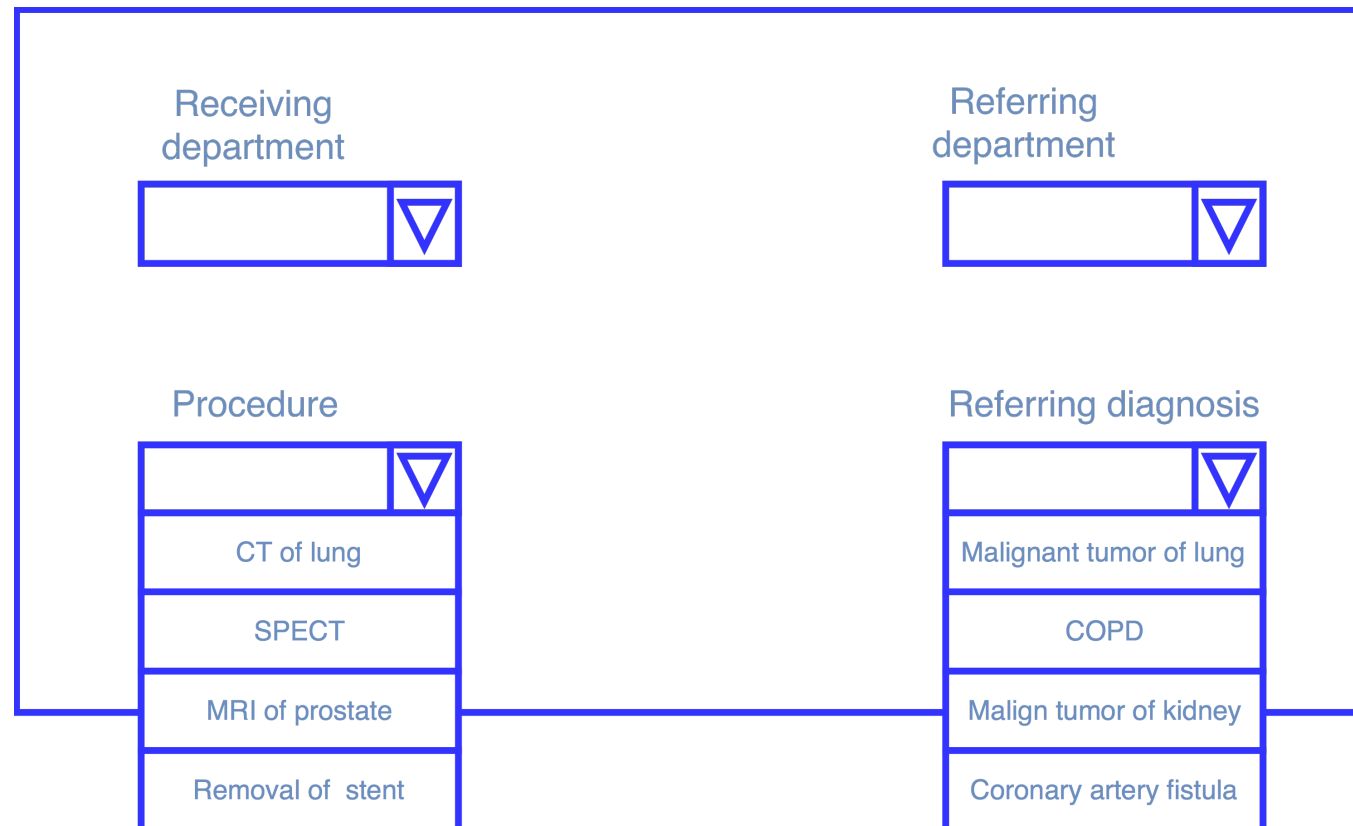


Agenda

- Case – Radiology department orders procedures
- **Contextual information**
 - Contextual information
 - Elements providing contextual information
- Leveraging context with SNOMED CT
- Demonstration
- How to
- Reduction of concepts leveraging the contextual information

