

Identifying Missing Finding Site Relations in SNOMED CT



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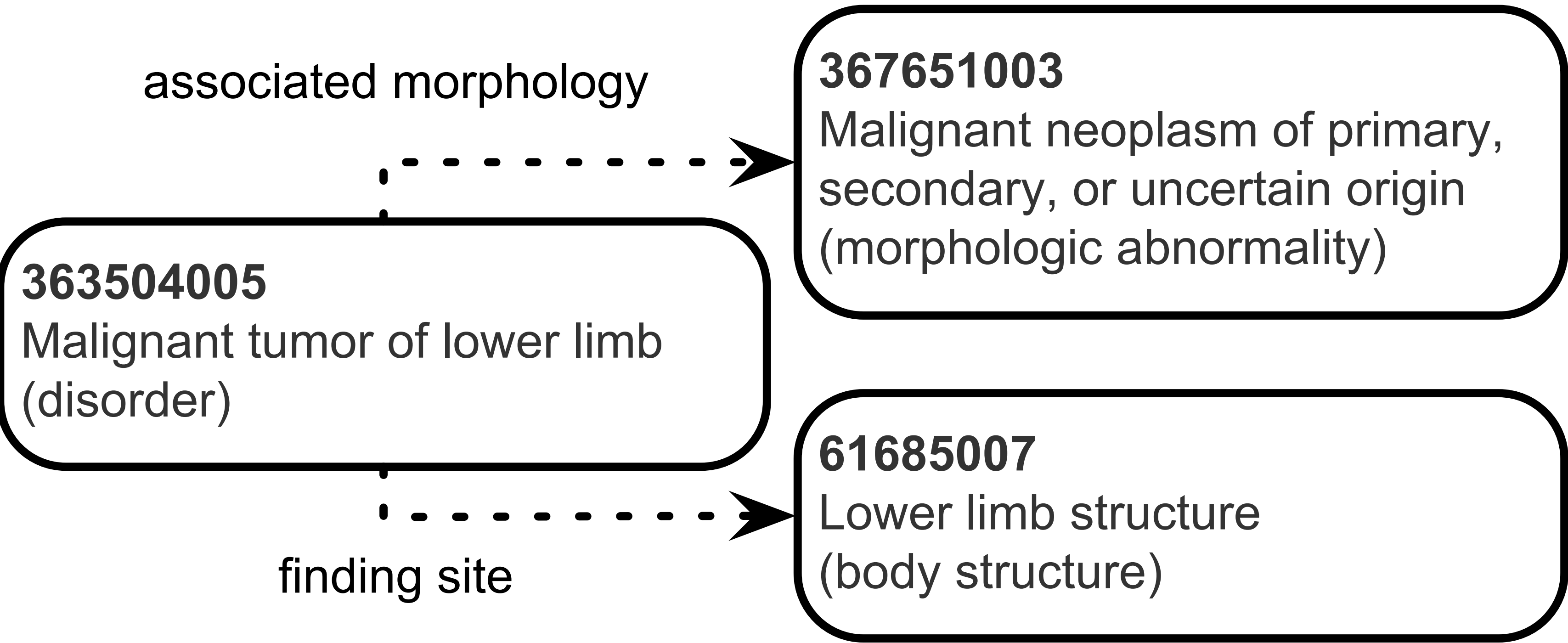
Introduction

Formally specified queryable relations between concepts in an ontology make it more complete and more useful for organizing and retrieving data. We have examined the use and disuse of finding site assertions in SNOMED CT finding concepts related to cancer staging, focusing on the 1038 SNOMED concepts organized under the concept 385356007 |Tumor stage finding (finding). We identified concepts whose logical definitions arguably should include finding site assertions using body structure concepts that are already present elsewhere in SNOMED CT.

