HemOnc: A New Standard Vocabulary for Chemotherapy Regimen Representation in the OMOP Common Data Model

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Disclosures

- Consulting: Westat
- Stock ownership: HemOnc.org LLC (no monetary value)
- Funding: NIH

Outline

- Motivation & overview of HemOnc.org
- Why another chemotherapy regimen ontology?
- The HemOnc regimen model
- OMOP CDM and extension
- Current status and near-term goals

Motivation & overview of HemOnc.org

Chemotherapeutics are given in complex combination regimens and protocols

Regimens are not well-represented in current systems, leading to an unmet need in data representation

The OHDSI Oncology Subgroup and HemOnc.org have been working together to create the first OMOP-compatible vocabulary of chemotherapy regimen concepts, to be made available in the ATHENA tool

Motivation

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9. HER2+ Breast cancer
10. B-ALL

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HemOnc.org - A Free Hematology/Oncology Reference

Regimens: 3,078		Regimen variants: 4,674	
Solid Tumors	Malignant Hematology	Cross-Disciplinary	Classical Hematology
Mobile Version	Editorial Board		Desktop Version
Disease index	Intervention index	Regimen index	General reference

If this is your first time visiting, please go to the tutorial page or just start exploring!

Links to all main disease pages

Solid Tumors			
Breast Oncology			
Breast cancer	Breast cancer, ER/PR-positive	Breast cancer, HER2-positive	Breast cancer, triple negative (TNBC)
Breast cancer, BRCA-mutated			

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Malignant Hematology			
Acute leukemias			
Acute myeloid leukemia (AML)	AML, FLT3-positive	AML, IDH-mutated	Acute promyelocytic leukemia (APL)
B-cell acute lymphoblastic leukemia (B-ALL)	B-ALL, Ph+	T-cell acute lymphoblastic leukemia (T-ALL)	Blastic plasmacytoid dendritic cell neoplasm
CNS leukemia			
Myeloproliferative neoplasms and myelodysplastic syndromes			
Chronic myelogenous leukemia (CML)	Chronic myelomonocytic leukemia (CMML)	Essential thrombocythemia (ET)	Hypereosinophilic syndrome (HES)
Myelodysplastic syndrome	Primary & secondary myelofibrosis	Polycythemia vera (PV)	Systemic mastocytosis
Aggressive lymphomas			
Burkitt lymphoma (BL) or Burkitt-like lymphoma	CNS lymphoma	Diffuse large B-cell lymphoma (DLBCL)	HIV-associated lymphoma
Hodgkin lymphoma (HL)	Mantle cell lymphoma (MCL)	Mediastinal gray-zone lymphoma (MGZL)	Primary mediastinal B-cell lymphoma (PMBL)
Transformed lymphoma (TL)			
Indolent lymphomas			
Chronic lymphocytic leukemia (CLL/SLL)	Follicular lymphoma (FL)	Hairy cell leukemia (HCL)	Hodgkin lymphoma, nodular lymphocyte-predominant (NLP-HL)
Marginal zone lymphoma (MZL)	Waldenström macroglobulinemia (WM/LPL)		
Plasma cell dyscrasias			

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Diffuse large B-cell lymphoma

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Section editor

J.C. Villasboas Bisneto, MD
Mayo Clinic
Rochester, MN

Share

Are you looking for a regimen, such as CHOP, but can't find it here? It is possible that we've moved it to the historical regimens page. If you still can't find it, please let us know so we can add it!

Contents [hide]

1 Guidelines
1.1 ESMO
1.2 NCCN
2 Untreated, pre-phase
2.1 Vincristine & Prednisone
3 Untreated, randomized data
3.1 ACVBP-R
3.2 DA-R-EPOC
3.3 R-CHOEP
3.4 R-CHOP

90 regimens on this page

141 variants on this page

R-CHOP

R-CHOP: **R**ituximab, **C**yclophosphamide, **H**ydroxydaunorubicin (Doxorubicin), **O**ncovin (Vincristine), **P**rednisone
R-CHOP-21: **R**ituximab, **C**yclophosphamide, **H**ydroxydaunorubicin (Doxorubicin), **O**ncovin (Vincristine), **P**rednisone given every **21** days
CHOP-R: **C**yclophosphamide, **H**ydroxydaunorubicin (Doxorubicin), **O**ncovin (Vincristine), **P**rednisone, **R**ituximab
RCHOP: **R**ituximab, **C**yclophosphamide, **H**ydroxydaunorubicin (Doxorubicin), **O**ncovin (Vincristine), **P**rednisone
CHOPR: **C**yclophosphamide, **H**ydroxydaunorubicin (Doxorubicin), **O**ncovin (Vincristine), **P**rednisone, **R**ituximab

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Example orders

- Example orders for R-CHOP in lymphoma

Note: most of the variation between regimen variants is in the dose or type of steroid.

Variant #1, prednisolone 40 mg/m^2

Study	Evidence	Comparator	Comparative Efficacy
Cunningham et al. 2013 (UK NCRI R-CHOP14v21)	Phase III (C)	R-CHOP-14	Seems not superior
Fridrik et al. 2016 (AGMT NHL-14)	Phase III (C)	R-COMP	Seems not superior

Note: Cunningham et al. 2013 states that the regimen is based on LNH 98-5, but notably it uses prednisolone instead of prednisone. AGMT NHL-14 states that R-CHOP was "given in standard doses" per LNH 98-5, but this regimen uses prednisone, whereas the title and text of Fridrik et al. 2016 implies that prednisolone was used. The authors have confirmed that prednisolone was used, due to prednisone not being available in Austria.

Chemotherapy

- Rituximab (Rituxan) 375 mg/m^2 IV once on day 1
- Cyclophosphamide (Cytoxan) 750 mg/m^2 IV once on day 1
- Doxorubicin (Adriamycin) 50 mg/m^2 IV once on day 1
- Vincristine (Oncovin) 1.4 mg/m^2 (maximum dose of 2 mg) IV once on day 1
- Prednisolone (Millipred) 40 mg/m^2 PO once per day on days 1 to 5

CNS prophylaxis

Variant #2, prednisone 40 mg/m^2

Study	Evidence	Comparator	Comparative Efficacy
Coiffier et al. 2002 (LNH 98-5)	Phase III (E)	CHOP	Superior OS
Delarue et al. 2013 (LNH03-6B)	Phase III (C)	R-CHOP-14	Seems not superior

Chemotherapy

- Rituximab (Rituxan) 375 mg/m^2 IV once on day 1
- Cyclophosphamide (Cytoxan) 750 mg/m^2 IV once on day 1
- Doxorubicin (Adriamycin) 50 mg/m^2 IV once on day 1
- Vincristine (Oncovin) 1.4 mg/m^2 (maximum dose of 2 mg) IV once on day 1
- Prednisone (Sterapred) 40 mg/m^2 PO once per day on days 1 to 5

CNS prophylaxis

As described in Delarue et al. 2013 (LNH03-6B):

- Methotrexate (MTX) 15 mg IT once every 21 days x 4 total doses

Supportive medications

- Filgrastim (Neupogen) used for later cycles if patients developed grade 4 neutropenia or febrile neutropenia

21-day cycle for 8 cycles

Variant #3, prednisone 60 mg/m^2

Study	Evidence	Comparator	Efficacy	Toxicity
Récher et al. 2011 (LNH03-2B)	Phase III (C)	ACVBP-R	Inferior OS	Decreased toxicity

Chemotherapy

- Rituximab (Rituxan) 375 mg/m^2 IV once on day 1
- Cyclophosphamide (Cytoxan) 750 mg/m^2 IV once on day 1

HemOnc.org – a growing resource

By the numbers

904 content pages

>465k lines of content

>43.8M characters of content

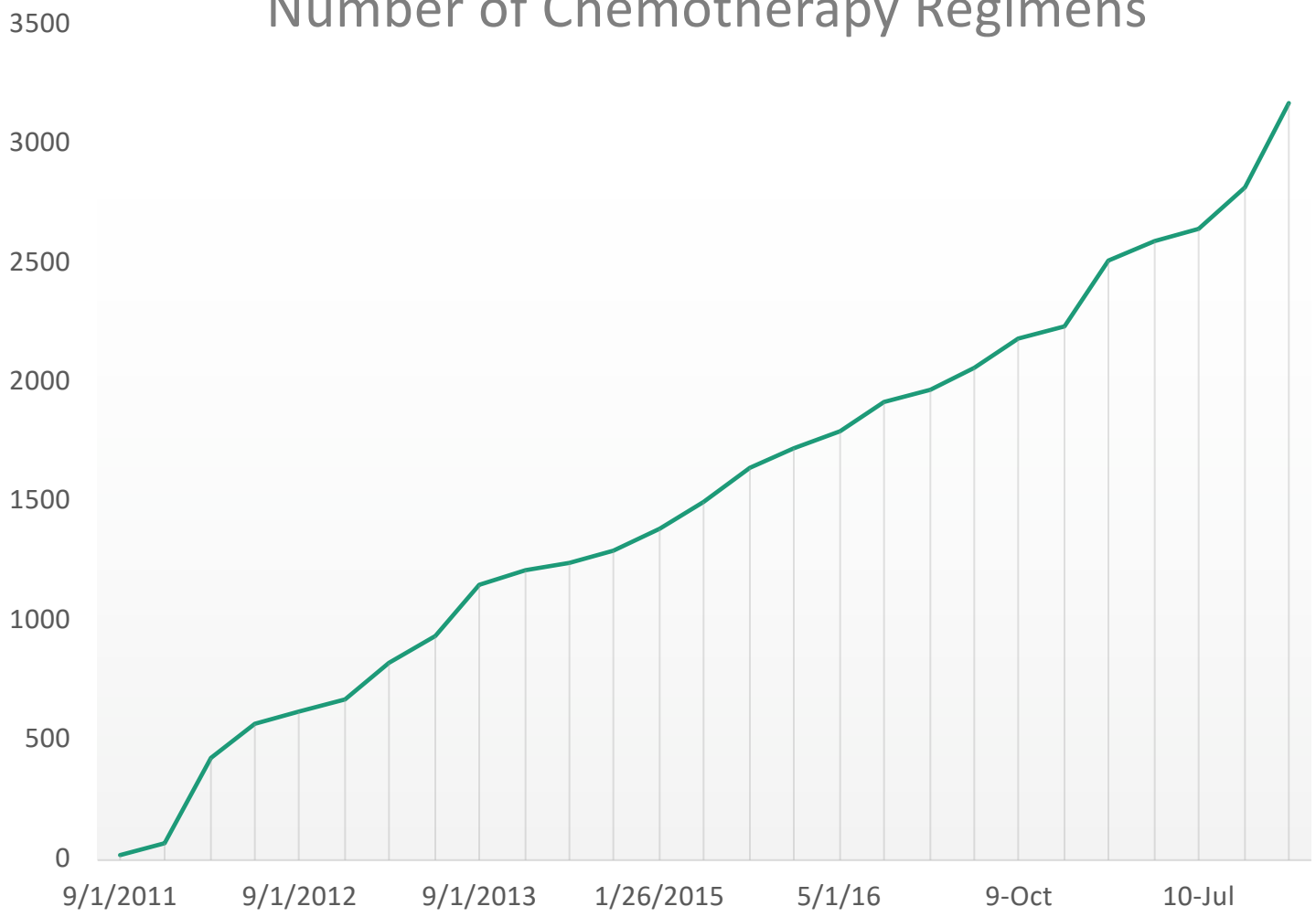
>5500 primary references

>3000 context-specific regimens

~1500 registered users

31 members of editorial board

2018 page views:
1,030,355



Semi-structured regimens

Variant #2, prednisone 40 mg/m^2

Study	Evidence	Comparator	Comparative Efficacy
Coiffier et al. 2002 (LNH 98-5)	Phase III (E)	CHOP	Superior OS
Delarue et al. 2013 (LNH03-6B)	Phase III (C)	R-CHOP-14	Seems not superior