Contextual information

- Ordering procedures from other departments



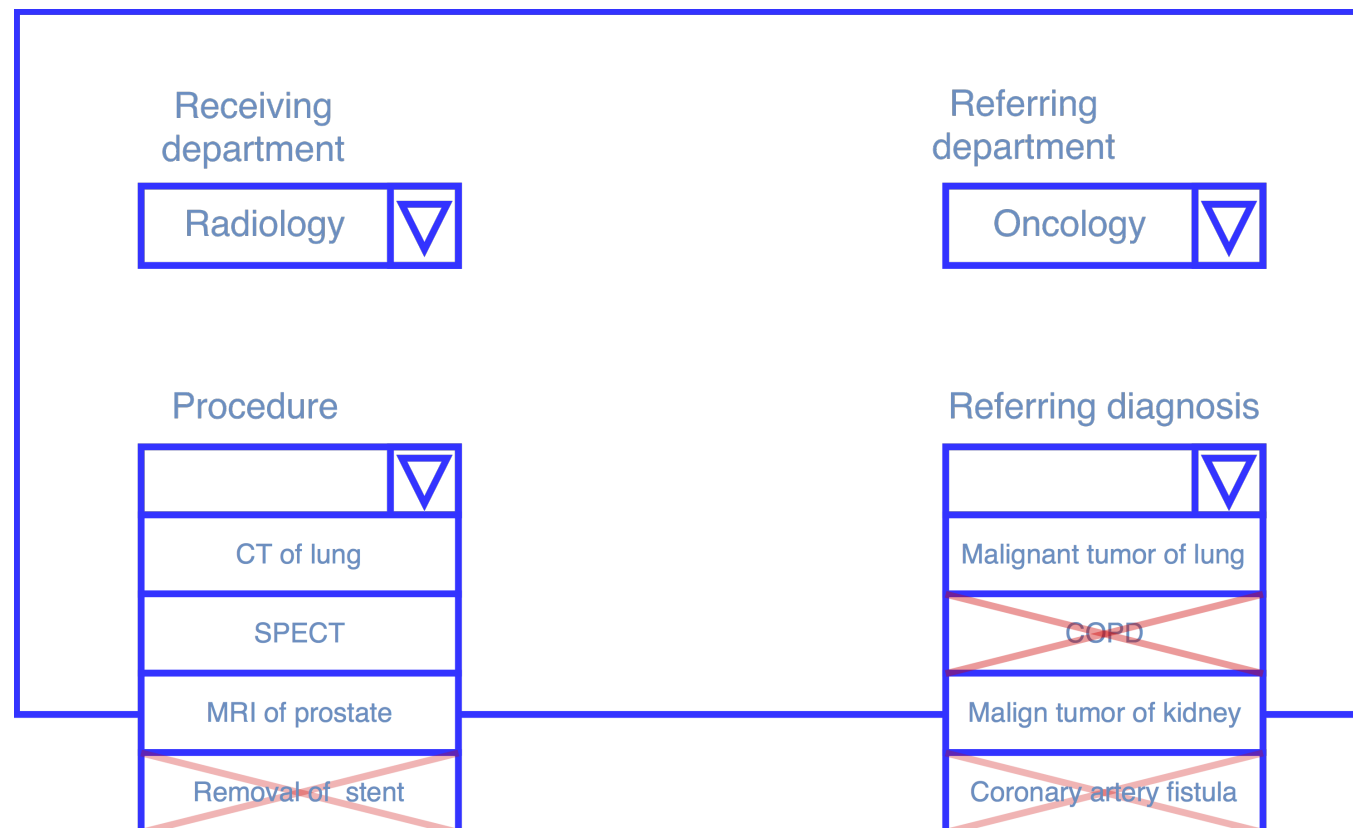
Contextual information

- Ordering procedures from other departments

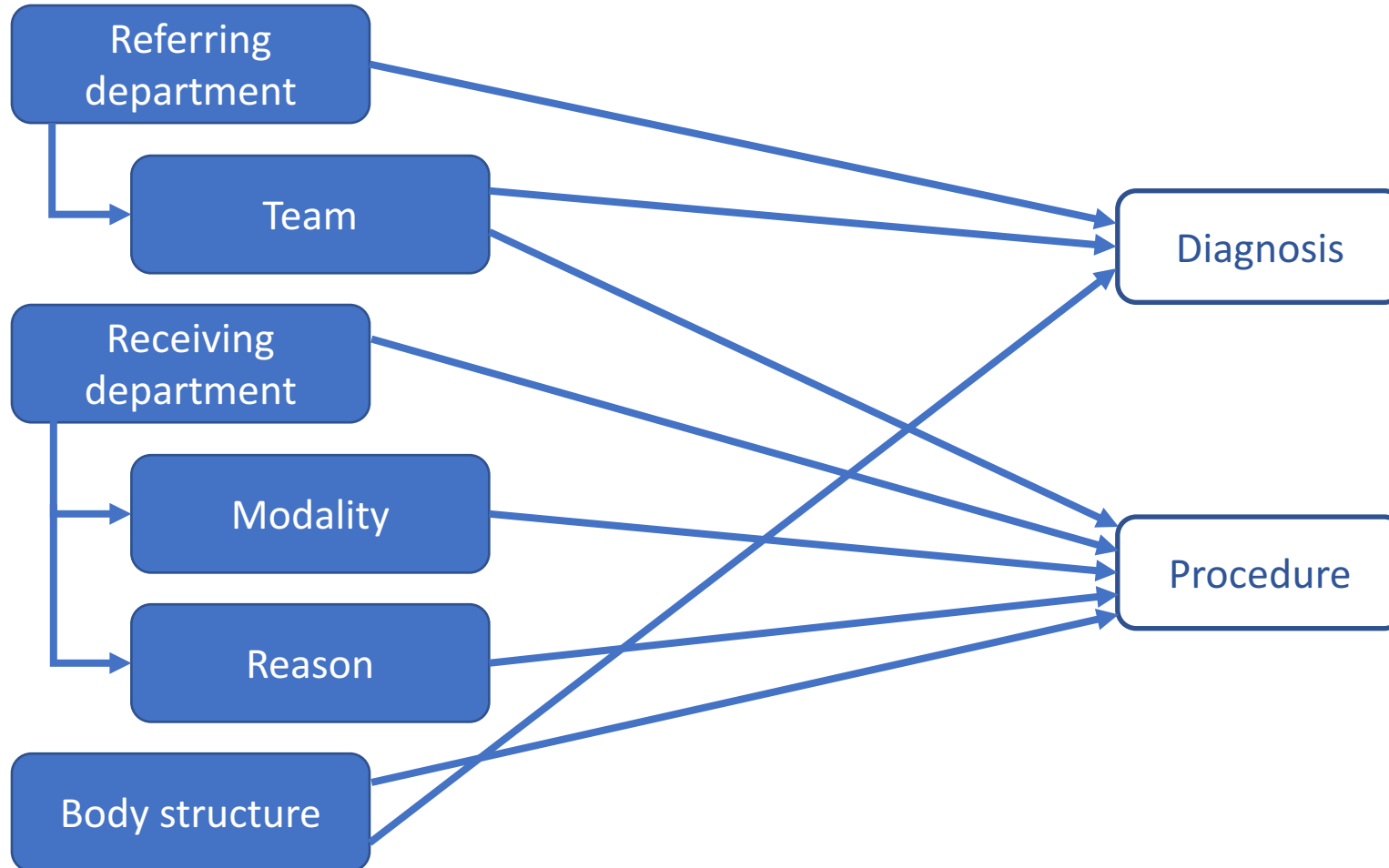
Receiving department	Referring department
<input type="text" value="Radiology"/>	<input type="text"/>
Procedure	Referring diagnosis
<input type="text"/>	<input type="text"/>
CT of lung	Malignant tumor of lung
SPECT	COPD
MRI of prostate	Malign tumor of kidney
Removal of stent	Coronary artery fistula