SNOMED CT

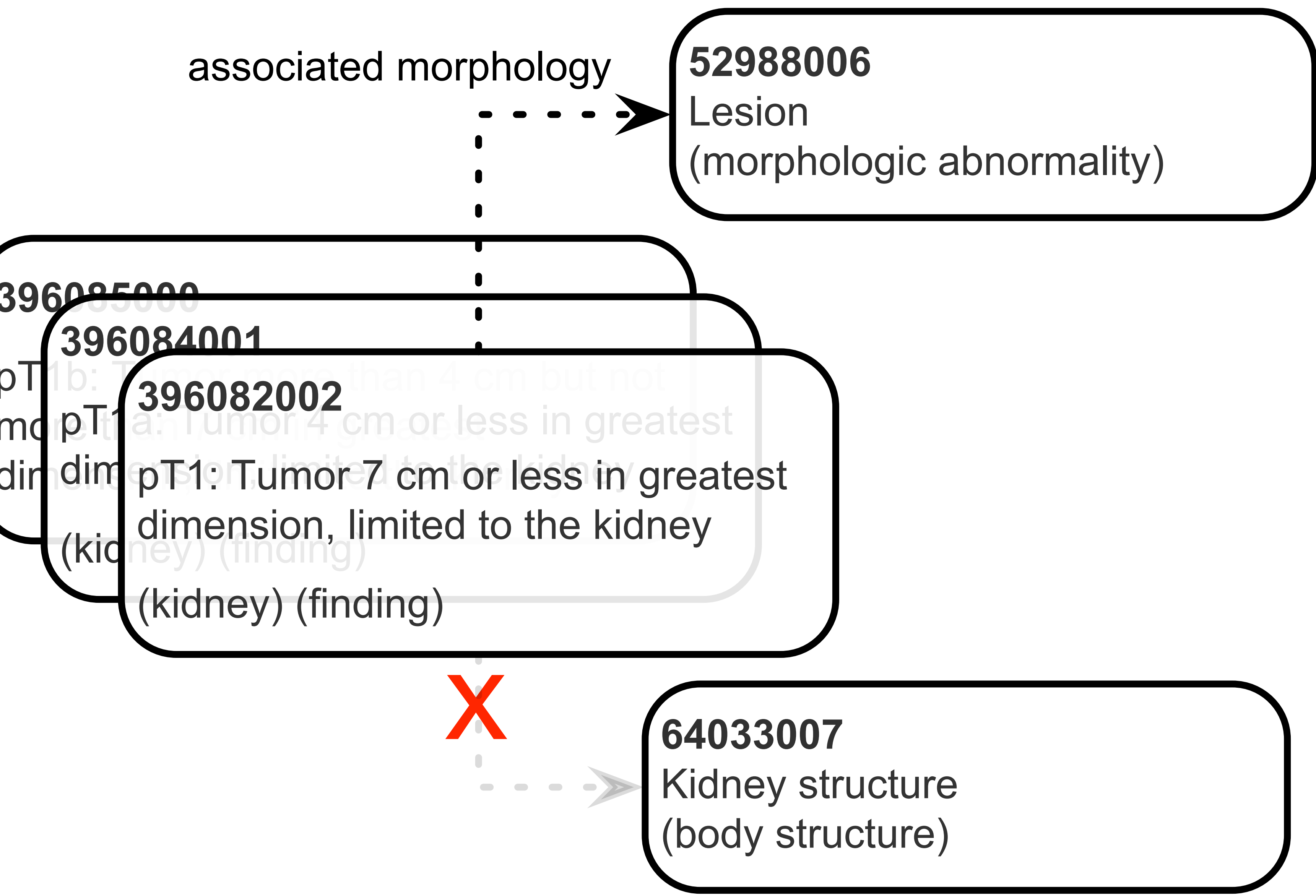
SNOMED CT is a reference terminology for the clinical domain. Its concepts have machine-readable logical definitions useful for making logical inferences. SNOMED has 300,000+ active concepts in an *Is-a* hierarchy. Each has an identifier and a *fully specified name* (FSN) with a *semantic tag*. Some also have non-hierarchical *associative* relations to other concepts.

- 363504005 Malignant tumor of lower limb (disorder)
- *is a*: 363346000 Malignant neoplastic disease (disorder)
 - *has finding site*: 61685007 Lower limb structure (body structure)
 - *has associated morphology*: 367651003 Malignant neoplasm of primary, secondary, or uncertain origin (morphologic abnormality)



