

Setting the Stage: The Importance of Pediatric Oncology Data Sharing

Pediatrics cancers, statistics and global key issues around data sharing

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French Society for Childhood Cancers (SFCE)

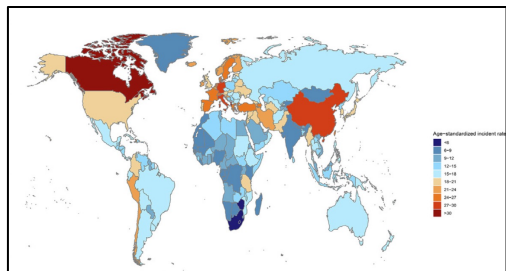
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Paris-Saclay University

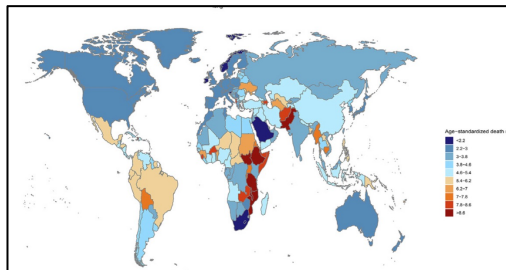
Pediatric cancers are rare but the first cause of death in children

Globally, in 2019, 291,319 new cases (0-14y) and 98,834 deaths from childhood cancer



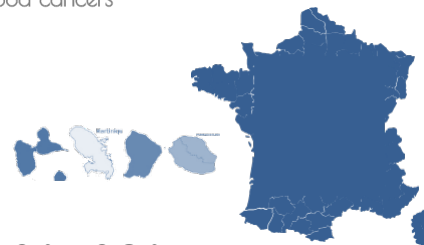
National age-standardized rates (per 100,000 population)