Contextual information

- Ordering procedures from other departments



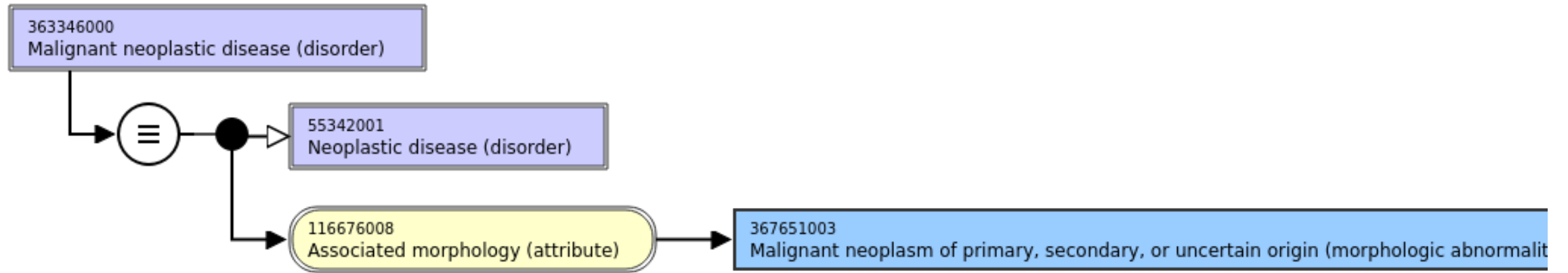
Elements providing contextual information