Chemotherapy

- Rituximab (Rituxan) 375 mg/m^2 IV once on day 1
- Cyclophosphamide (Cytoxan) 750 mg/m^2 IV once on day 1
- Doxorubicin (Adriamycin) 50 mg/m^2 IV once on day 1
- Vincristine (Oncovin) 1.4 mg/m^2 (maximum dose of 2 mg) IV once on day 1
- Prednisone (Sterapred) 40 mg/m^2 PO once per day on days 1 to 5

CNS prophylaxis

As described in Delarue et al. 2013 (LNH03-6B):

- Methotrexate (MTX) 15 mg IT once every 21 days x 4 total doses

Supportive medications

- Filgrastim (Neupogen) used for later cycles if patients developed grade 4 neutropenia or febrile neutropenia

21-day cycle for 8 cycles

Variant #2, prednisone 40 mg/m^2

Study	Evidence	Comparator	Comparative Efficacy
Coiffier et al. 2002 (LNH 98-5)	Phase III (E)	CHOP	Superior OS
Delarue et al. 2013 (LNH03-6B)	Phase III (C)	R-CHOP-14	Seems not superior

Chemotherapy

- Rituximab (Rituxan) 375 mg/m^2 IV once on day 1
- Cyclophosphamide (Cytoxan) 750 mg/m^2 IV once on day 1
- Doxorubicin (Adriamycin) 50 mg/m^2 IV once on day 1
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CNS prophylaxis

As described in Delarue et al. 2013 (LNH03-6B):

- Methotrexate (MTX) 15 mg IT once every 21 days x 4 total doses

Supportive medications

- Filgrastim (Neupogen) used for later cycles if patients developed grade 4 neutropenia or febrile neutropenia

21-day cycle for 8 cycles

References

1. **LNH 98.5:** Coiffier B, Lepage E, Briere J, Herbrecht R, Tilly H, Bouabdallah R, Morel P, Van Den Neste E, Salles G, Gaulard P, Reyes F, Lederlin P, Gisselbrecht C. CHOP chemotherapy plus rituximab compared with CHOP alone in elderly patients with diffuse large-B-cell lymphoma. N Engl J Med. 2002 Jan 24;346(4):235-42. link to original article **contains verified protocol** PubMed
    1. **Update:** Feugier P, Van Hoof A, Sebban C, Solal-Celigny P, Bouabdallah R, Fermé C, Christian B, Lepage E, Tilly H, Morschhauser F, Gaulard P, Salles G, Bosly A, Gisselbrecht C, Reyes F, Coiffier B. Long-term results of the R-CHOP study in the treatment of elderly patients with diffuse large B-cell lymphoma: a study by the Groupe d'Etude des Lymphomes de l'Adulte. J Clin Oncol. 2005 Jun 20;23(18):4117-26. link to original article **contains protocol** PubMed
    2. **Update:** Coiffier B, Thieblemont C, Van Den Neste E, Lepeu G, Plantier I, Castaigne S, Lefort S

References

1. **LNH 98.5:** Coiffier B, Lepage E, Briere J, Herbrecht R, Tilly H, Bouabdallah R, Morel P, Van Den Neste E, Salles G, Gaulard P, Reyes F, Lederlin P, Gisselbrecht C. CHOP chemotherapy plus rituximab compared with CHOP alone in elderly patients with diffuse large-B-cell lymphoma. N Engl J Med. 2002 Jan 24;346(4):235-42. link to original article **contains verified protocol** PubMed
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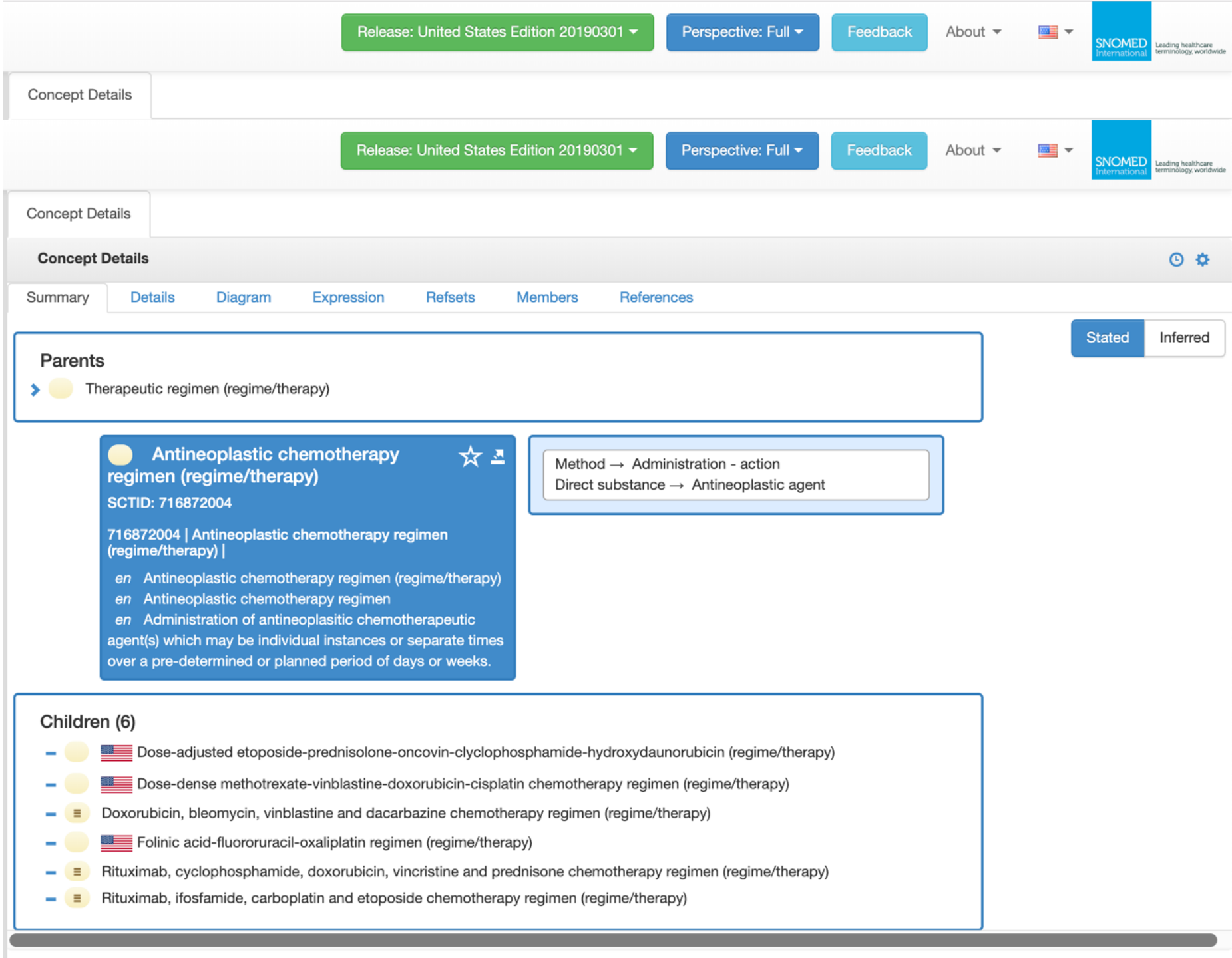
    2. **Update:** Coiffier B, Thieblemont C, Van Den Neste E, Lepeu G, Plantier I, Castaigne S, Lefort S

Why another chemotherapy regimen ontology?