Incidence rates



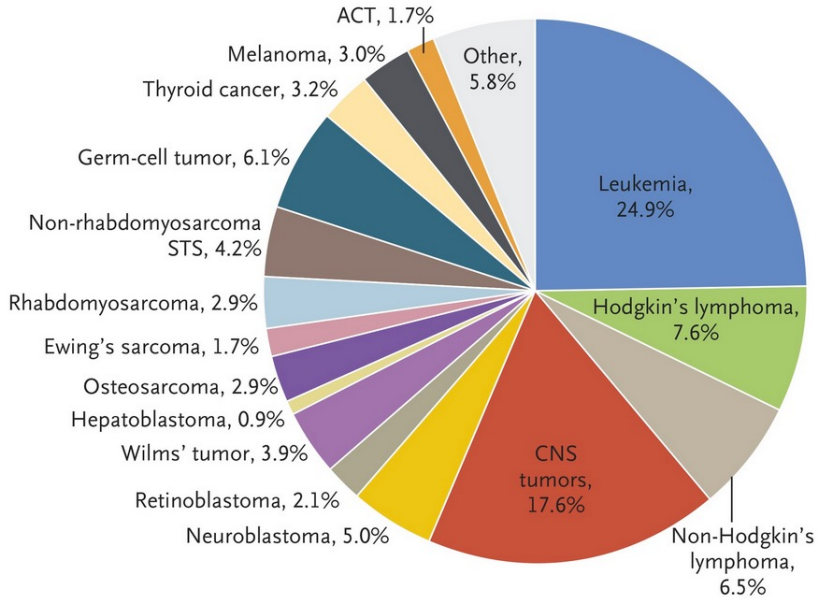
Deaths rates

French National Registry of Childhood Cancers

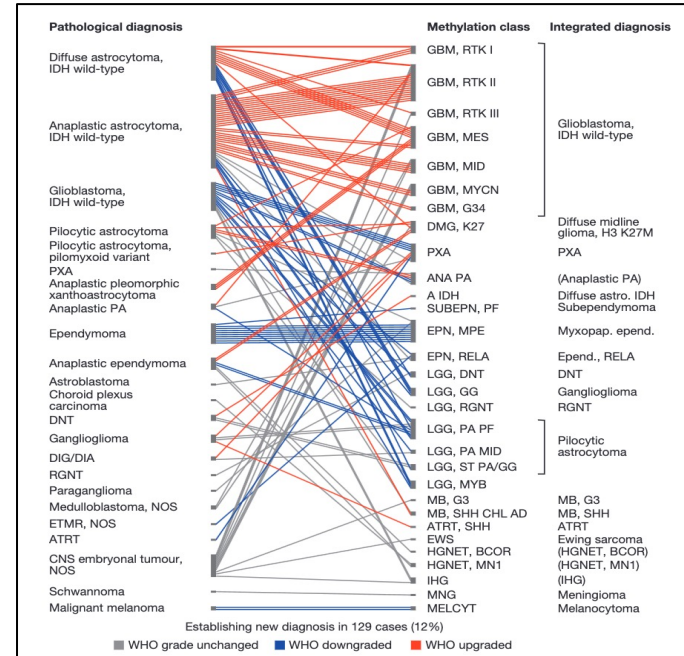


France (0-18y):
~ 2200 new cases per year
542 deaths in 2020 (<25y)

Pediatric cancers are heterogeneous



**Top 3 incidence:
Leukemia-Brain tumors- Lymphomas**

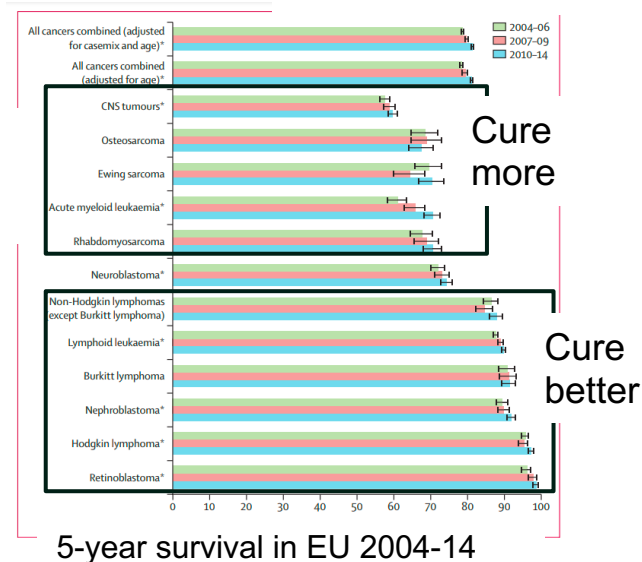
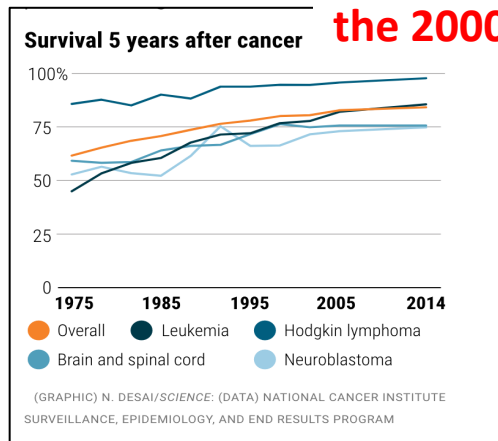


**Ex Brain tumors:
More than 100 molecular subtypes!**

all, 81% survival

Challenges in Pediatric Oncology

- Cure more**
Brain tumors,
Sarcomas, NBL
High risk leukaemia
Resistant disease



- Cure better:** reduce acute and long-term toxicity

- Understand causes and origins of pediatric cancers**

Objectives of Data Sharing

- Set up large clinical database to identify **NEW PROGNOSTIC FACTORS** and evaluate different **THERAPEUTIC APPROACHES**
- Develop **Common Risk stratification** to compare clinical trials results and build international trials: **ACCELERATE access to new treatment** for children with cancers
- **INTEGRATE MODERN BIOLOGY data** (OMICS, MODELS) with clinical data to identify new entities / new targets and drivers/ new prognostic biomarker - **Clinically relevant Machine-Learning and Artificial Intelligence technologies**
- **UNDERSTAND cause of childhood cancers in large-scale longitudinal studies** and database for epidemiogenetic and exposomes approaches
- **ULTIMATELY, establish a pediatric cancer network** to develop **international studies improving pediatric cancer treatments and survivals**

History of international collaboration: The exemple of Soft Tissue Sarcoma

Since 1986, data sharing in “Workshops”

- 11 international workshops
- 11 manuscripts published

Rules for data exchanges

- Until 2014, nothing in writing
- Informal agreement
- After data exchange and analysis, no persistence



Prior international collaborations: The exemple of Soft Tissue Sarcoma

Limitations

Informal agreements not realistic in current era

Data exchange limited:

No updating

No further data mining

Each Workshops was new

No linkage to higher dimensional data

Key topics not always addressed

> *Med Pediatr Oncol.* 1989;17(3):210-5. doi: 10.1002/mpo.2950170308.