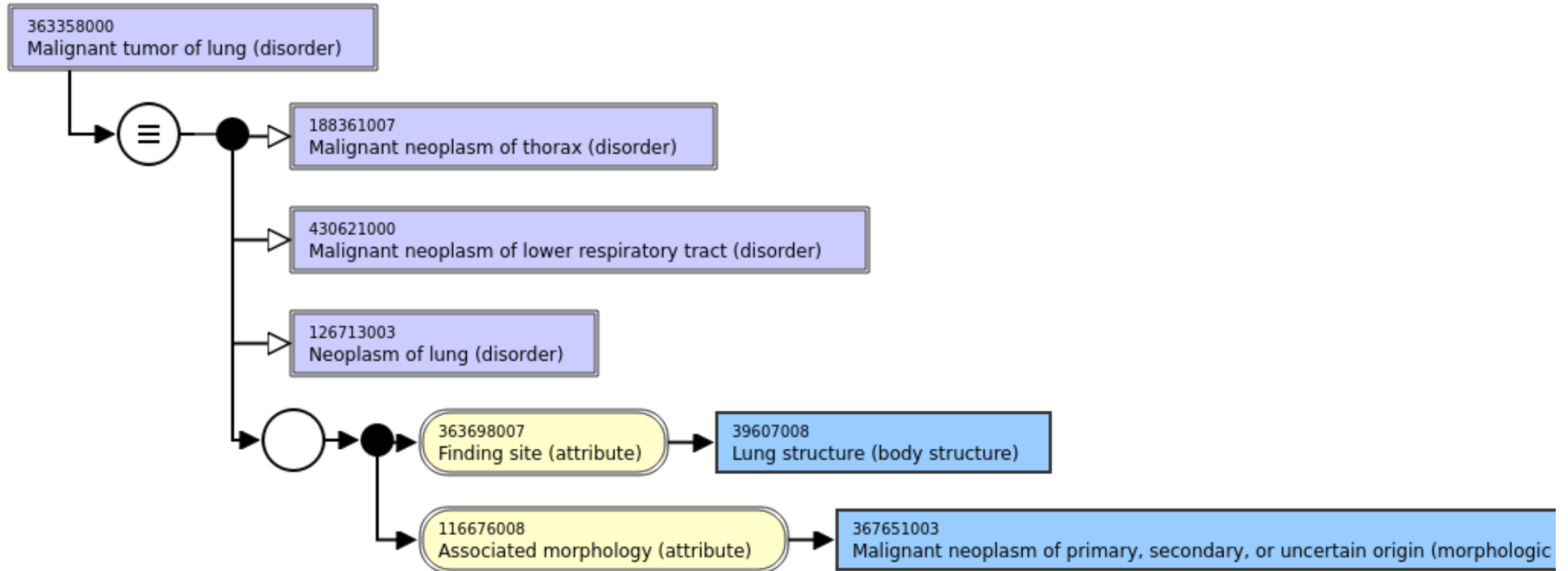
Agenda

- Case – Radiology department orders procedures
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- **Leveraging context with SNOMED CT**
- Demonstration
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Leveraging context with SNOMED CT



Leveraging context with SNOMED CT



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- Case – Radiology department orders procedures
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- Leveraging context with SNOMED CT
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Demonstration



Demonstration



termPAS

Rekvisiterende

Henvisende afdeling

Team

Henvisende læge navn

Henvisende læge tf

Patientoplysninger

Patient navn

CPR nr.

Behandlingstype

Undersøgelse Antal begreber: 50721

"tom stol"-teknik
(s) Stromeyer-Little hepatotomioperation
+3 dioptrier sfærisk test
1-pentamol-måling
1. anthraxvaccination
1. brev til rask kvinde vedr. monitorering
1. brev til rask mand vedr. monitorering
1. brev til rask voksen vedr. monitorering
1. brev vedr. cancermonitorering

Modtagende

Modtagende afdeling

Transportmåde

Prioritering

Undersøgelsesspecificering

Modalitet

Formål

Sideangivelse

Kropsstruktur

Henvisningsdiagnose Antal begreber: 62059

"Cold injury"-syndrom hos nyfødt
"Dying back"-fænomen
"Steal-fænomen" i subclavia
"U"-rift i retina
#5221 IHTSDO: FSN of "Adenosquamous cell carcinoma (di
(R)-20-hydroxysteroiddehydrogenasemangel
(S)-2-hydroxysyreoxidasemangel
1,3-beta-glukansyntasemangel

Agenda

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- Demonstration
- **How to**
 - Tagging
 - Retrieval of concepts
- Results: Reduction of concepts

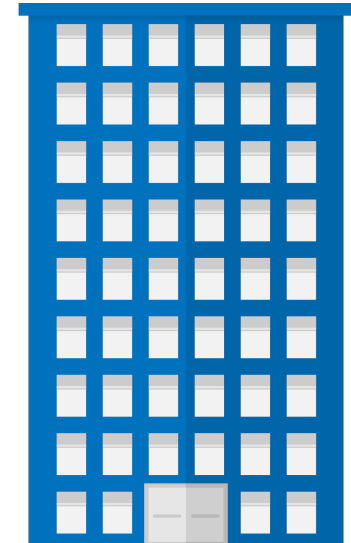
How to

- Example:
 - Ordering a procedure from another department
 - Contextual elements:
 - Oncology department
 - Lung team
 - Reducing the number of diagnoses

