



Paris Conference for an International Childhood Cancer Data Partnership Newcap Event Center (Paris, France), November 7-8, 2023



Pediatric Cancer Data Commons

Samuel Volchenboum, MD, PhD
University of Chicago
7-November-2023







We build communities, platforms, and ecosystems that maximize the potential of data to drive discovery and improve human health.









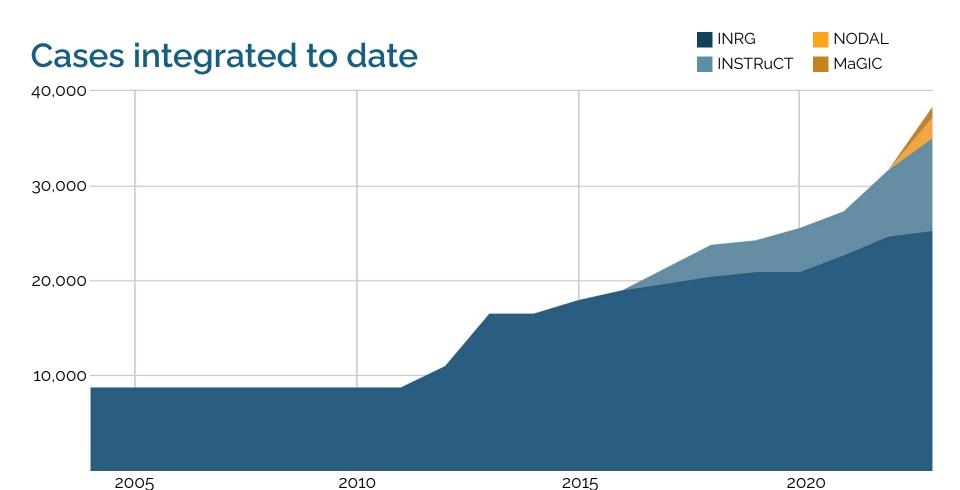
Pediatric Cancer Data Commons (PCDC)

- 1. Provides a hub for researchers across most pediatric cancers
- Facilitates cross-disease research
- 3. Develops common core data dictionaries
- 4. Creates common governance structures
- 5. Builds on an active international network of researchers
- 6. Educates, trains, and increases data literacy of the community
- 7. Sources data from clinical trials, registries, and (soon) EHRs













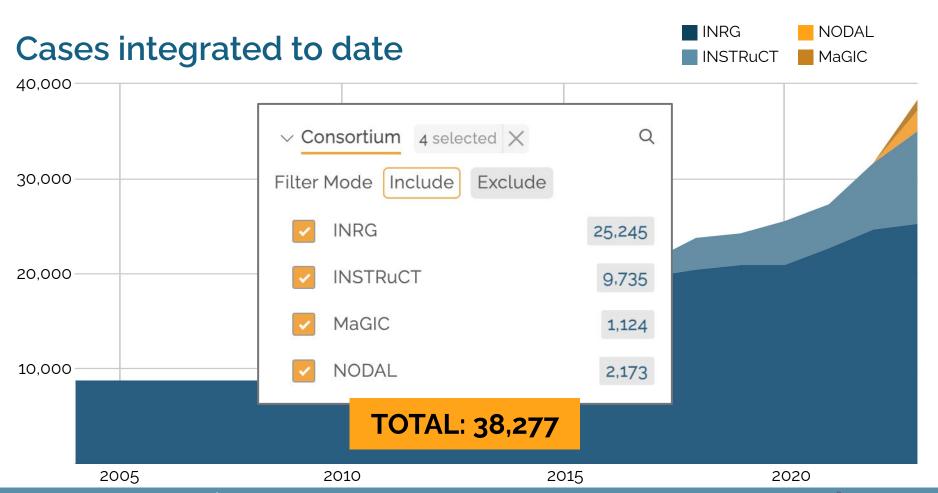


























Building a data commons—the D4CG way

Step 1: Establish a consortium



- PCDC Master Data Dictionary
- Acute Lymphoblastic Leukemia (ALL)
- Acute Myeloid Leukemia (AML)
- Central Nervous System Tumors (CNS)
- Ewing Sarcoma (EWS)
- Germ Cell Tumors (GCT)
- Hodgkin Lymphoma (HL)
- Neuroblastoma (NBL)
- Non-Rhabdomyosarcoma Soft Tissue Sarcoma (NRST
- Osteosarcoma (OS)
- Predisposition
- Retinoblastoma (RB)
- Rhabdomyosarcoma (RMS)