An attempt to use a common staging system in rhabdomyosarcoma: a report of an international workshop initiated by the International Pediatric Oncology (SIOP)

C Rodary¹, F Flamant, S S Donaldson

Pediatr Blood Cancer. 2015 December ; 62(12): 2125-2131. doi:10.1002/pbc.25684.

Prognostic Factors for Outcome in Localized Extremity Rhabdomyosarcoma. Pooled Analysis From Four International Cooperative Groups

Odlie Oberlin, MD^{1*}, Annie Rey¹, Kenneth L.B. Brown, MD², Gianni Bisogno, MD, PhD³, Ewa Koscielniak, MD, PhD⁴, Michael C.G. Stevens, MD⁵, Douglas S. Hawkins, MD⁶, William H. Meyer, MD, PhD⁷, Trang H. La, MD⁸, Modesto Carli, MD⁹, and James R. Anderson, PhD⁹

Journal of Clinical Oncology > List

PEDIATRIC ONCOLOGY

Treatment of Orbital Rhabdomyosarcoma: Survival and Late Effects of Treatment—Results of an International Workshop

Pediatr Blood Cancer. 2018 September ; 65(9): e27096. doi:10.1002/pbc.27096.

Localized vaginal/uterine rhabdomyosarcoma—results of a pooled analysis from four international cooperative groups

Modesto Carli, R. Beverley Raney, Joern

Veronique Minard-Colin¹, David W. Anderson², David A. Rodeberg³, Ari Gianluca De Salvo⁴, Carola Arndt⁵, Dominique Schwob⁶, Christine Ha Stevens⁷, Odile Oberlin⁸, Douglas

Annals of Oncology 23: 231-236, 2014
doi:10.1093/annonc/mdt428

Parameingeal rhabdomyosarcoma in pediatric age: results of a pooled analysis from North American and European cooperative groups

J. H. M. Merks^{1*}, G. L. De Salvo², C. Bergeron³, G. Bisogno⁴, A. De Paoli⁵, A. Ferrari⁶, A. Rey⁶, O. Oberlin⁶, M. C. G. Stevens⁷, A. Kelsey⁸, J. Michalski⁹, D. S. Hawkins¹⁰ & J. R. Anderson¹¹

VOLUME 36 · NUMBER 20 · DECEMBER 10, 2018

JOURNAL OF CLINICAL ONCOLOGY

ORIGINAL REPORT

Demographic and Treatment Variables Influencing Outcome for Localized Paratesticular Rhabdomyosarcoma: Results From a Pooled Analysis of North American and European Cooperative Groups

David G. Malhotra, Donald A. Berkenbosch, David Hall, Andrea Ferrari, Gian Luigi De Salvo, Tom Kocinski, Michael C.G. Stevens, Halina Marzella, Gustav Saito, David A. Rodeberg, Margaret Steinhilber, Bochen Daiganga, John C. Breneman, James R. Anderson, Christophe Bergeron, Gianni Bisogno, William H. Meyer, Douglas S. Hawkins, and Veronique Minard-Colin



Sam Volchenboun talk
Consortium Road Traveled
Critical success factors for
accomplishments to date

Lessons learned



INSTRuCT

International Soft Tissue saRcoma ConsorTium

Established May 2018

Challenges of international data sharing in childhood cancers

- **Mapping** and building on existing multi-disciplinary and multi-national platforms/datasets and registries: International, European, and National
- **Clinical trial database** \neq **Biological database (Omics and models)** with clinical data \neq **Cancer Registry**
- **Data dictionary, harmonization and update**
- **Most up-to-date** (and clinically relevant) **technologies for analysis**
- Collaboration on **specific scientific project/initiative** \neq **large data sharing**
- **Regulatory:** GDPR, Safeguarding and **Human factors:** trust (friendly partnership), transparency, shared responsibilities, and win-win project