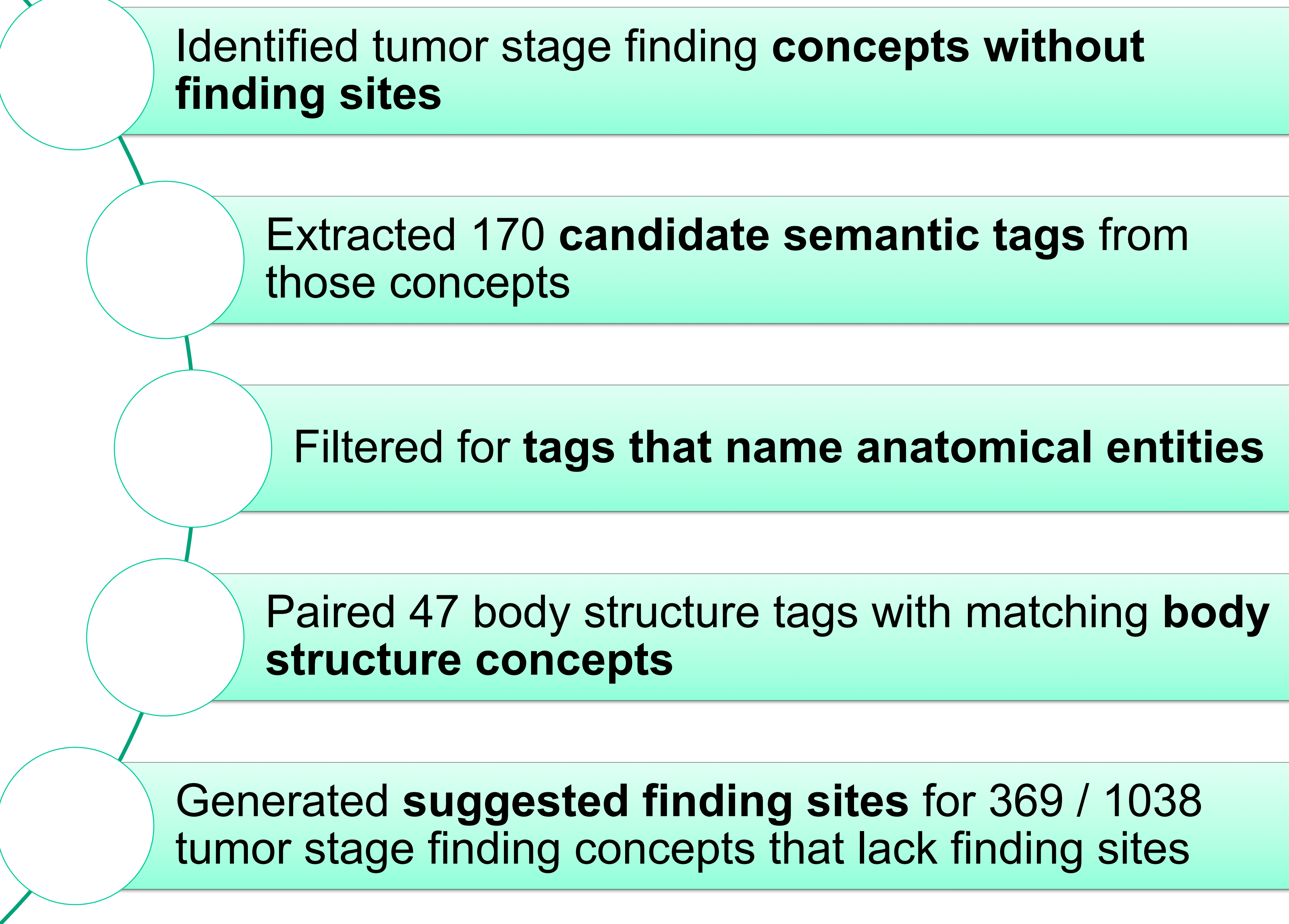
Missing Finding Sites

Some tumor stage finding concepts lack finding site assertions even though the concept appears to be about a finding in a particular body structure that is represented in SNOMED.



Methods

We generated suggested finding sites for concepts lacking them:



Results

Tag	Finding Concept	Body Structure	Concept Ancestor
breast	pT1: Tumor 2 cm or less in greatest dimension (breast) (finding)	Entire breast (body structure)	Breast TNM finding (finding)
oropharynx	pT1: Tumor 2 cm or less in greatest dimension (oropharynx) (finding)	Oropharyngeal structure (body structure)	Oropharynx TNM finding (finding)
thyroid	pT1: Tumor 2 cm or less in greatest dimension limited to the thyroid (thyroid) (finding)	Entire thyroid gland (body structure)	Thyroid TNM finding (finding)
kidney	pT1: Tumor 7 cm or less in greatest dimension, limited to the kidney (kidney) (finding)	Entire kidney (body structure)	Kidney TNM finding (finding)
nasopharynx	pT1: Tumor confined to the nasopharynx (nasopharynx) (finding)	Entire nasopharynx (body structure)	Nasopharynx TNM finding (finding)

After identifying body structure concepts for 369 of those 1038 tumor staging concepts lacking finding sites, the body structures were manually verified as coherent and plausible finding sites for the relevant concepts, and each tumor staging concept was paired with its nearest anatomically-specific TNM finding ancestor concept. The prevalence of anatomically-specific TNM finding concepts with *Is-a* descendants suggests a strategy to add finding sites for many of these concepts by associating the ancestor concepts with the relevant body structures -- relations that will apply also to their descendants after classification.

Our investigation reveals a gap that limits the usefulness of some tumor stage finding concepts for fully representing and reasoning about cancer staging and its relation to patients, their bodies, their health, etc. We've identified body structures for many of these concepts that could be used as their finding sites.

Acknowledgement

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