Step 2: Develop and deploy data operations



Step 3: Establish and implement governance



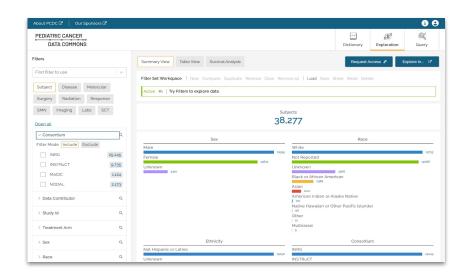








Building a data commons—the D4CG way





Step 4: Develop and deploy the **technical infrastructure**

Step 5: Socialize and sustain the commons





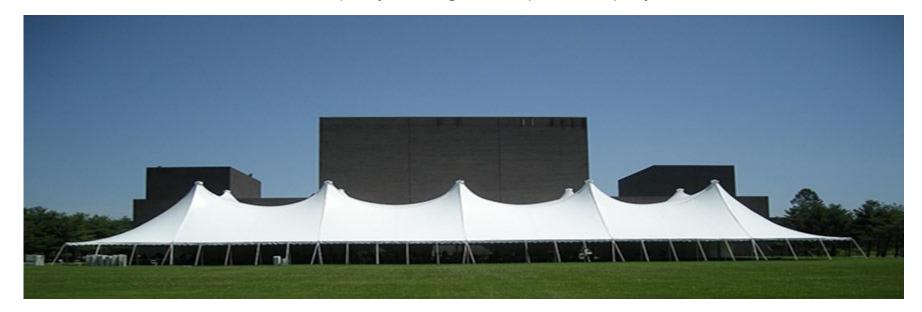






Engage stakeholders

We employ a "big tent" philosophy.





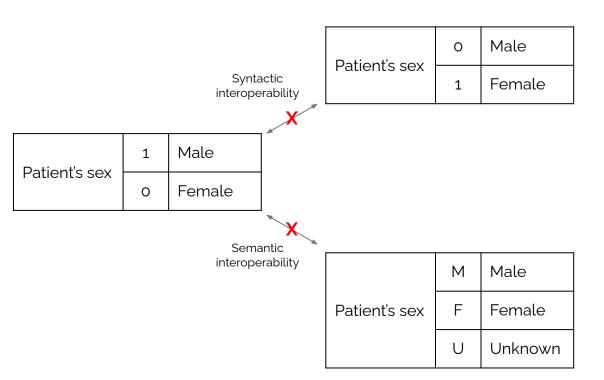








The importance of data standards



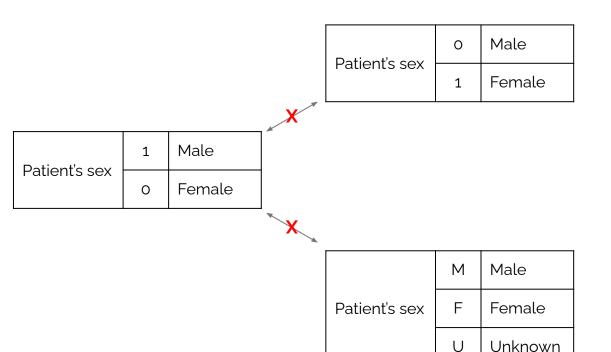








The importance of data standards



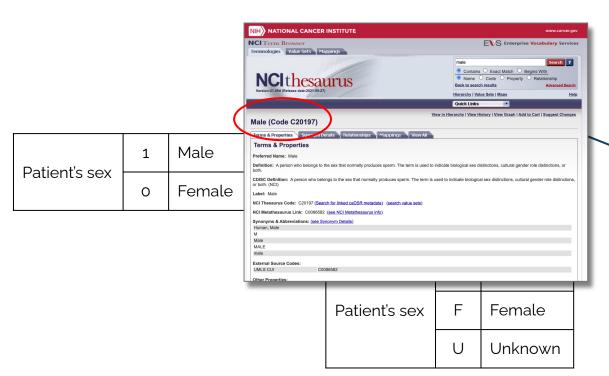
Sex				
Description	NCIt Code			
Male	<u>C20197</u>			
Female	<u>C16576</u>			
Unknown	<u>C17998</u>			