SNOMED-CT

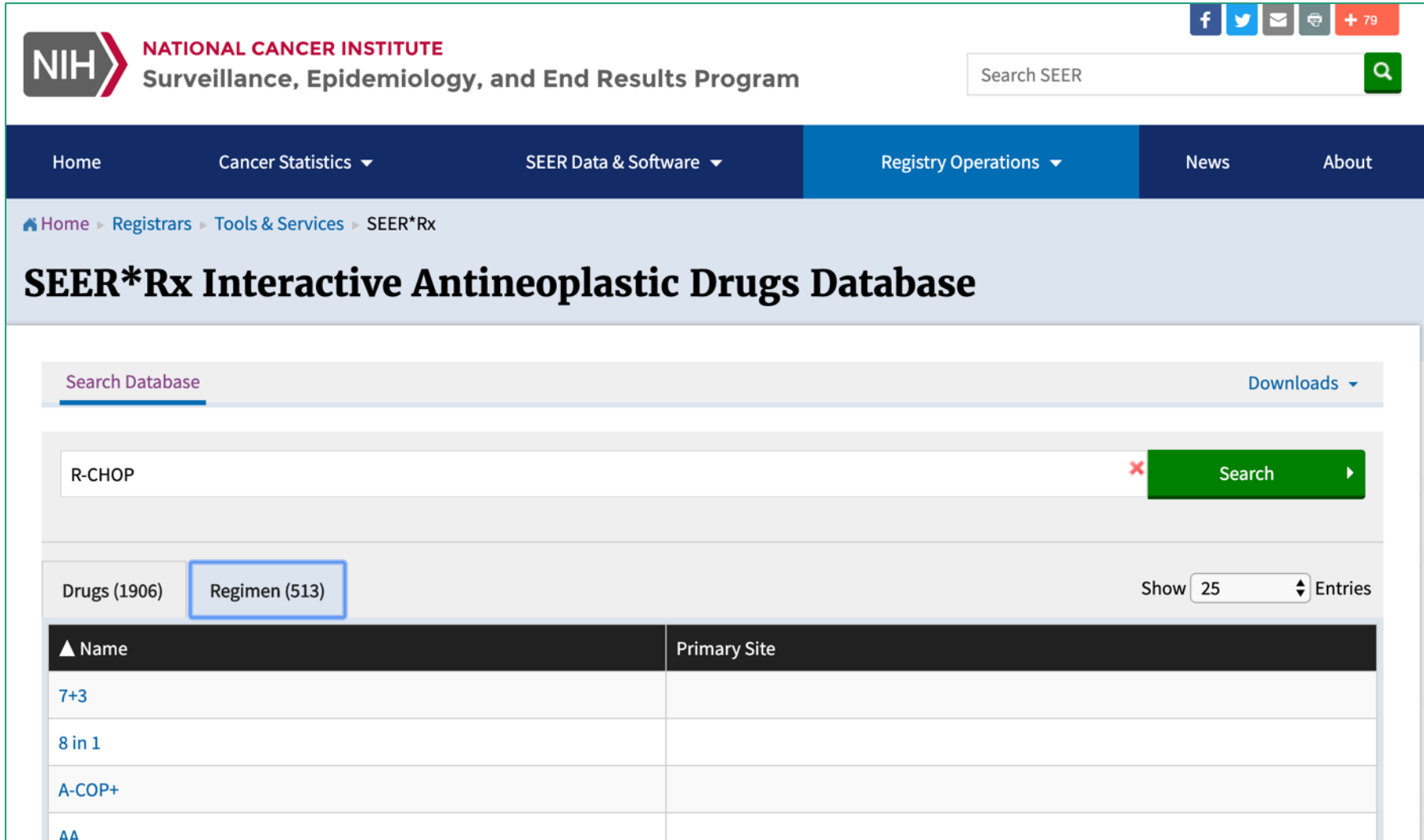
6 regimens



SEER*Rx

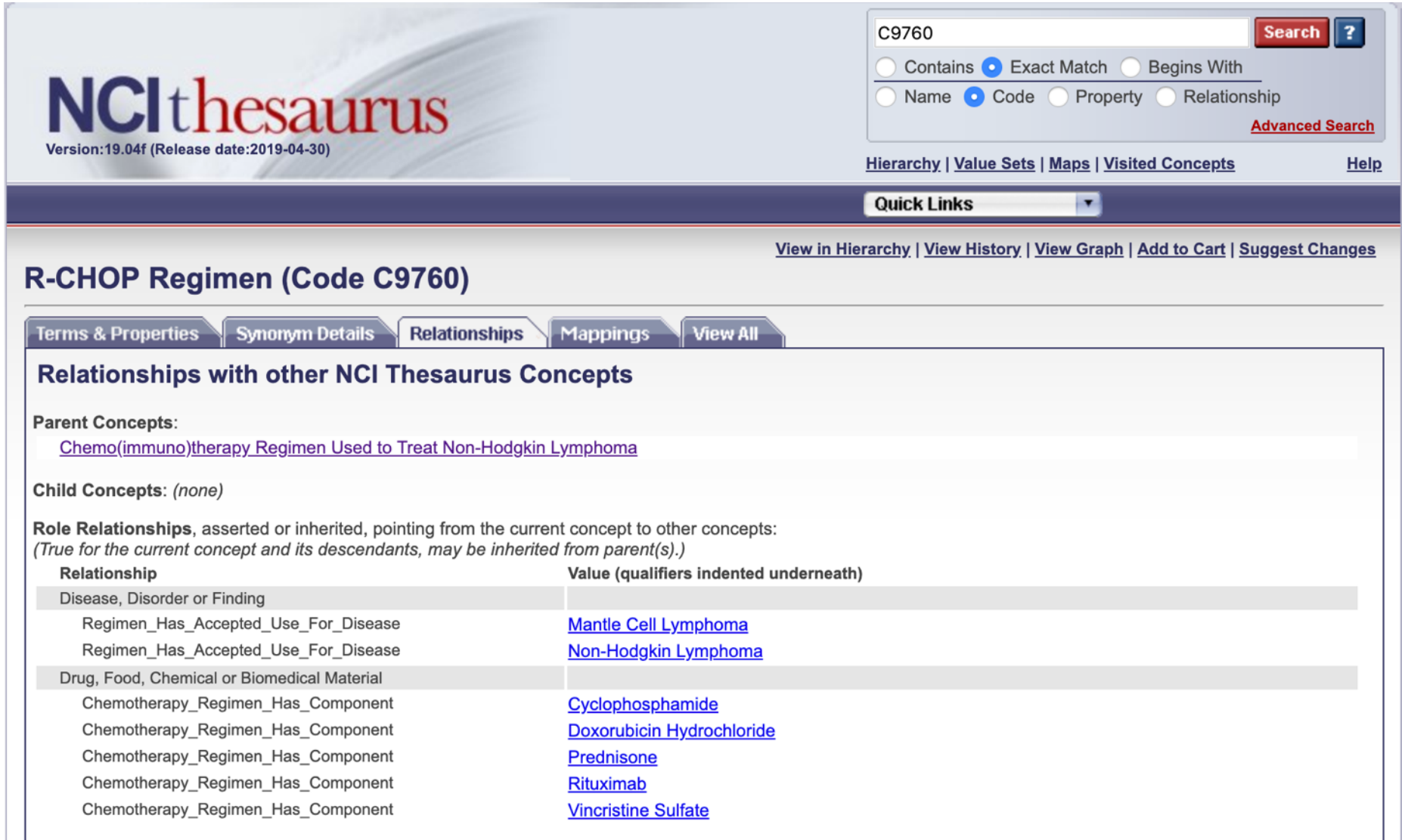
513 regimens, but:

- Many are outdated
- No concept codes



NCI Thesaurus

451 regimens



NCI thesaurus
Version:19.04f (Release date:2019-04-30)

C9760 Search ?
Contains Exact Match Begins With
Name Code Property Relationship
Advanced Search

Hierarchy | Value Sets | Maps | Visited Concepts Help

Quick Links

View in Hierarchy | View History | View Graph | Add to Cart | Suggest Changes

R-CHOP Regimen (Code C9760)

Terms & Properties | Synonym Details | Relationships | Mappings | View All

Relationships with other NCI Thesaurus Concepts

Parent Concepts:
Chemo(immuno)therapy Regimen Used to Treat Non-Hodgkin Lymphoma

Child Concepts: *(none)*

Role Relationships, asserted or inherited, pointing from the current concept to other concepts:
(True for the current concept and its descendants, may be inherited from parent(s).)

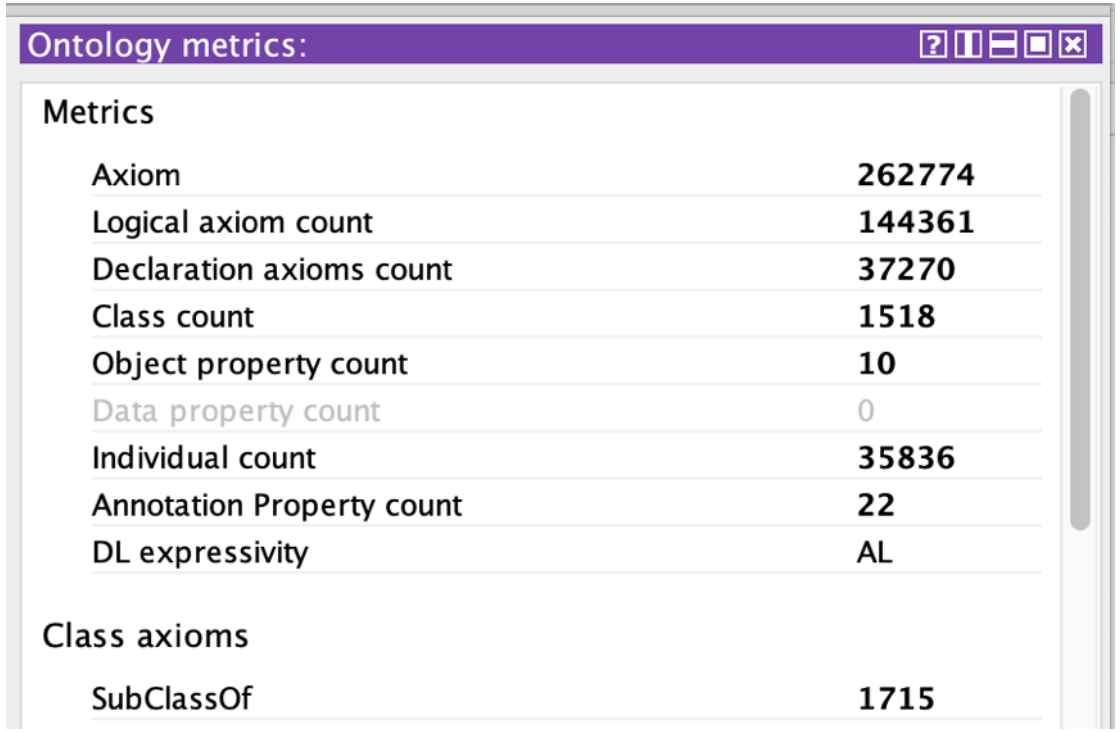
Relationship	Value (qualifiers indented underneath)
Disease, Disorder or Finding	
Regimen_Has_Accepted_Use_For_Disease	Mantle Cell Lymphoma
Regimen_Has_Accepted_Use_For_Disease	Non-Hodgkin Lymphoma
Drug, Food, Chemical or Biomedical Material	
Chemotherapy_Regimen_Has_Component	Cyclophosphamide
Chemotherapy_Regimen_Has_Component	Doxorubicin Hydrochloride
Chemotherapy_Regimen_Has_Component	Prednisone
Chemotherapy_Regimen_Has_Component	Rituximab
Chemotherapy_Regimen_Has_Component	Vincristine Sulfate

Comparison of the terminologies

Terminology	Maps to Drugs	Disease Context	Treatment Context	Link to Evidence	Number of regimens
SNOMED-CT	Yes*	No	No	No	6
SEER*Rx	Yes*	No	No	No	513
NCI Thesaurus	Yes*	Yes	No	No	451
HemOnc	Yes	Yes	Yes	Yes	1,550

*Antineoplastics; HemOnc also maps to supportive medications

The HemOnc OWL ontology[1-3]



version 2019-01-03 (dev)

Current licensees (by institution)

- Boston Children's Hospital
- Dana-Farber Cancer Institute
- EMBL-EBI
- Mayo Clinic
- NCI SEER
- Northwestern University
- Odysseus Data Services Inc
- OHDSI
- UAMS
- University of Illinois—Chicago College of Pharmacy
- University of Pennsylvania
- University of Pittsburgh
- UT Health Science Center
- Vanderbilt University Medical Center