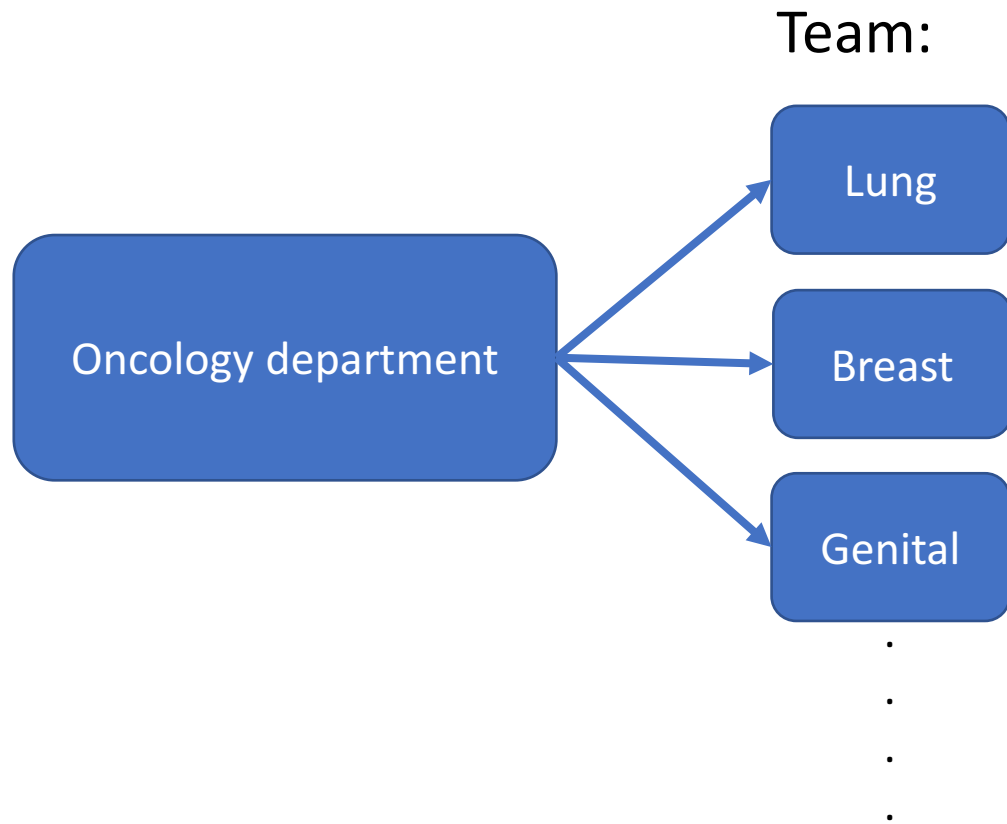


Personer		Kategori	
Navn	_____	_____	_____
Udviklingsnr.	_____	_____	_____
A. Identifikationsnr.	_____	_____	_____
Udviklingsnr. 1	_____	_____	_____
Udviklingsnr. 2	_____	_____	_____
Udviklingsnr. 3	_____	_____	_____
Udviklingsnr. 4	_____	_____	_____
Udviklingsnr. 5	_____	_____	_____
Udviklingsnr. 6	_____	_____	_____
Udviklingsnr. 7	_____	_____	_____
Udviklingsnr. 8	_____	_____	_____
Udviklingsnr. 9	_____	_____	_____
Udviklingsnr. 10	_____	_____	_____
Udviklingsnr. 11	_____	_____	_____
Udviklingsnr. 12	_____	_____	_____
Udviklingsnr. 13	_____	_____	_____
Udviklingsnr. 14	_____	_____	_____
Udviklingsnr. 15	_____	_____	_____
Udviklingsnr. 16	_____	_____	_____
Udviklingsnr. 17	_____	_____	_____
Udviklingsnr. 18	_____	_____	_____
Udviklingsnr. 19	_____	_____	_____
Udviklingsnr. 20	_____	_____	_____
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Udviklingsnr. 24	_____	_____	_____
Udviklingsnr. 25	_____	_____	_____
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Udviklingsnr. 37	_____	_____	_____
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Udviklingsnr. 40	_____	_____	_____
Udviklingsnr. 41	_____	_____	_____
Udviklingsnr. 42	_____	_____	_____
Udviklingsnr. 43	_____	_____	_____
Udviklingsnr. 44	_____	_____	_____
Udviklingsnr. 45	_____	_____	_____
Udviklingsnr. 46	_____	_____	_____
Udviklingsnr. 47	_____	_____	_____
Udviklingsnr. 48	_____	_____	_____
Udviklingsnr. 49	_____	_____	_____
Udviklingsnr. 50	_____	_____	_____

Order



Example



Tagging

Team:

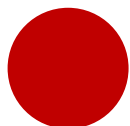
Lung

Breast

Genital

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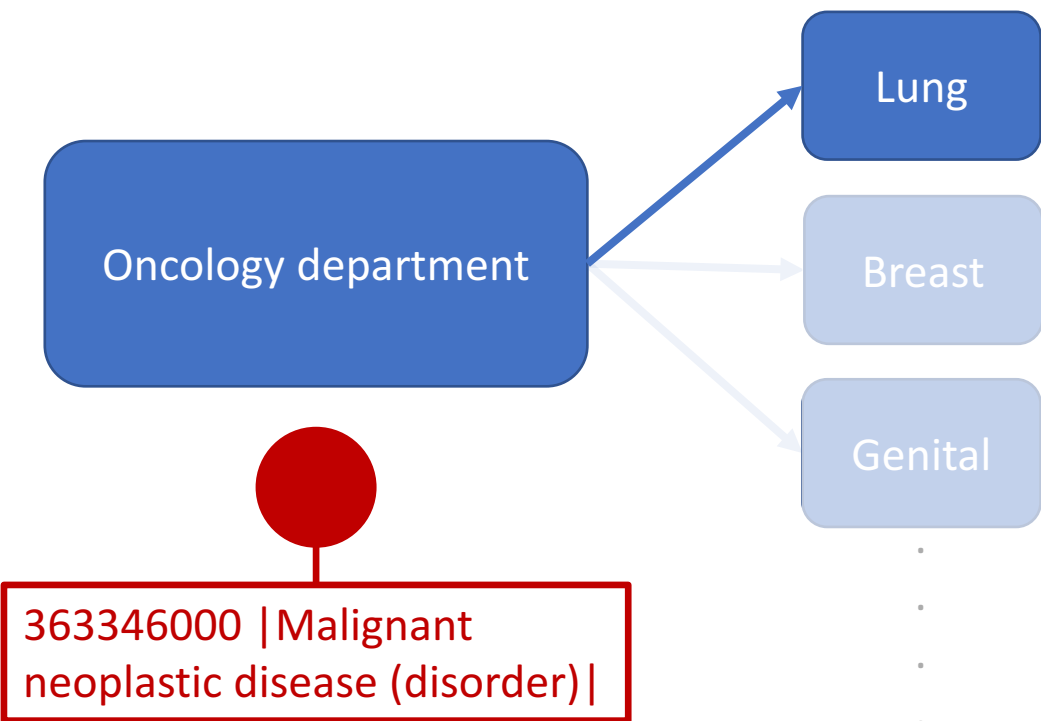
Oncology department