The importance of data standards



Sex				
Description	NCIt Code			
Male	<u>C20197</u>			
Female	<u>C16576</u>			
Unknown	<u>C17998</u>			









Building a consensus data dictionary

AGE_OFF	Number	Age in Days When Off Protocol Therapy or Study	C172678	Age of subject (in days) who		
DISEASE_PHASE	Code	Disease Phase	C168878	The stage or period of an ir	Initial Diagnosis	C:
					Relapse	C
DISEASE_PHASE_NUMBER	Number	Disease Phase Number	C173258	The number of the disease		
COURSE	Code	Protocol Treatment Course	C168807	The type of protocol treatm	Prephase	<u>C</u> 1
				* 5%× C	Induction	<u>C1</u>
					Intensification	<u>C</u> 1
					Consolidation	C
					Stem Cell Transplant Conditioning	<u>C</u> 1
					Maintenance	C
					Palliative Treatment	C:
					Other	<u>C</u> 1
COURSE_NUMBER	Number	Course Number	C166235	The number assigned to a		
OFF_TYPE	Code	Off Protocol Therapy or Study	C173256	The code used to designate	Protocol Therapy	<u>C</u> 1
					Study	Ca
REASON_OFF	Code Off Protocol Therapy or Study Rea	Off Protocol Therapy or Study Reason	C173519	The reason a subject went	Death	C
		30-0-007 400			Lost to Follow-Up	C
					Completion of Planned Therapy	<u>C1</u>
					Physician Decision	C
					Withdrawal of Consent	C
					Subject/Guardian Refused Further Treatment	<u>C1</u>
					Disease Progression	<u>C:</u>
					Relapse	C
					Adverse Event	C
					Secondary Malignancy	C
					Other	<u>C</u> 1
					Unknown	<u>C1</u>
	I				Not Reported	C

http://sam.am/datadictionaries

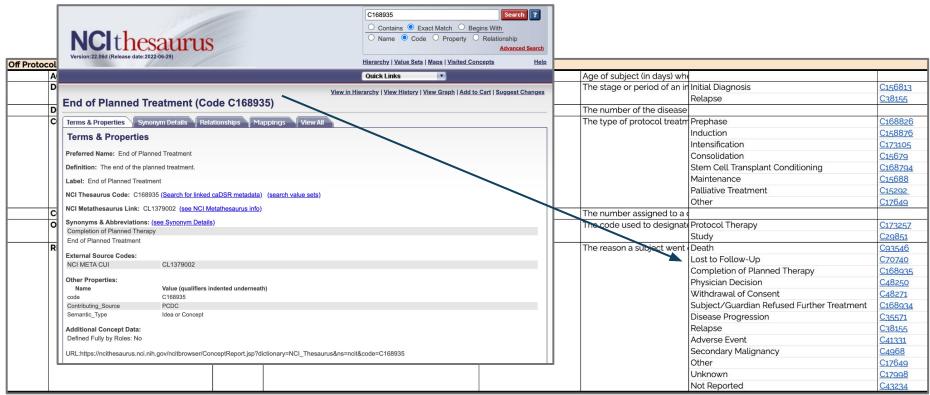








Building a consensus data dictionary



http://sam.am/datadictionaries









Data collection is highly localized

☐ Male ☐ Female ☐ Unknown English	□ 男 □ 女性 □ わからない Japanese
ذكر أنثى مجهول Arabic	☐ Homme ☐ Femelle ☐ Inconnue French
Männlich	□男性
□Weiblich	│□ 女性
□Unbekannt	│□未知
German	Chinese









CDE mapping solves the localization problem

☐ Male ☐ Female ☐ Unknown English	□ 男 □ 女性 □ わからない Japanese		NIH) NATIONAL CANCER INSTITUTE NCI Term Browser Terminologies Value Sets Mappings NCI thesaurus Version:22.08e (Release date:2022-08-26)	Enterprise Vocabulary Services Contains Exact Match Begins With Name Code Property Relationship Back to search results Advanced Search Hierarchy Value Sets Maps Outch Links Maps Outch
ذكر أنثى مجهول Arabic	☐ Homme ☐ Femelle ☐ Inconnue French	C20197 C16576 C17998	Male (Code C20197) Terms & Properties Synonym Details Relationships Mappings Vi Terms & Properties Preferred Name: Male Definition: A person who belongs to the sex that normally produces sperm. The term both. CDISC Definition: A person who belongs to the sex that normally produces sperm. The or both. (NCI) Label: Male	View in Hierarchy View History View Graph Add to Cart Suggest Changes
☐ Männlich ☐ Weiblich ☐ Unbekannt German	□ 男性 □ 女性 □ 未知		Laber: Male NCI Thesaurus Code: C20197 (<u>Search for linked caDSR metadata</u>) (<u>search value s</u> NCI Metathesaurus Link: C0086582 (<u>see NCI Metathesaurus info</u>) Synonyms & Abbreviations: (<u>see Synonym Details</u>) Human, Male M male Male MALE	sets)