Consensus harmonization of primary site

CWS COG EpSSG

Major Primary Site	CWS	COG	EpSSG/MMT Name
ORBIT	Eyelid	1=Eye	Eyelid
	Orbit	2=Orbit	Orbit
HEAD & NECK (non PM)	Scalp	10=Scalp	Soft tissue of scalp External auricular canal Ear soft tissue, external ear Temporal muscle
	Parotid	9=Paratoid	Parotid, soft tissue
	Oral Cavity	7=Oral cavity	Gum Base of tongue Lip Lower lip Upper lip Tongue
	Larynx	5=Larynx	Larynx
	Oropharynx	8=Orophaynx	Oropharynx Lingual tonsil Mandible soft tissue Bone of face (Maxillar) Masseter Oral cavity Cheek
	Cheek	3=Cheek	
	Hypopharynx	4=Hypopharynx	Hypopharynx
	Thyroid & Parathyroid	11=Thyroid & Parathyroid	Thyroid
	Neck	6=Neck	Neck Neck Supra-clavicular soft tissues Neck, nodes Nos Chin
		12=Other Head & Neck	Soft tissue face (non specified region) Face specified region Nasolabial fold (skin) Nostril

INSTRuCT consensus

Orbit		CUI
	Eyelid	C0015426
	Orbit	C0029180
	Other orbit	C0700042
Head and Neck		
	Scalp	C0036270
	Parotid	C0030580
	Oral cavity	C0226896
	Larynx	C0023078
	Oropharyngeal	C0521367
	Cheek	C0007966
	Hypopharynx	C0020629
	Thyroid and/or parathyroid	C0574117
	Neck	C0027530
	Other head and neck	C0460004



European Initiatives Pediatric Cancer Data Sharing





A call from the EU commission Single Electronic Data Interchange Area (SEDIA)

Develop Artificial Intelligence for diagnosis and treatment of paediatric cancer PPPA-AIPC-A (2020)

A Pilot Project and Preparatory Action coordinated by



- A state-of-the-art report to help **understanding** the challenges, needs and gaps in capturing data on paediatric cancer across the Union
- **mapping** and building on existing multi-disciplinary and multi-national platforms/datasets and registries
- a framework to find solutions and prioritise opportunities to **bridge existing gaps** with a multi-national, multi-disciplinary approach.
- a multi-stakeholder network to connect and **facilitate the exchanges and dissemination** of best practices in clinically relevant Machine-Learning and Artificial Intelligence technologies between all relevant stakeholders,

Delivery in November 2023



UNICA4EU has received funding from the European Union's Call for Pilot Projects and Preparatory Actions (PPPA) under Grant Agreements No 101052609

Thanks to Gilles Vassal



Mapping where childhood cancer data sit in Europe

30 years of academic research by European Clinical Trial Groups, members of the SIOPE Clinical Research council. Large databases. [For example:](#)

- **SIOPEN** database in Austria with **7,000 neuroblastoma patients**,
- **IBFM/AEIOP** databases in Italy and Germany with **10,000 ALL patients**
- **EpSSG** databases in France and Italy with **3,000 soft tissue sarcoma patients**
- **GPOH** database in Germany with **4,500 Ewing sarcoma patients**
- **SIOPEL** database in the UK with **450 hepatoblastoma patients**
- **EU DIPG registry** in the Netherland with **500 DIPG patients**
- **PARTNER**, the European registry for very rare pediatric cancer
- Several large cohorts of childhood cancer survivors in several countries