363346000 | Malignant
neoplastic disease (disorder) |

Tagging

Team:



82094008 | Lower respiratory tract structure (body structure) |

76752008 | Breast structure (body structure) |

21514008 | Structure of genitourinary system (body structure) |

Retrieval of concepts

- Traditional value set terminology binding

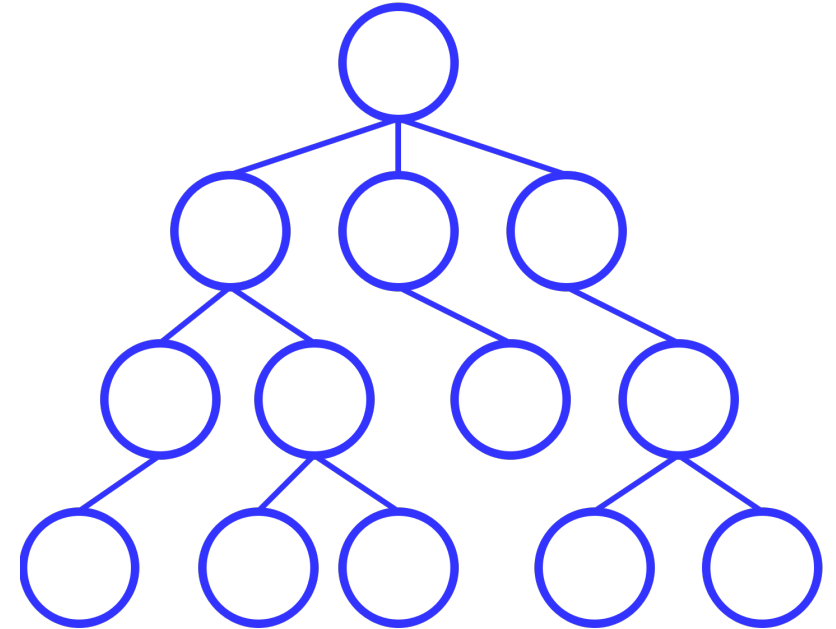
Referring diagnosis

▼
Malignant tumor of lung
COPD
Malign tumor of kidney
Coronary artery fistula

•
•
•
•

72253

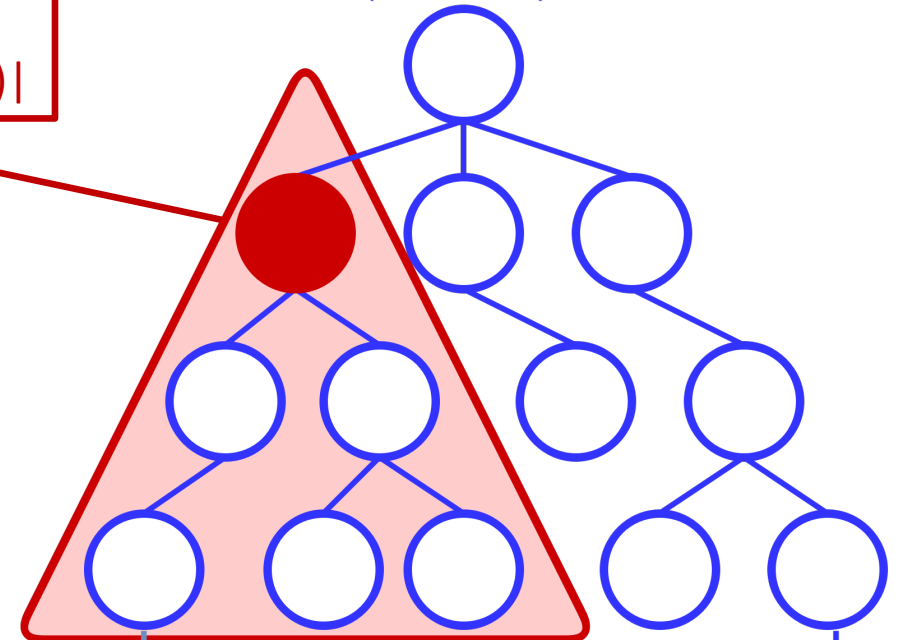
< 64572001 IDisease
(disorder)