PCDC data dictionaries

- PCDC Master Data Dictionary
- Acute Lymphoblastic Leukemia (ALL)
- Acute Myeloid Leukemia (AML)
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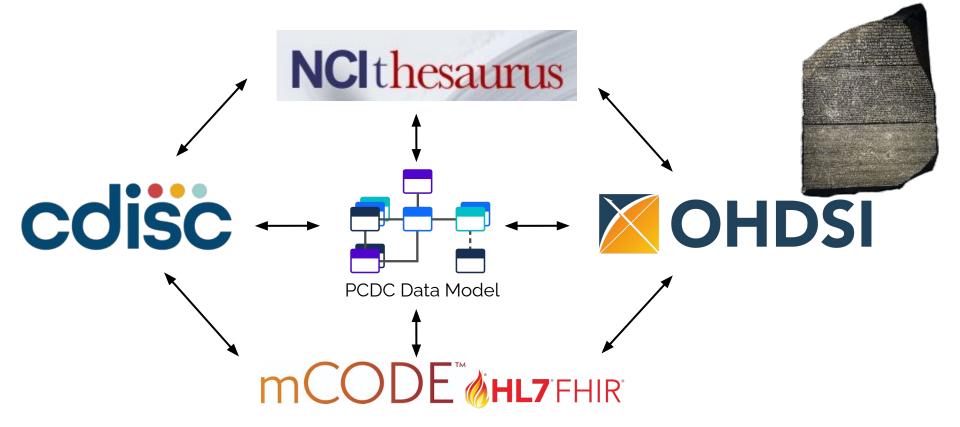








Data dictionary interoperability







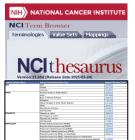


Getting data into the PCDC





Tier 1 - Required
Tier 2 - Prioritize Inclusion
Tier 3 - Don't Prioritize Inclusion





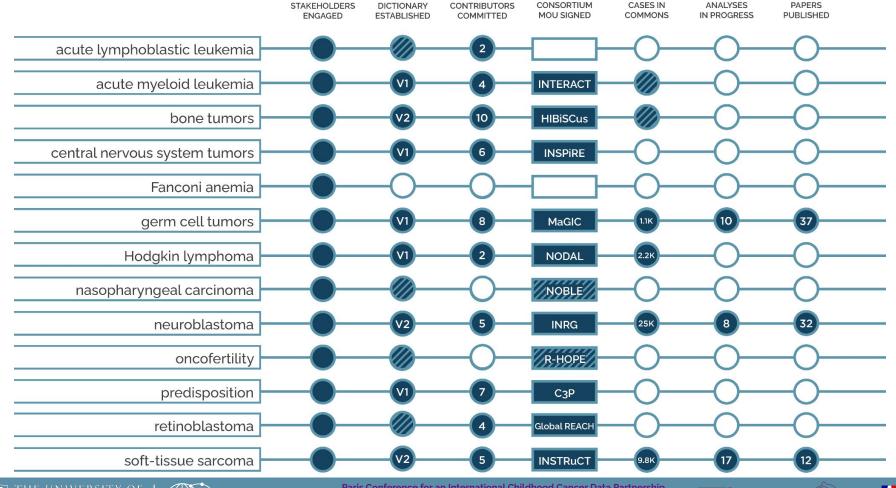












DATA

DATA





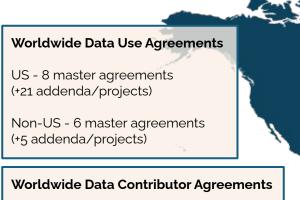








PCDC worldwide participation



(+18 addenda)

US - 7 master agreements

Non-US - 13 master agreements (+12 addenda)















New cancer-related consortia

post transplant lymphoproliferative disease

acute lymphocytic leukemia

acute myeloid leukemia

INTERACT

bone tumors (OS and FWS)