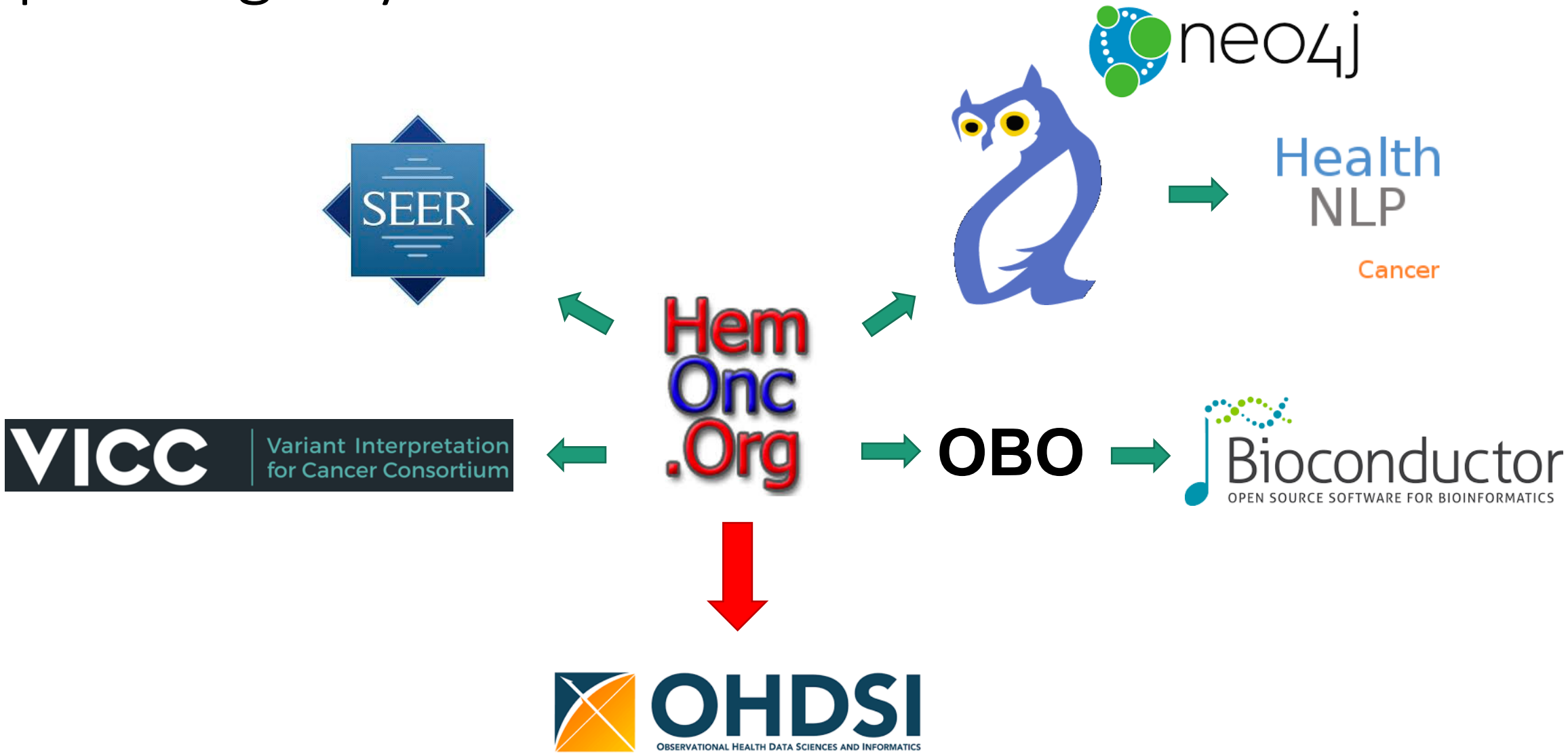
[1]Supported by U24 CA184407, U24 CA194215, and U01 CA231840. Previously supported by L30 CA171123

[2]See Malty et al. 2018 doi: 10.1200/CCI.17.00142

[3]Access and request license here: https://itcr.cancer.gov/informatics-tools

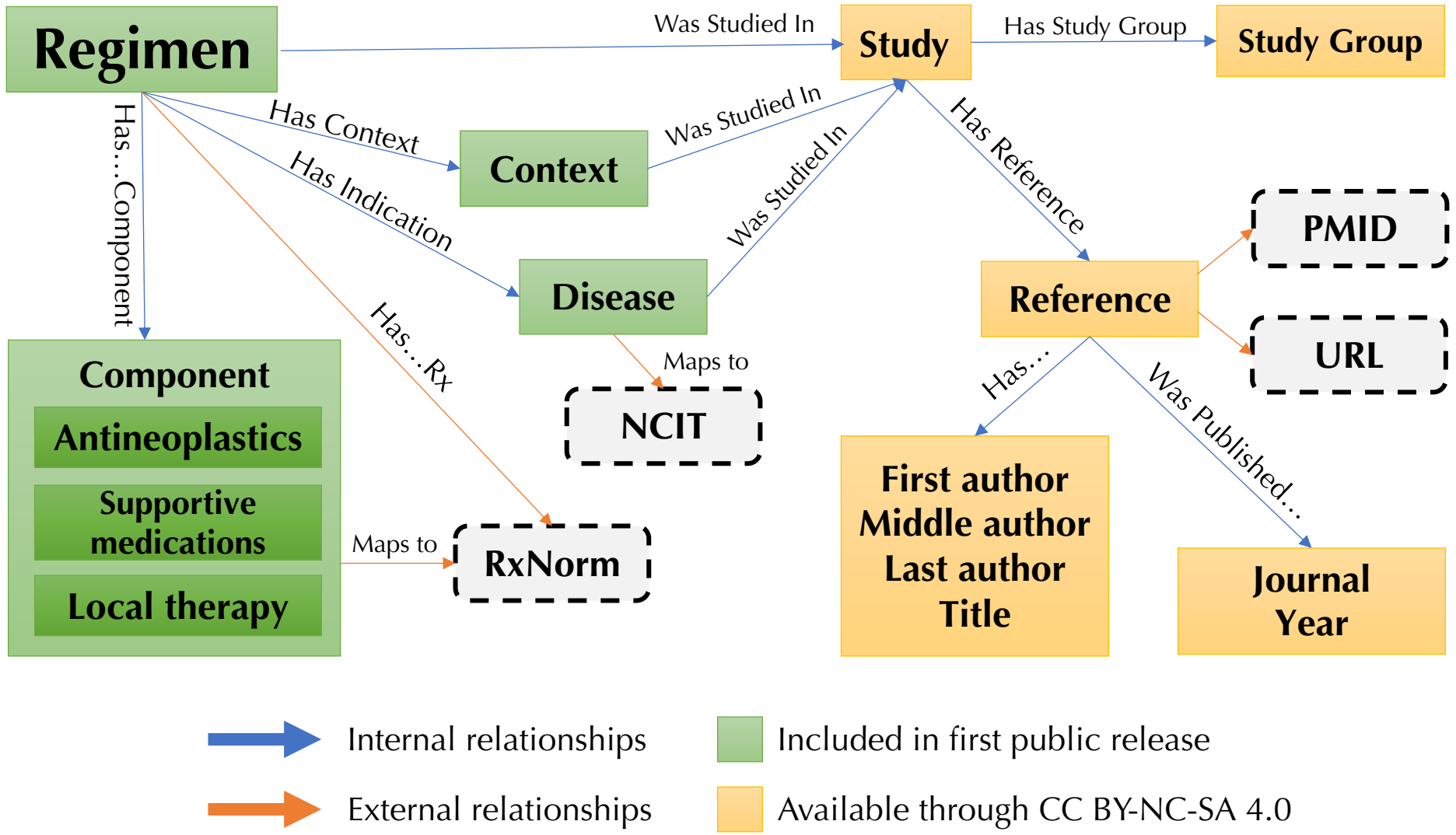
https://hemonc.org/wiki/Ontology

Expanding beyond OWL



The HemOnc regimen model

HemOnc Regimen Model*



*There are currently N=59 components in the regimen model

Regimen Component	Example
Disease context	Diffuse large B-cell lymphoma
Encoded disease context	
SNOMED-CT	SCTID: 413990004
OncoTree	DLBCLNOS
NCIT	C8851
Biomarker context	NRAS-mutated melanoma
Treatment context	Untreated; Adjuvant therapy; etc.

A. Disease, treatment, biomarker contexts

Regimen Component	Example
Preferred regimen name	R-CHOP
Regimen name expansion if acronym	Rituximab, Cyclophosphamide, Hydroxydaunorubicin, Oncovin, Prednisone
Regimen synonym(s)	CHOP-R; R-CHOP-21; etc.
Regimen coded concepts	
NCIT	C9760
Regimen type	Chemotherapy; Immunotherapy
Regimen schedule	21-day cycle
Regimen duration	8 cycles
If randomized – type	Control; Experimental
If experimental – type	Escalation; De-escalation; Substitution
Regimen variant #, if applicable	Variant #2
Regimen variant short description, if applicable	prednisolone 40 mg/m2

B. Regimen-level concepts

C. Component-level concepts

Regimen Component	Example
Component* preferred name	rituximab
Drug generic name(s)	rituximab
Drug brand name(s)	Ikgdar, Mabtas, MabThera, Reditux, Ristova, Rituxan, Rituxim, Transera-Kit
Drug synonym(s)	BI 695500, CT-P10, IDEC-102, IDEC-C2B8, PF-05280586, RTXM83
Drug approval status	FDA approved
If FDA approved, year of approval	1997
Encoded drug concepts	
RxNorm	RXCUI: 226754
ATC code etc.	
Drug sig (whole)	375 mg/m2 IV once over 30 minutes on day 1, given first
Drug dose	375
Drug units	mg/m2
Drug route	IV
Drug frequency	once
Drug infusion time	over 30 minutes
Drug sequencing	given first
Drug schedule	day 1
Drug special instructions	Maximum of 2 mg per cycle
Drug category	Antineoplastic chemotherapy; Supportive medications, etc.

*Mostly drugs, but other interventions are allowed (radiation, surgery)

Regimen Component	Example
Study unique identifier	AGMT NHL-14
Study short name	Fridrik et al. 2016
Study coded concept	NCT00991211
Study design	Phase III
Study collaborative	AGMT
Study start year	2007
Study end year	2010

D. Study-level concepts

Regimen Component	Example
Reference	AGMT NHL-14::00
Reference URL	https://www.ejcancer.com/article/S0959-8049(16)00088-5/fulltext
PubMed URL	https://www.ncbi.nlm.nih.gov/pubmed/26990931
PubMed Central URL	NONE
Reference meta-data	
Title	Cardiotoxicity with rituximab, cyclophosphamide, non-pegylated liposomal doxorubicin, vincristine and prednisolone compared to rituximab, cyclophosphamide, doxorubicin, vincristine, and prednisolone in frontline treatment of patients with diffuse large B-cell lymphoma: A randomised phase-III study from the Austrian Cancer Drug Therapy Working Group [Arbeitsgemeinschaft Medikamentöse Tumortherapie AGMT](NHL-14)
Journal	European Journal of Cancer
Journal impact factor	7.191
Year of publication	2016
Reference order	00 = first publication; 01 = second, and so on

E. Publication-level concepts

Regimen Component	Example
Author name	Fridrik_Michael A
Author metadata	
Author position	First author
Author institutional affiliation	Kepler University Hospital, Johannes Kepler University, Linz, Austria

F. Author-level concepts

Cardinality (in progress)

Regimen Attribute	Concept Class	Example
Preferred regimen name [1]	Regimen	R-CHOP
Regimen name expansion if acronym [0..n]		Rituximab, Cyclophosphamide, Hydroxydaunorubicin, Oncovin, Predniso(lo)ne
Regimen synonym(s) [0..n]	N/A	CHOP-R; R-CHOP-21; CHOP-R; RCHOP; CHOPR
Regimen coded concept(s), if available [0..n]		NCIT ID: C9760
Regimen type [1..n]	Regimen_type	Chemotherapy
Regimen schedule [1..2]		21-day cycle
Regimen duration [1..2]		6 cycles
If randomized – type [0..1]		Experimental
If experimental – type [0..1]		Escalation
Regimen variant #, if applicable [0..n]		Variant #5
Regimen variant short description, if applicable [0..n]		prednisone 100 mg, IV rituximab, flat-dose vincristine