Retrieval of concepts

363346000 | Malignant
neoplastic disease (disorder) |

< 64572001 | Disease
(disorder) |



Retrieval of concepts

Referring diagnosis

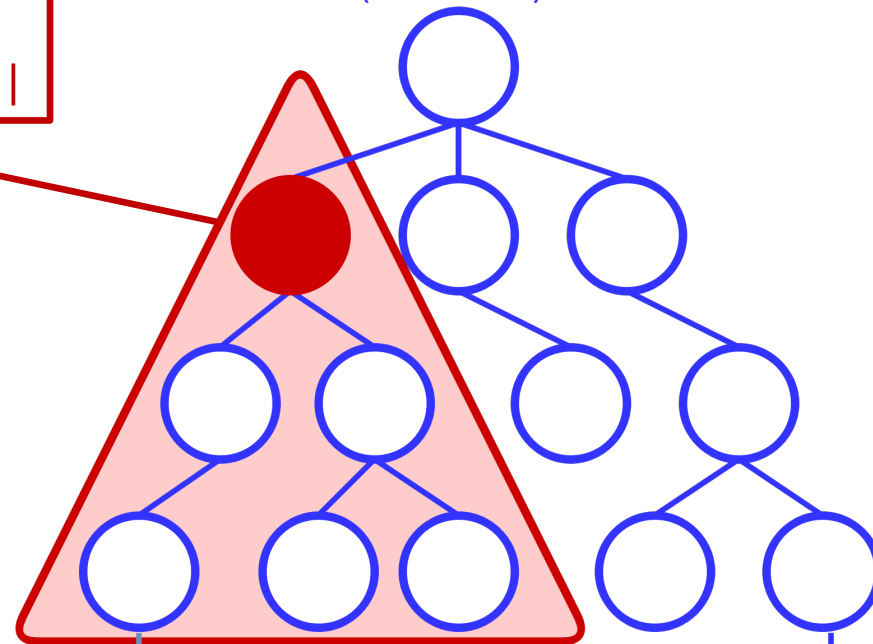
▼
Malignant tumor of lung
COPD
Malign tumor of kidney
Coronary artery fistula