HIBiSCus

Fanconi anemia

central nervous system tumors

INSPIRE

germ cell tumors

MaGIC

Hodakin lymphoma

NODAL

neuroblastoma

INRG

nasopharyngeal carcinoma

NOBLE

oncofertility

Reproductive **HOPE**

Langerhans cell histiocytosis

cancer predisposition

C₃P

retinoblastoma

Global REACH

soft-tissue sarcoma

INSTRuCT

myelodysplastic syndrome

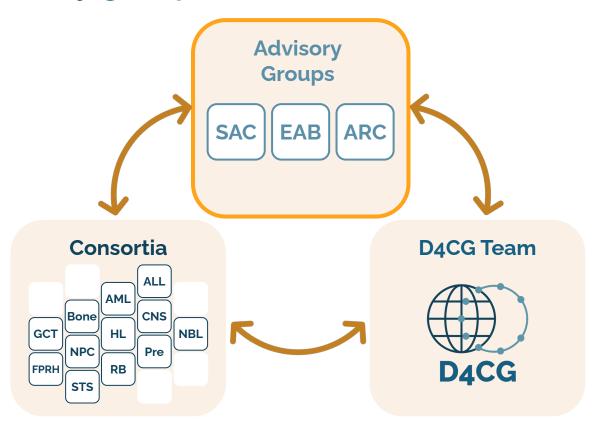








PCDC advisory groups structure



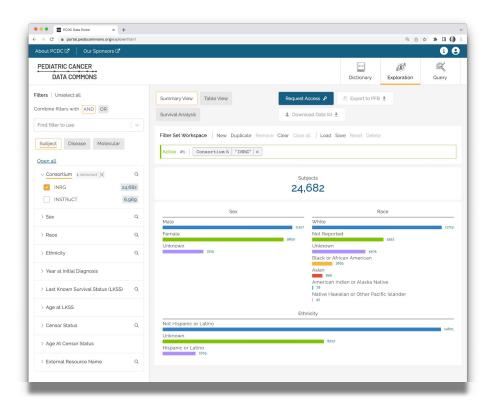








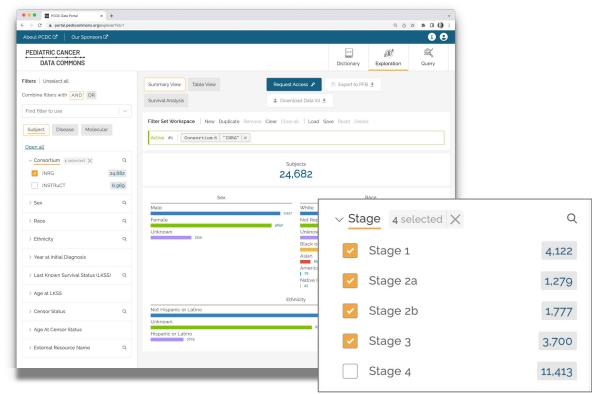










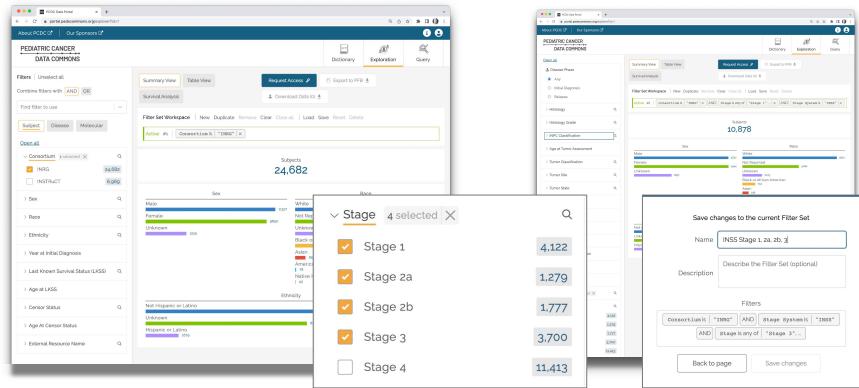










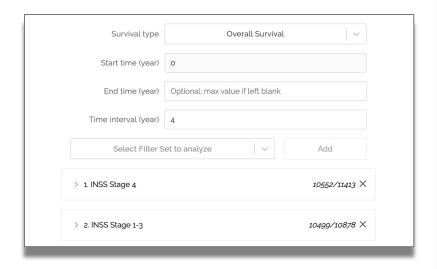