OMOP CDM and extension

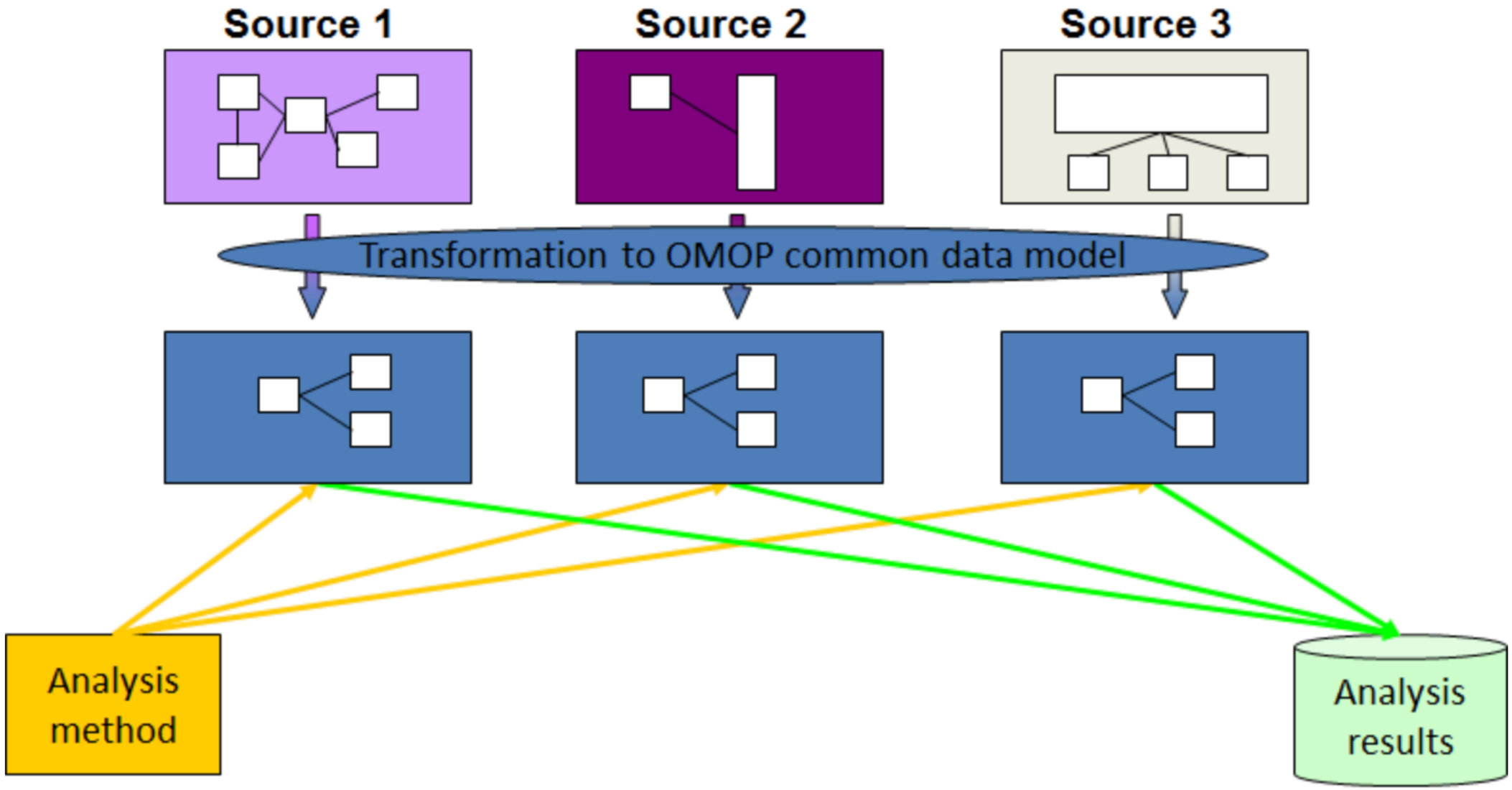
OHDSI

Observational Health Data Sciences and Informatics

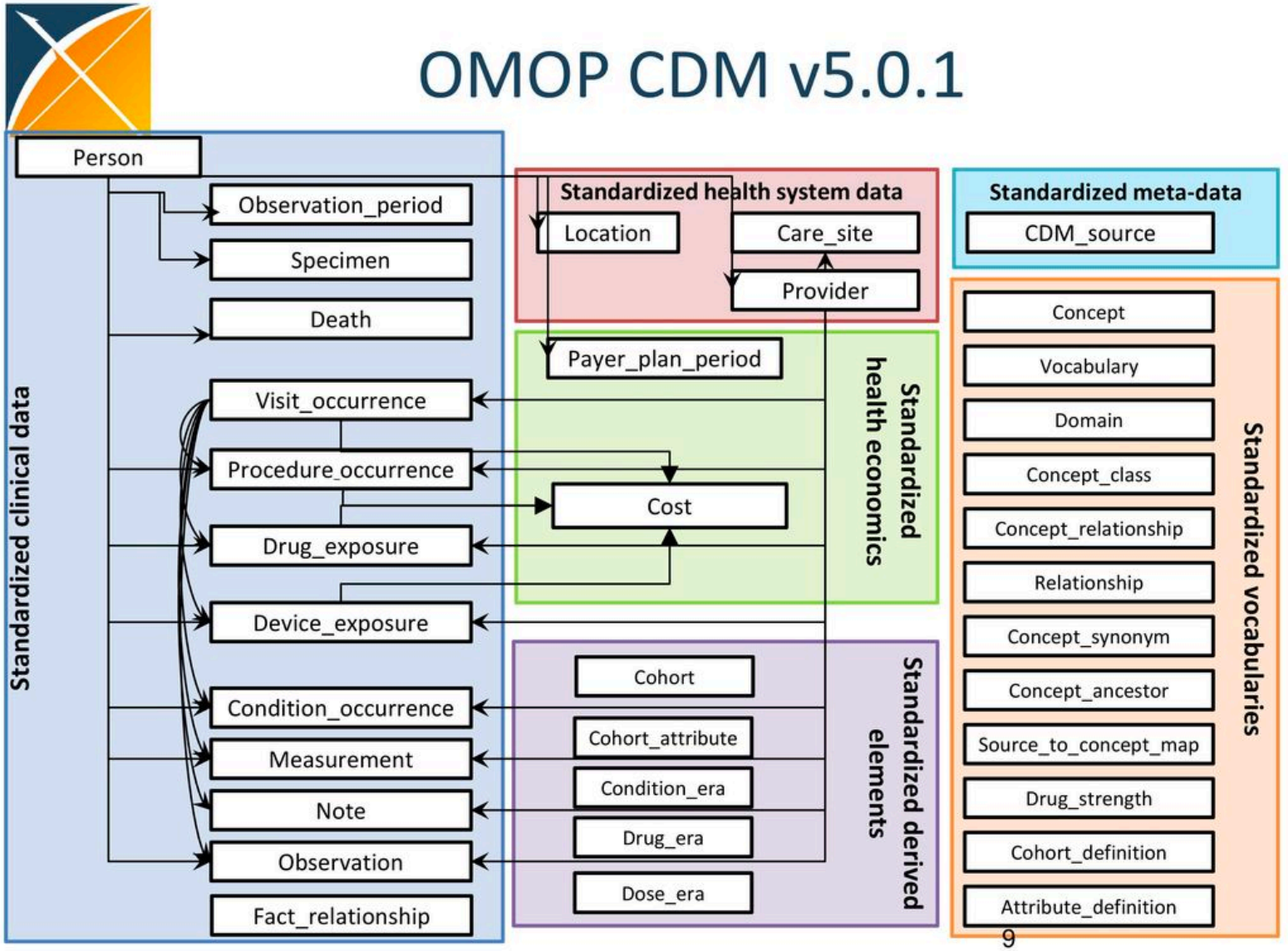
The Observational Health Data Sciences and Informatics (or OHDSI, pronounced "Odyssey") program is a multi-stakeholder, interdisciplinary collaborative to bring out the value of health data through large-scale analytics. All our solutions are open-source.

IMAGE: FINE ART IMAGES/HERITAGE IMAGES/GETTY IMAGE

OMOP Common Data Model

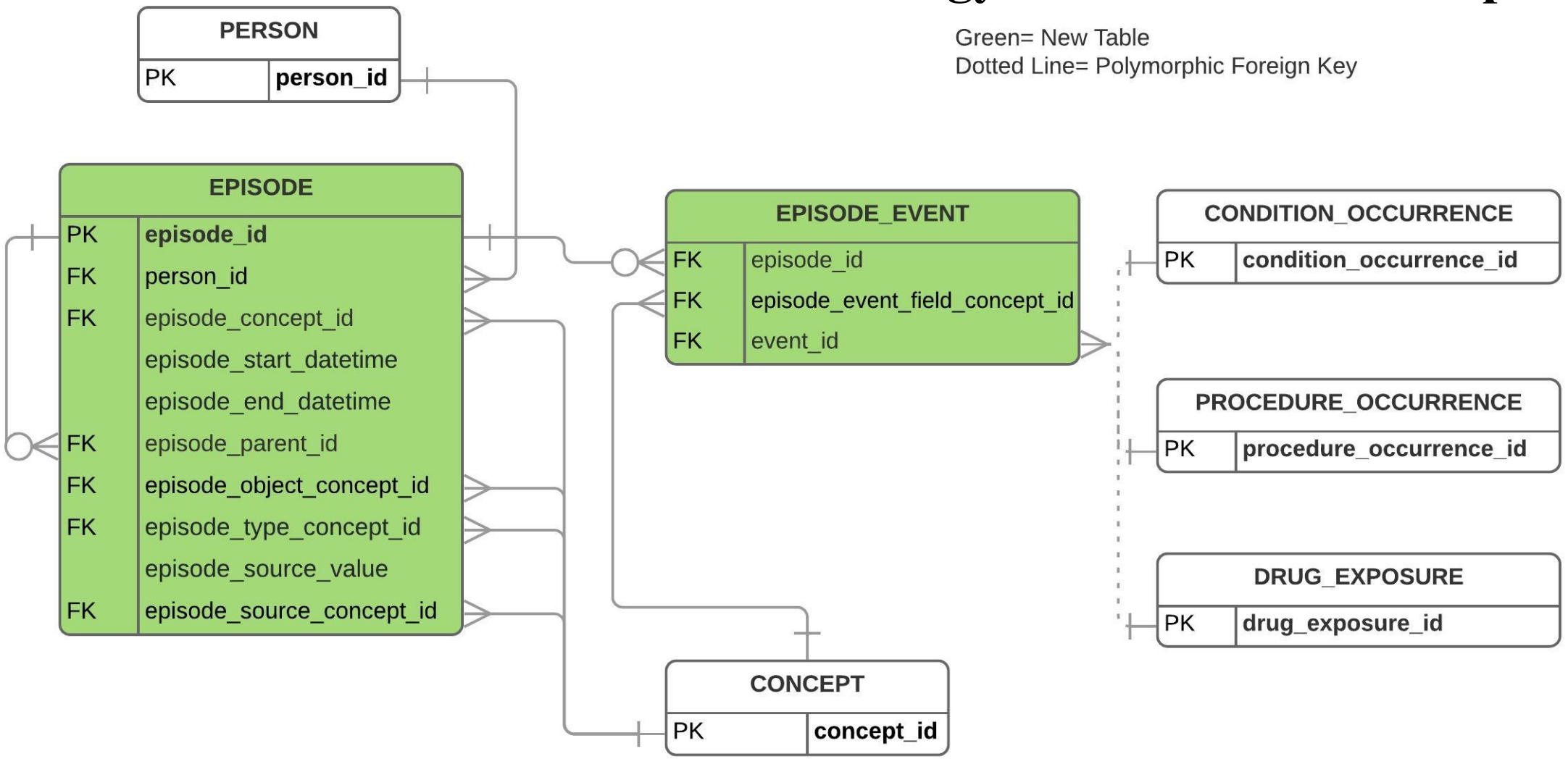


OMOP CDM v5.0.1



Oncology CDM Extension Proposal

Green= New Table
Dotted Line= Polymorphic Foreign Key



Current status and near-term goals

Classes (N = 22)