•
•
•
•

4038

363346000 | Malignant neoplastic disease (disorder) |

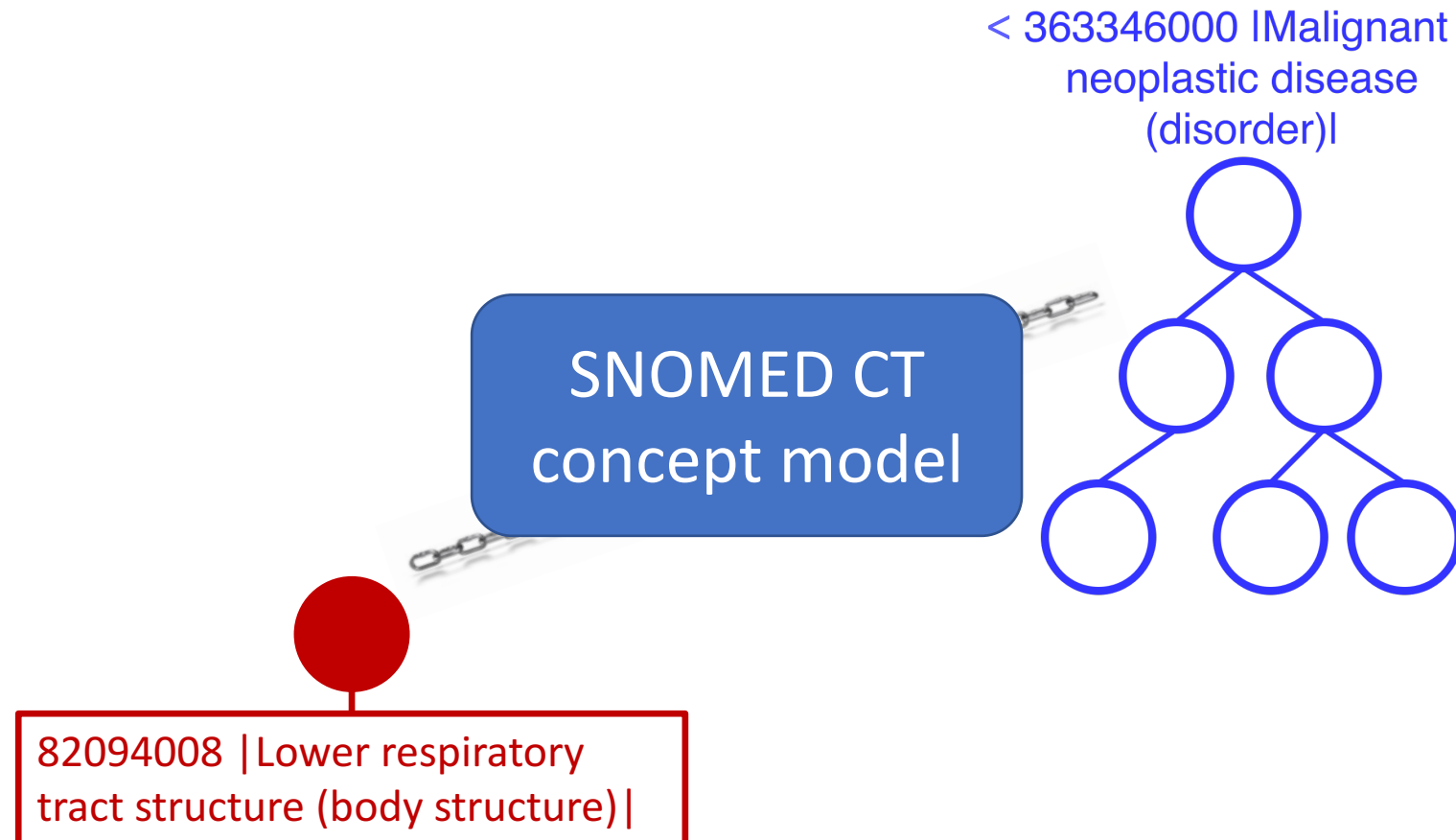
< 64572001 | Disease (disorder) |



399068003 | Malignant tumor of prostate (disorder) |

~~13645005 | Chronic obstructive lung disease (disorder) |~~

Retrieval of concepts



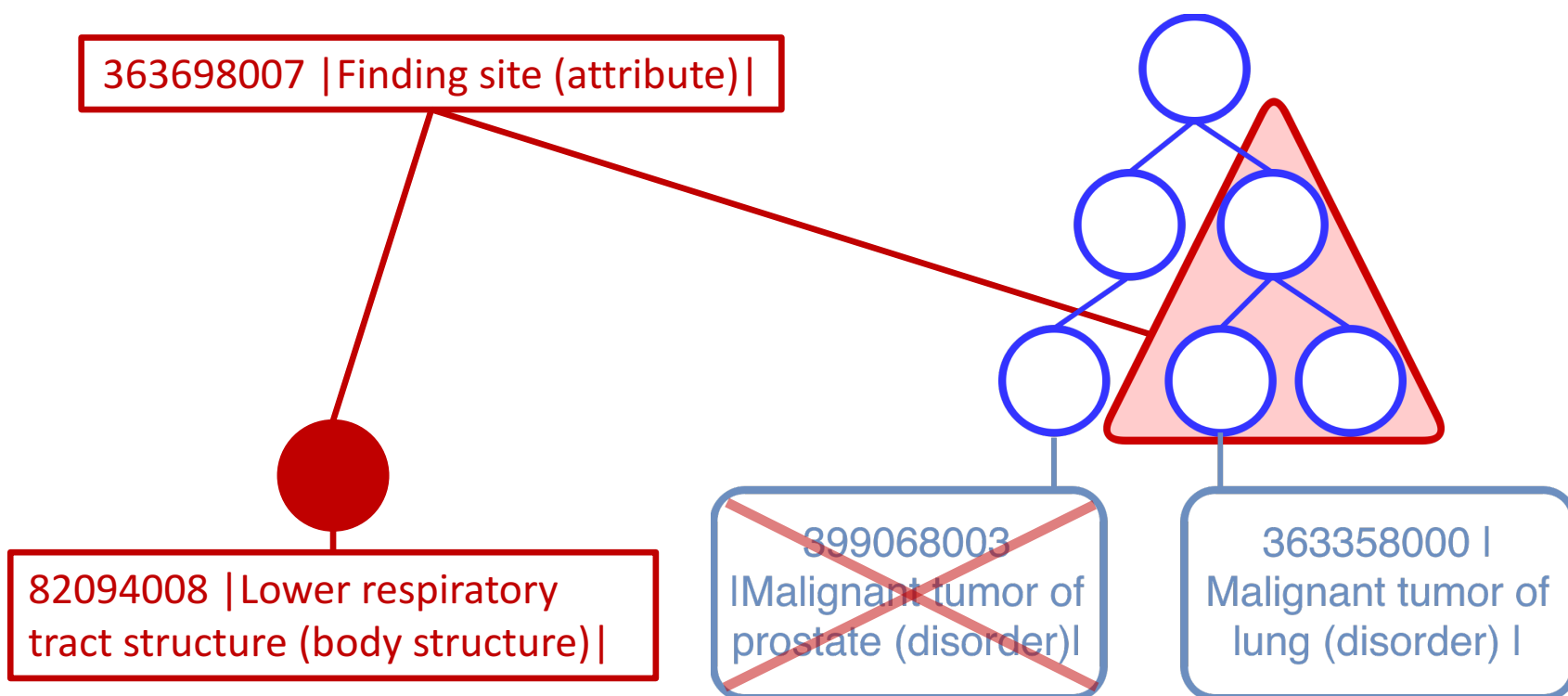
Retrieval of concepts

Referring diagnosis

	▼
Malignant tumor of lung	
COPD	
Malign tumor of kidney	
Coronary artery fistula	

⋮

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- **Reduction of concepts leveraging the contextual information**

Reduction of concepts leveraging the contextual information



Referring department	Team	Receiving department	Modality	Purpose	Anatomical location	Number of procedures	Number of diagnoses
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Reduction of concepts leveraging the contextual information



Referring department	Team	Receiving department	Modality	Purpose	Anatomical location	Number of procedures	Number of diagnoses
-	-	-	-	-	-	56366	722254

Reduction of concepts leveraging the contextual information



Referring department	Team	Receiving department	Modality	Purpose	Anatomical location	Number of procedures	Number of diagnoses
-	-	-	-	-	-	56366	722254
Oncology	-	-	-	-	-	56366	4039
Oncology	Lung team	-	-	-	-	471	183
Oncology	Lung team	Radiology	-	-	-	99	183
Oncology	Lung team	Radiology	CT-scan	-	-	18	183
Oncology	Lung team	Radiology	CT-scan	Progression evaluation	-	18	183
Oncology	Lung team	Radiology	CT-scan	Progression evaluation	Trachea	15	11

Conclusion

- Potential for automatically extracting of context
 - The user does not necessarily need to fill out every context providing element
- Number of context providing elements should be considered in every usecase
- This should not be considered a standalone technology to preform concept selection but should be combined with traditional search techniques
- Future work
 - Looking at systems where we test this approach
 - We want to investigate clinical acceptance – changing lists of concepts