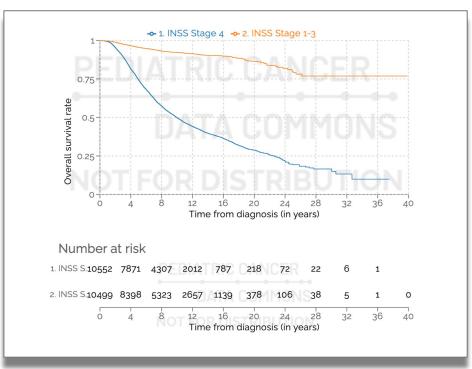














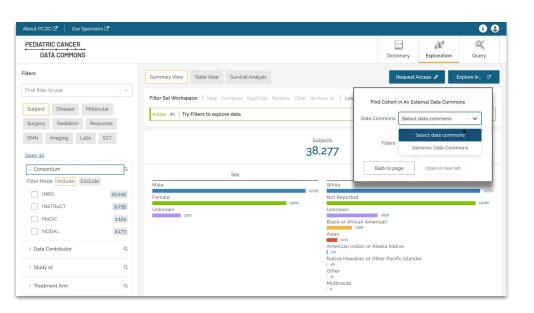


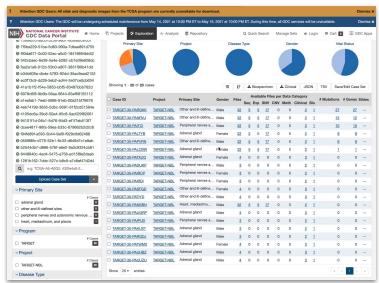






Cohort discovery - linking to Genomic Data Commons





<u>Direct</u> connection to other data commons (Genomic Data Commons, Gabriella Miller Kids First)









Engagement / Education

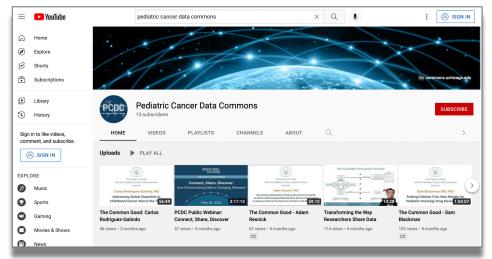
Education

- Promoting data literacy through training
- Young / early stage investigator seminars

Engage the community

- Webinars
- Thought leadership
- Live events
- Patient and family involvement
- International advisory board