Concept class (Category)	Count	Concept class (Category)	Count
Author	29,163	Study Group	975
Reference	5,638	Sig Stub	864
ReferenceTitle	5,609	Component*	555
ReferenceURL	5,499	Component Class*	476
PubMedURL	5,545	Journal	186
Sig	3,995	Disease*	126
Study	4,887	Year*	82
Study_name_short	4,569	Disease Class*	50
Brand_name*	2,130	Context*	33
Regimen*	1,550	BioDisease*	23
Regimen Stub	1,474	Regimen_type*	15
		Total unique concepts	**73,444**

*These concepts are to be included in the first public release

Regimen Binary Relationships (N = 17)

Plain English Description	Concept 1 Class	Relationship Type	Concept 2 Class
Biomarker-specific regimen	Regimen	Has BioIndication	BioDisease
Antineoplastic interventions	Regimen	Has Antineoplastic	Component
Supportive interventions	Regimen	Has Supportive Med	Component
Immune suppressing interventions	Regimen	Has Immunosuppressor	Component
Local interventions, including CNS therapy	Regimen	Has Local Therapy	Component
Episode context of treatment	Regimen	Has Context	Context
Disease context of treatment	Regimen	Has Indication	Disease
Current Regimen	Regimen	Is Current In	Disease
Historical Regimen	Regimen	Is Historical In	Disease
Link to preceding treatment(s)	Regimen	Can Be Preceded By	Regimen
Link to subsequent treatment(s)	Regimen	Can Be Followed By	Regimen
Direct comparison within an RCT*	Regimen	Has Been Compared To	Regimen or Regimen Stub
Regimen type	Regimen	Has Regimen Type	Regimen_type
Antineoplastic interventions (RxNorm)	Regimen	Has Antineopl Rx	RxNorm Ingredient
Supportive interventions (RxNorm)	Regimen	Has Support Med Rx	RxNorm Ingredient
Immune suppressing interventions (RxNorm)	Regimen	Has Immunosuppr Rx	RxNorm Ingredient
Local interventions, including CNS therapy (RxNorm)	Regimen	Has Local Therap Rx	RxNorm Ingredient

*This relationship will not be included in the first public release

Non-Regimen Binary Relationships (N = 18)

Plain English Description	Concept 1 Class	Relationship Type	Concept 2 Class
Generic class hierarchy	(Multiple)	Is a	(Multiple)
Generic external mapping*	(Multiple)	Maps to	(Multiple)
Evidence to support use	(Multiple)	Was Studied In	Study
Biomarker-specific disease subtype*	BioDisease	Is Bio SubClass	Disease
Brand name(s)*	Component	Has Brand Name	Brand_Name
Drug prescription signetur	Component	Has Sig	Sig or Sig Stub
Year of FDA approval	Component	Was FDA Approved Yr	Year
Middle author	Reference	Has Middle Author	Author
First author	Reference	Has First Author	Author
Last author	Reference	Has Last Author	Author
Journal of publication	Reference	Was Published In	Journal
PubMed URL	Reference	Has PMID	PubMedURL
Reference title	Reference	Has Title	ReferenceTitle
Reference URL	Reference	Has URL	ReferenceURL
Year of Publication	Reference	Was Published Year	Year
Reference	Study	Has Reference	Reference
Study group	Study	Has Study Group	Study Group
Study's short name	Study	Has Study Short Name	Study_name_short

*These relationships are to be included in the first public release

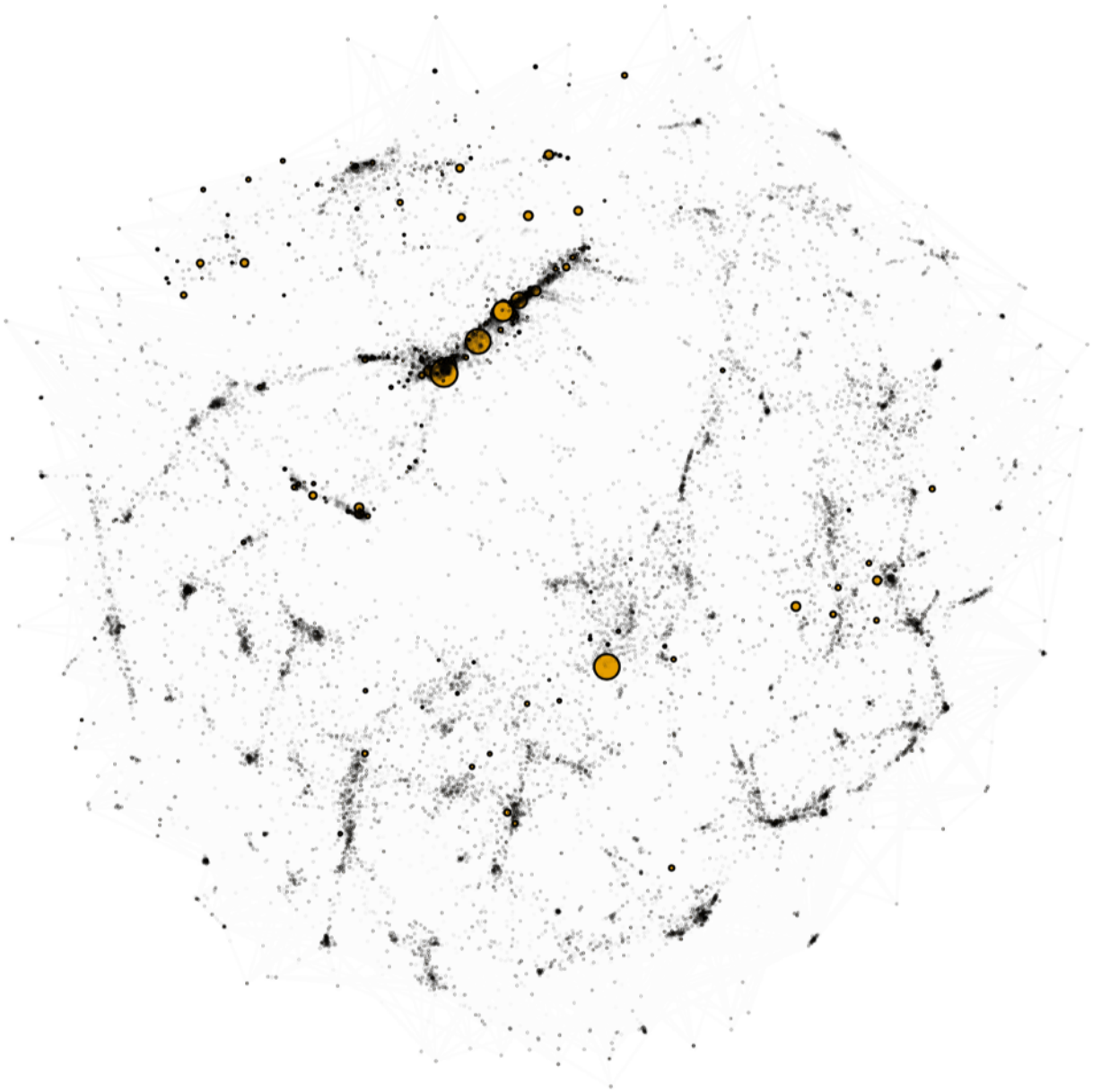
Example: CapeOx (N = 49* relationships)

Concept 1	Relationship Type	Concept 2	Vocab. 1	Vocab. 2
CapeOx	Has Regimen Type	Chemotherapy	HemOnc	HemOnc
CapeOx	Has Antineoplastic	Capecitabine	HemOnc	HemOnc
CapeOx	Has Antineoplastic	Oxaliplatin	HemOnc	HemOnc
CapeOx	Has Antineopl Rx	(RxCUI) 194000	HemOnc	RxNorm
CapeOx	Has Antineopl Rx	(RxCUI) 32592	HemOnc	RxNorm
CapeOx	Has Context	Adjuvant_therapy	HemOnc	HemOnc
CapeOx	Has Context	Non-curative_first-line_therapy	HemOnc	HemOnc
CapeOx	Has Context	Non-curative_second-line_therapy	HemOnc	HemOnc
CapeOx	Has Context	Non-curative_third-line_therapy	HemOnc	HemOnc
CapeOx	Has Context	Non-curative_therapy	HemOnc	HemOnc
CapeOx	Has Context	Neoadjuvant_therapy	HemOnc	HemOnc