Data Operations

Governance

Platform

Engagement

Sustainability









Α	В	С	D			cam am /no	cdcrosoarch
INRG Research						Samami po	Cucieseaicii
Click on a de	escription to view the original pro	nject proposal.					
INRG#	Principal Investigator	Description	Project Type		Status	Publication	Presentation
2022-04	Mallory Taylor Thomas Cash Wendy London Julie Park Meredith Irwin	Outcomes for patients aged 12-18 months with Stage M MYCN non-amplified neuroblastoma and unfavorable biologic features ('Mixed Phenotype Toddlers')	Investigator	•	(In Progress	•	Presented at ANR 20
2022-03	Hanxaio Yu Xingda Zhan Mark Appelbaum Gudrun Schleiermacher statistician to be named	Prognostic impact of segmental chromosome atterations in high-risk neuroblastoma patients on immunotherapy: A report from the International Neuroblastoma Risk Group (INRG) project	Investigator	•)	(In Progress		
2022-02	Boris Decarolis Wendy London Susan Cohn Andrew Pearson	Survival of patients with low-, intermediate-, or high-risk neuroblastoma over a 35 year period	Investigator	•	In Progress	•	
2022-01	Wendy London Ramya Ramanujachar Kavitha Srivatsa Paola Angelini	Neuroblastoma in adolescents and adults- a study of clinical and biological features and outcomes	Investigator	•)	In Progress	D	
	INRG Click on a de INRG # 2022-04 2022-03	INRG Research Click on a description to view the original processor of the processor of th	INRG Research Click on a description to view the original project proposal. INRG # Principal Investigator Description Mallory Taylor Thomas Cash Wendy London Julie Park Meredith Irwin 2022-03 Hanxaio Yu Xingda Zhan Mark Appelbaum Gudrun Schleiermacher statistician to be named Boris Decarolis Wendy London Susan Cohn Andrew Pearson Wendy London Ramya Ramanujachar Kavitha Strivatsa Wendy London Ramya Ramanujachar Kavitha Strivatsa Neuroblastoma for patients aged 12-18 months with Stage M MYCN non-amplified neuroblastoma and unfavorable biologic features ('Mixed Phenotype Toddlers') Prognostic impact of segmental chromosome alterations in high-risk neuroblastoma patients on immunotherapy: A report from the International Neuroblastoma Risk Group (INRG) project	INRG Research Click on a description to view the original project proposal. INRG # Principal Investigator Description Mallory Taylor Thomas Cash Wendy London Julie Park Meredith Irwin 2022-03 Hanxaio Yu Xingda Zhan Mark Appelbaum Gudrun Schleiermacher statistician to be named Boris Decarolis Wendy London Susan Cohn Andrew Pearson Wendy London Ramya Ramanujachar Kavitha Srivatsa Wendy London Susan Cohn Ramya Ramanujachar Kavitha Srivatsa Neuroblastoma in adolescents and adults- a study of clinical and biological features and outcomes Project Type Investigator Investigator Investigator Investigator Investigator Investigator	INRG # Principal Investigator Description Mallory Taylor Thomas Cash Wendy London Julie Park Meredith Irwin 2022-03 Mark Appelbaum Gudrun Schleiermacher statistician to be named Boris Decarolis Wendy London Susan Cohn Andrew Pearson Wendy London Ramya Ramanujachar Kavitha Sinya Ramanujachar Kavitha Sinya Ramanujachar Kavitha Sinya Ramanujachar Kavitha Sinya Proposal. Description Description Description Description Outcomes for patients aged 12-18 months with Stage M MYCN non-amplified neuroblastoma and unfavorable biologic features ('Mixed Phenotype Toddlers') Prognostic impact of segmental chromosome alterations in high-risk neuroblastoma patients on immunotherapy: A report from the International Neuroblastoma Risk Group (INRG) project Investigator	INRG # Principal Investigator Description Mallory Taylor Thomas Cash Wendy London Julie Park Meredith Irwin 2022-03 Mark Appelbaum Gudrun Schleiermacher statistician to be named Boris Decarolis Wendy London Susan Cohn Andrew Pearson Wendy London Ramya Ramanujachar Kavitha Sirvatsa Wendy London Mark Appelbaum Gudrun Schleiermacher Statistician to be named Boris Decarolis Wendy London Susan Cohn Andrew Pearson Wendy London Ramya Ramanujachar Kavitha Srivatsa Wendy London Ramya Ramanujachar Kavitha Srivatsa Neuroblastoma in adolescents and adults- a study of clinical and biological features and outcomes Project Type Status Project Type Status Investigator ▼ In Progress In Progress	INRG Research Click on a description to view the original project proposal. INRG Principal Investigator Mallory Taylor Thomas Cash Wendy London Julie Park Meredith Irwin Hanxaio Yu Xingda Zhan Mark Appelbaum Gudrun Schleiermacher statistician to be named Boris Decarolis Wendy London Susan Cohn Andrew Pearson Wendy London Ramya Ramanujachar Kavitha Srivatsa Neuroblastoma in adolescents and adults- a study of clinical and biological features and outcomes Project Type Status Publication Project Type Status Project Type Status Project Type In Project Type In Project Type In Project Type Status Publication Investigator In Progress In Progress

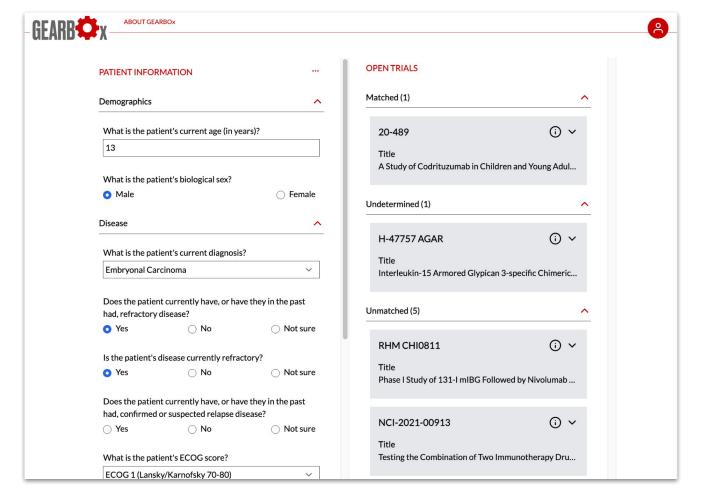




















DATA FOR THE

COMMON GOOD

PATIENT INFORMA	ATION		OPEN TRIALS	
Demographics		^	Matched (1)	
What is the patien	t's current age (in ye	ears)?	20-489	(i)
13 What is the patien Male	t's biological sex?	○ Female	Title A Study of Codrituzumab in 0 With Solid Tumors and Have Treatment or Have Come Ba	Not Responded to
isease	t's current diagnosi	^	Description The purpose of this study to codrituzumab is a safe treatr mild side effects in children a	nent that causes few or and young adults who ha
Embryonal Carcin	noma	~	solid tumors that express the researchers also want to stud is absorbed, distributed, and	dy the way codrituzuma
Does the patient or had, refractory disconnection	urrently have, or ha ease?	ve they in the past Not sure	Locations	
	ease currently refra		Link • ClinicalTrials.gov [™]	
Yes	○ No	○ Not sure		











Connecting the dots



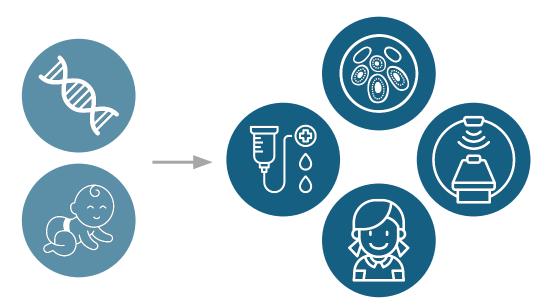
pediatric, AYA, or adult cancer







Connecting the dots



cancer predisposition syndrome

pediatric, AYA, or adult cancer



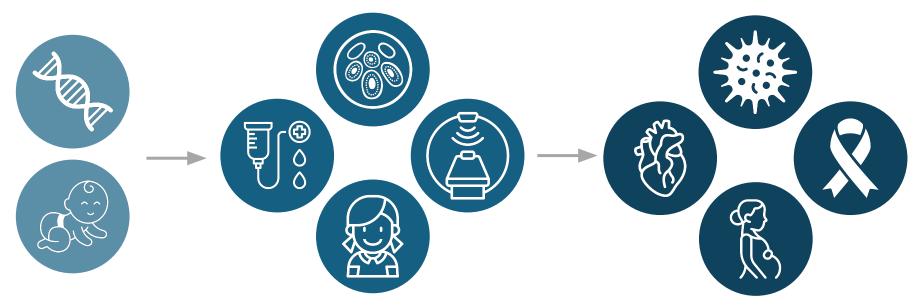








Connecting the dots



cancer predisposition syndrome

pediatric, AYA, or adult cancer

secondary malignancy, late effects











Why use the D4CG model for other rare diseases?



Lack of data hinders research for rare diseases.



Lack of community consensus and **deficient data standards** make data aggregation difficult or impossible.



Researchers cannot make progress and improve patient outcomes without high-quality data.









We envision a world where access to high-quality data is never a barrier to improving human health.

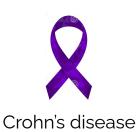




pediatric cancer



monogenic diabetes





epilepsy



Sociome



other rare diseases



...and more













A model for transforming human health



- Studying rare diseases requires collaboration and sharing
- Data sharing must be built on a foundation of trust and consensus
- Connecting disparate data types and sources enriches research
- Consensus data standards are critical for the success of national and international data ecosystems – allowing aggregation across trials and diseases
- Early adoption of data standards and consideration for the lifecycle of the data are critical to accelerating progress and discovery







Do research with the PCDC and stay connected

portal.pedscommons.org

Explore the PCDC Data Portal

sam.am/datadictionaries

Access data dictionaries

slv@uchicago.edu suzi@uchicago.edu Sign up for our email list!

sam.am/D4CGnews









Sustainability is key

Thank you to these funders for supporting our work in FY23 and/or FY24.























United States Department of the Interior















Aileen S. Andrew Foundation







Sarah Jane Adjcoff Endowment for Research in Rhabdomyosarcoma

Seattle Children's



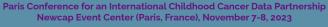




RÉPUBLIQUE FRANÇAISE







Thank you!

consortium members

collaborators

data portal users

advisory group members

funders

patients and families

