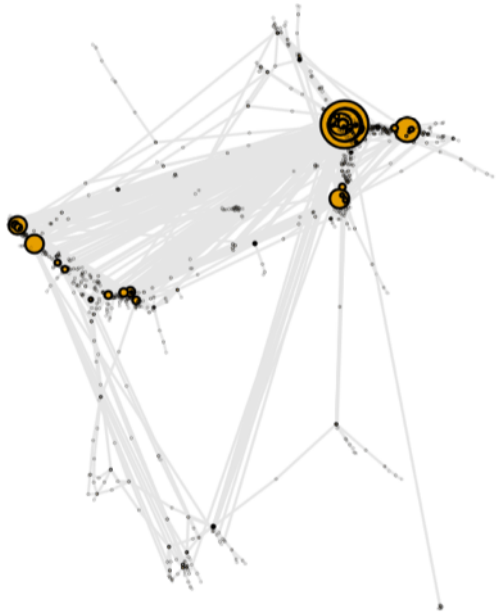
Concept 1	Relationship Type	Concept 2	Vocab. 1	Vocab. 2
CapeOx	Has Indication	Colon_cancer	HemOnc	HemOnc
CapeOx	Has Indication	Esophageal_cancer	HemOnc	HemOnc
CapeOx	Has Indication	Gastric_cancer	HemOnc	HemOnc
CapeOx	Has Indication	Hepatocellular_carcinoma	HemOnc	HemOnc
CapeOx	Has Indication	Pancreatic_cancer	HemOnc	HemOnc
CapeOx	Has Indication	Rectal_cancer	HemOnc	HemOnc
CapeOx	Is Current In	Colon_cancer	HemOnc	HemOnc
CapeOx	Is Current In	Esophageal_cancer	HemOnc	HemOnc
CapeOx	Is Current In	Gastric_cancer	HemOnc	HemOnc
CapeOx	Is Current In	Hepatocellular_carcinoma	HemOnc	HemOnc
CapeOx	Is Current In	Pancreatic_cancer	HemOnc	HemOnc
CapeOx	Is Current In	Rectal_cancer	HemOnc	HemOnc
CapeOx	Can Be Preceded By	Colon_cancer_surgery	HemOnc	HemOnc
CapeOx	Can Be Preceded By	CAPIRI	HemOnc	HemOnc
CapeOx	Can Be Preceded By	Irinotecan_monotherapy	HemOnc	HemOnc
CapeOx	Can Be Preceded By	Gastrectomy	HemOnc	HemOnc
CapeOx	Can Be Preceded By	Capecitabine_monotherapy	HemOnc	HemOnc
CapeOx	Can Be Preceded By	Capecitabine_and_RT	HemOnc	HemOnc

* Not shown are 20 studies that evaluated CapeOx alone or as part of an RCT

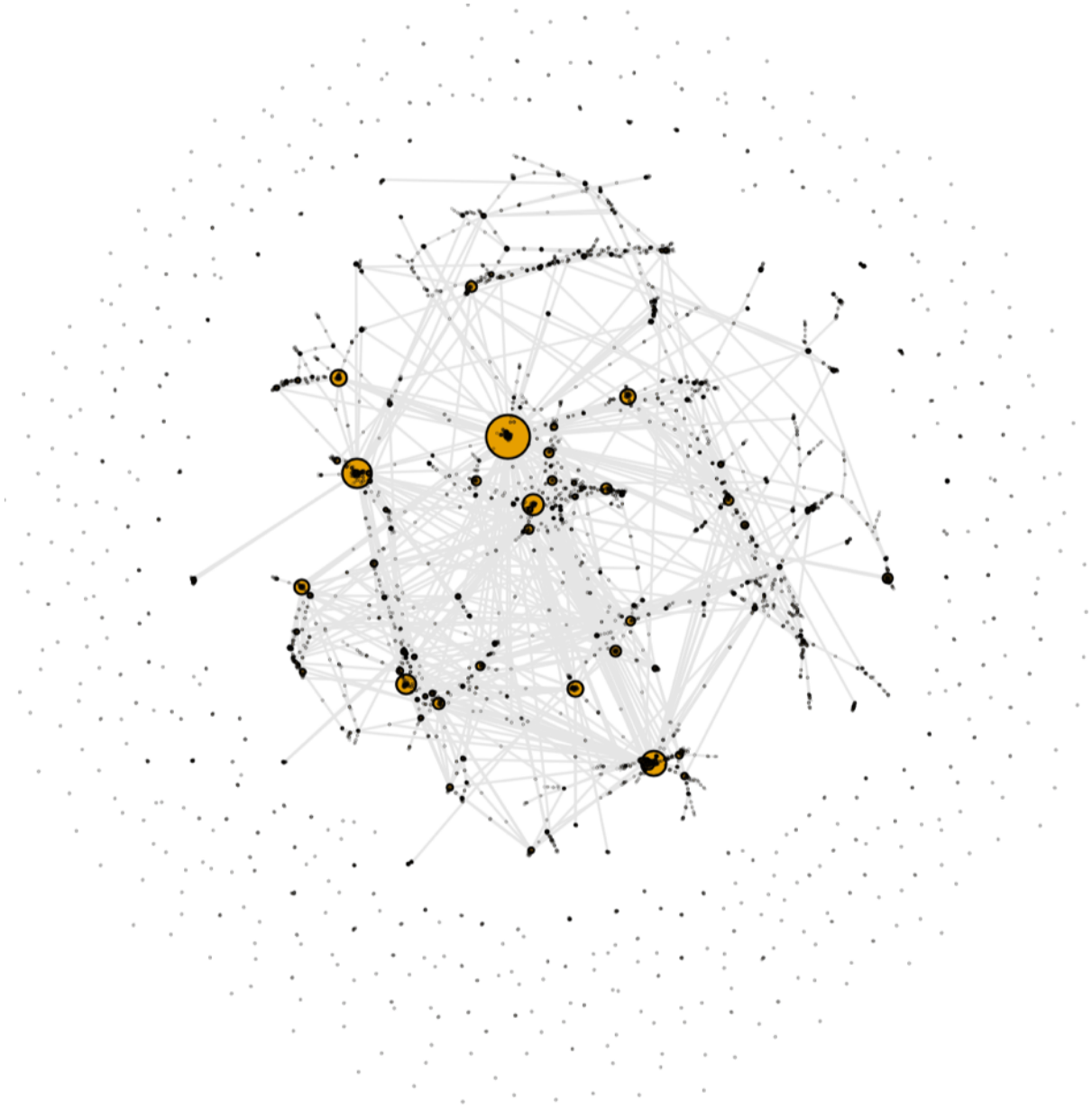
The Entire Network 74,000 nodes and 178,096 edges



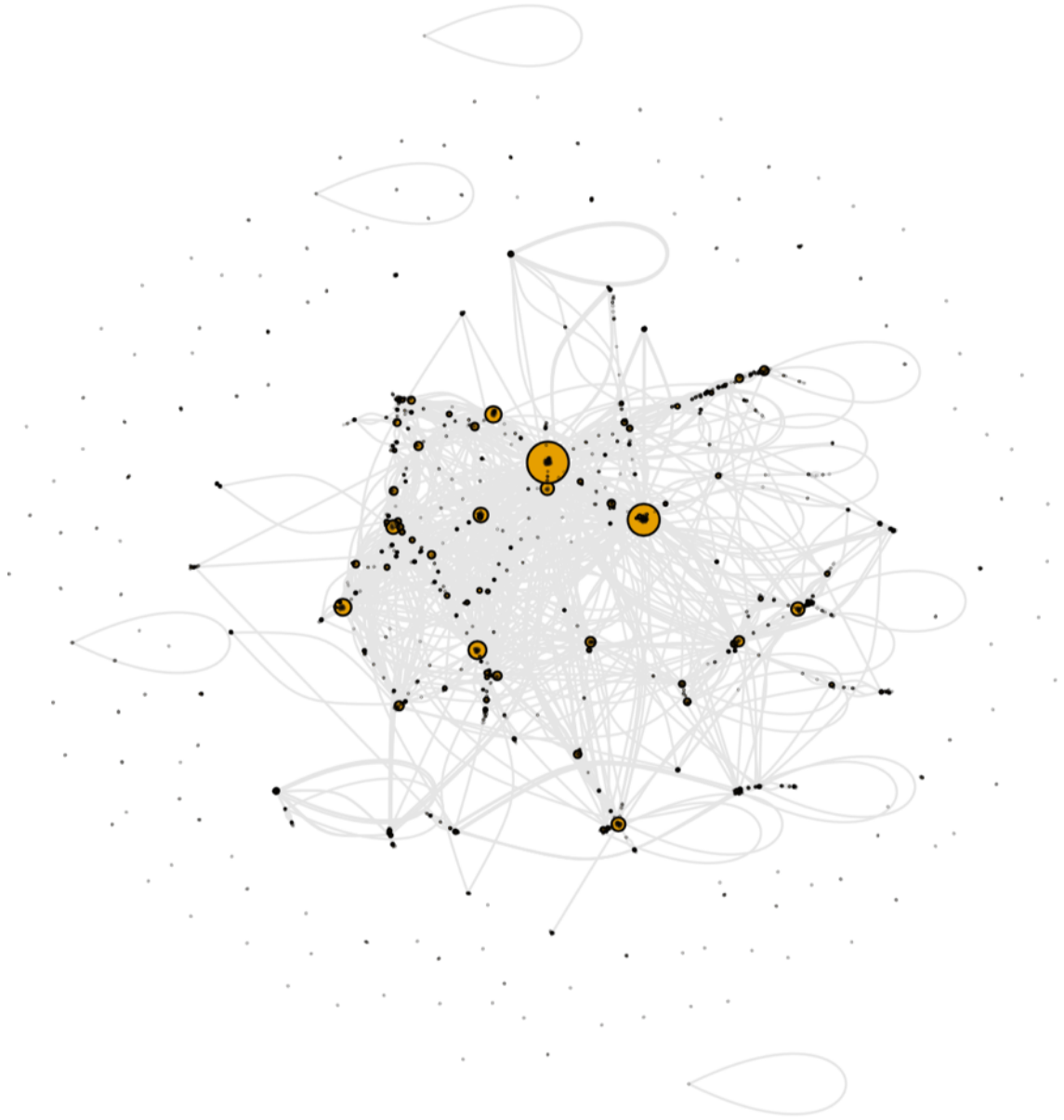
Antineoplastic Subgraph 1772 nodes and 4227 edges



Regimen “Was Studied In” Subgraph 6410 nodes and 7266 edges



“Has Been Compared To” Subgraph 2401 nodes and 4060 edges



Next step #1: Normalizing Drug Sigs

id	step	sig	doseNum	doseUnit	divided	doseCap	route	time	duration	frequency	days+misc	comment	corollary
39486	1/1	1.3 mg/m^2 (or previously tolerated dose) IV once per day on days 1_and_8	1.3	mg/m^2	NOS	NOS	IV	once per day	NOS	once per day	on day 1_and_8	(or previously tolerated dose)	NOS
39488	1/1	1.3 mg/m^2 IV bolus once on day 1	1.3	mg/m^2	NOS	NOS	IV	bolus once	NOS	once	on day 1	NOS	NOS
39489	1/1	1.3 mg/m^2 IV bolus once per day on days 1_4_15_22	1.3	mg/m^2	NOS	NOS	IV	bolus once per day	NOS	once per day	on day 1_4_15_22	NOS	NOS
39490	1/1	1.3 mg/m^2 IV bolus once per day on days 1_4_8_11	1.3	mg/m^2	NOS	NOS	IV	bolus once per day	NOS	once per day	on day 1_4_8_11	NOS	NOS
39491	1/1	1.3 mg/m^2 IV bolus once per day on days 1_4_8_11_22_25_29_32	1.3	mg/m^2	NOS	NOS	IV	bolus once per day	NOS	once per day	on day 1_4_8_11_22_25_29_32	NOS	NOS
39492	1/1	1.3 mg/m^2 IV bolus once per day on days 1_8_15_22	1.3	mg/m^2	NOS	NOS	IV	bolus once per day	NOS	once per day	on day 1_8_15_22	NOS	NOS
39493	1/1	1.3 mg/m^2 IV bolus once per day on days 1_8_22_29	1.3	mg/m^2	NOS	NOS	IV	bolus once per day	NOS	once per day	on day 1_8_22_29	NOS	NOS
39494	1/1	1.3 mg/m^2 IV once on day 1	1.3	mg/m^2	NOS	NOS	IV	once	NOS	once	on day 1	NOS	NOS
39495	1/1	1.3 mg/m^2 IV once per day on days 1_and_4	1.3	mg/m^2	NOS	NOS	IV	once per day	NOS	once per day	on day 1_and_4	NOS	NOS
39496	1/1	1.3 mg/m^2 IV once per day on days 1_and_4, given first on day 1	1.3	mg/m^2	NOS	NOS	IV	once per day	NOS	once per day	on day 1_and_4, given first	NOS	given first
39497	1/1	1.3 mg/m^2 IV once per day on days 1_4_8_11	1.3	mg/m^2	NOS	NOS	IV	once per day	NOS	once per day	on day 1_4_8_11	NOS	NOS
39498	1/1	1.3 mg/m^2 IV once per day on days 1_4_8_11, given first	1.3	mg/m^2	NOS	NOS	IV	once per day	NOS	once per day	on day 1_4_8_11, given first	NOS	given first
39499	1/1	1.3 mg/m^2 IV once per day on days 1_4_8_11_22_25_29_32	1.3	mg/m^2	NOS	NOS	IV	once per day	NOS	once per day	on day 1_4_8_11_22_25_29_32	NOS	NOS
39500	1/1	1.3 mg/m^2 IV once per day on days 1_8_15	1.3	mg/m^2	NOS	NOS	IV	once per day	NOS	once per day	on day 1_8_15	NOS	NOS
39501	1/1	1.3 mg/m^2 IV once per day on days 1_8_15_22	1.3	mg/m^2	NOS	NOS	IV	once per day	NOS	once per day	on day 1_8_15_22	NOS	NOS
39502	1/1	1.3 mg/m^2 IV once per day on days 1_8_22_29	1.3	mg/m^2	NOS	NOS	IV	once per day	NOS	once per day	on day 1_8_22_29	NOS	NOS
39503	1/1	1.3 mg/m^2 IV once per week for two weeks	1.3	mg/m^2	NOS	NOS	IV	once per week for two weeks	NOS	once per week	NOS	NOS	NOS
39508	1/1	1.3 mg/m^2 IV over 3_to_5 seconds once per day on days 1_4_8_11	1.3	mg/m^2	NOS	NOS	IV	over 3_to_5 seconds once per day	over 3_to_5 second	once per day	on day 1_4_8_11	NOS	NOS
45123	1/1	1.3 mg/m^2 (maximum dose of 2 mg) IV once per day on days 1_and_15	1.3	mg/m^2	NOS	of 2 mg	IV	once per day	NOS	once per day	on day 1_and_15	(maximum dose of 2 mg)	NOS
40468	1/1	1.3_to_1.8 mg/m^2 IV once on day 3	1.3_to_1.8	mg/m^2	NOS	NOS	IV	once	NOS	once	on day 3	NOS	NOS

Next step #2: Protocols

GeparQuinto

Arm 1A - Control (HER2-negative)

- EC x 4, then Docetaxel x 4, then surgery

Arm 1B - Control (HER2-positive)

- ECH x 4, then TH (Taxotere) x 4, then surgery

Arm 2A - Experimental (HER2-negative)

- EC & Bevacizumab x 4, then Docetaxel & Bevacizumab x 4, then surgery

Arm 2B - Experimental (HER2-positive)

- ECL x 4, then TL (Taxotere) x 4, then surgery

Preceding treatment

- GeparSepto: nab-Paclitaxel x 4 versus weekly Paclitaxel x 12
- Neo-tAnGo (taxanes-EC arm): ddT x 4 versus ddTG x 4

Chemotherapy

- Epirubicin (Ellence) 90 mg/m^2 IV once on day 1
- Cyclophosphamide (Cytoxan) 600 mg/m^2 IV once on day 1

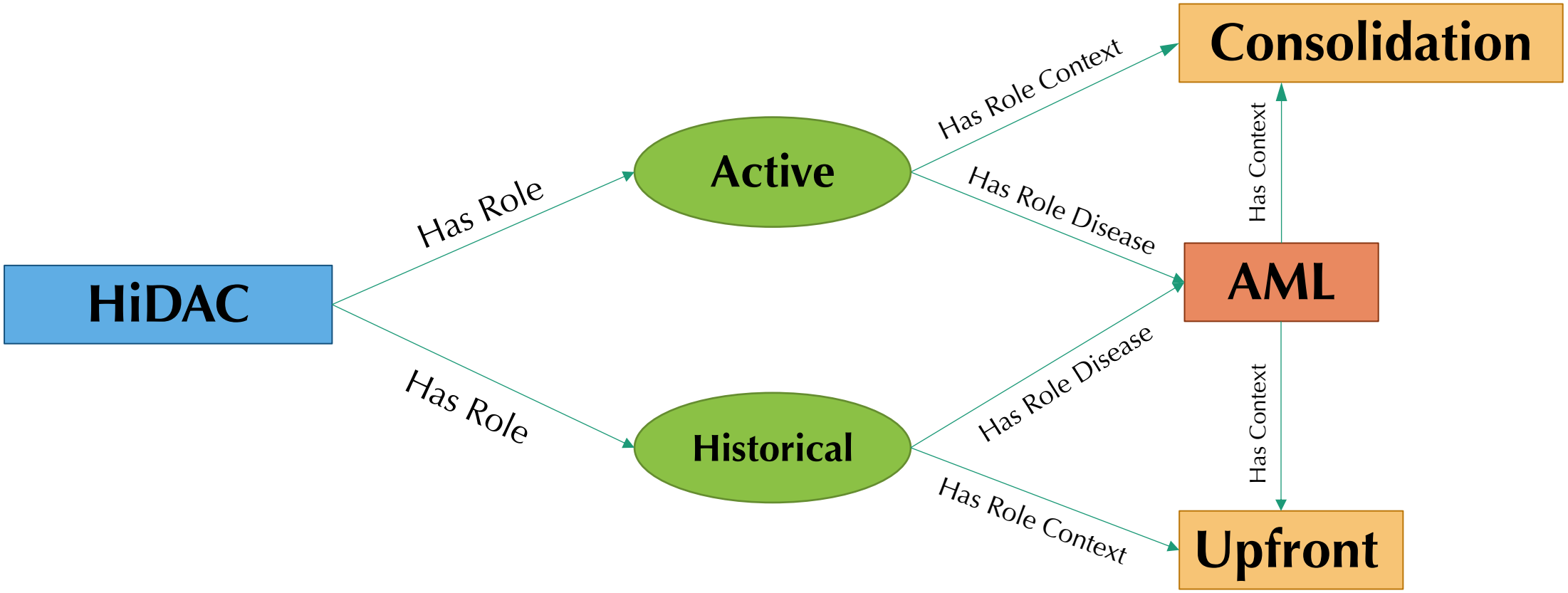
21-day cycle for 4 cycles

Subsequent treatment

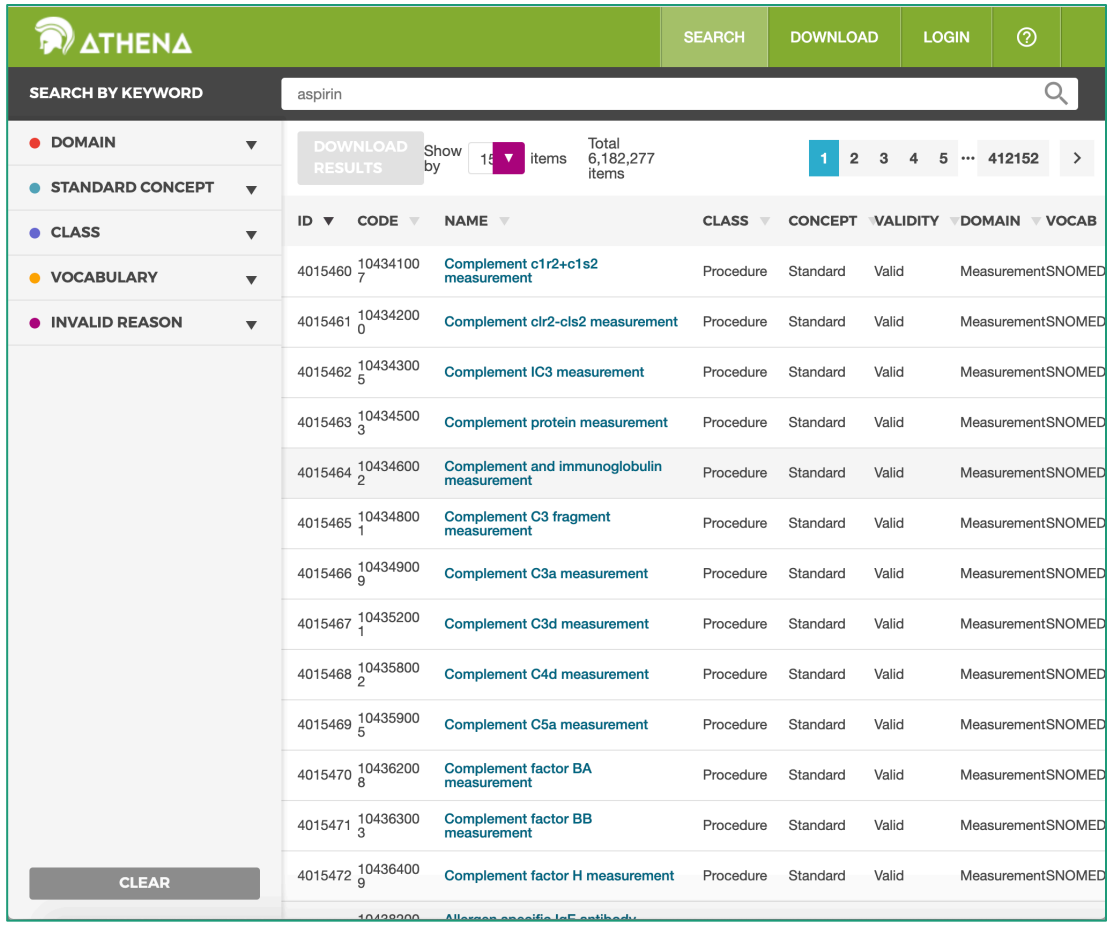
- GeparQuattro: T (Taxotere) x 4 versus T-X versus TX, then surgery
- GeparQuinto: Docetaxel, then surgery
- Neo-tAnGo (EC-taxane arms): ddT x 4 versus ddTG x 4, then surgery
- GeparSepto: Surgery

Next step #3: Modeling complex roles in the ontology

1. HiDAC is a historical regimen in the upfront treatment of AML
2. HiDAC is an active regimen in the consolidation treatment of AML



Availability



Coming soon!

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Appendix