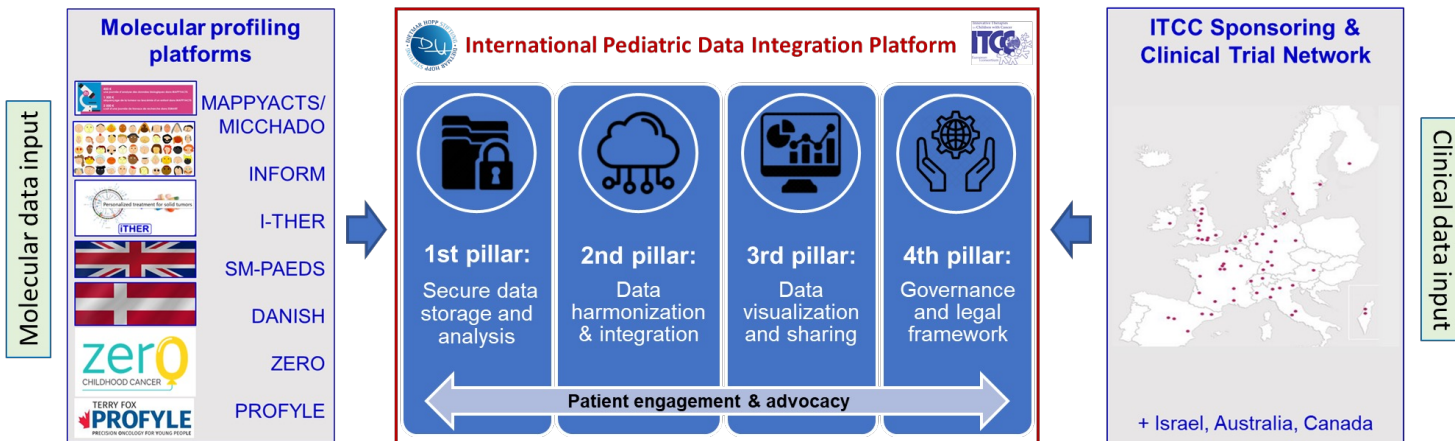




Mapping where childhood cancer data sit in Europe

The Pediatric Genomic Data Integration Platform

- to aggregate data from clinical sequencing projects and make these data accessible in a standardized way both for basic research and (pre-)clinical applications. **More than 5000 WES at relapse already collected**



INFORM in Cancer Discovery 2021, 11, 2764

MAPPYACTS in Cancer Discovery 2022, 2, 1266



Mapping where childhood cancer data sit in Europe

Conclusion

- Large data sets for all pediatric malignancies in Europe by disease, survivorship cohorts and genomic data
- But unconnected data silos and fragmentation
- No collection of Real Word data from electronic health records

A call for a EU Childhood Cancer Data Initiative

Within the futur



Cancer Mission: The



HORIZON-MISS-2021-
UNCAN-01-01
Preparing UNCAN.eu, a
European initiative to
understand cancer

a unique digital platform where **researchers from all over the world share and have access to high-quality cancer research data.**

A **Project** to deliver by **November 2023** a **blueprint for the UNCAN.eu platform** in order to prepare a fully-fledged, sustainable platform, managed by Member States, associated countries & stakeholders.

Coordination by **Inserm**

Among partners:



*SIOPE, Gilles Vassal
CCI, Patricia Blanc*

PARTNERS

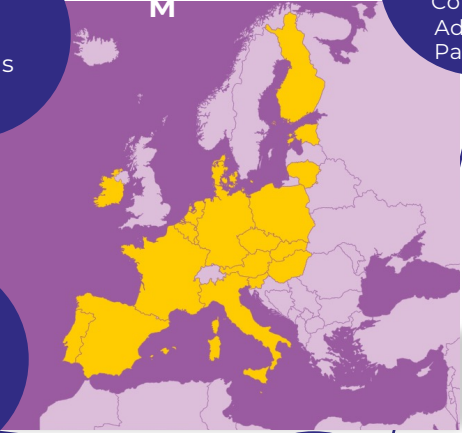
Blueprint delivered to be in November 2023



15
Months

29
Core and
Advisory
Partners

CONSORTIUM



20
Member
States

FUNDING

3M
€

DURATION

COUNTRIES



Inserm
La science pour la santé
From science to health
Inserm

ALLIANCE AGAINST CANCER
Alliance Against Cancer

ciberonc
Biomedical Research Networking Center

Childhood Cancer International EUROPE
Childhood Cancer International Europe

European Cancer Patient Coalition
European Cancer Patient Coalition

dkfz. GERMAN CANCER RESEARCH CENTER
Research for a life without cancer
German Cancer Research Center

NETHERLANDS CANCER INSTITUTE
ANTONI VAN LEEUWENHOEK
Netherlands Cancer Institute Antoni Van Leeuwenhoek

CORE PARTNERS

SIOP Europe
the European Society for Paediatric Oncology
European Society for Paediatric Oncology

ECI
Organisation of European Cancer Institutes - EEIG
Organisation of European Cancer Institutes - EEIG

National Institute of Oncology Hungary

Oncode Institute
Oncode Institute

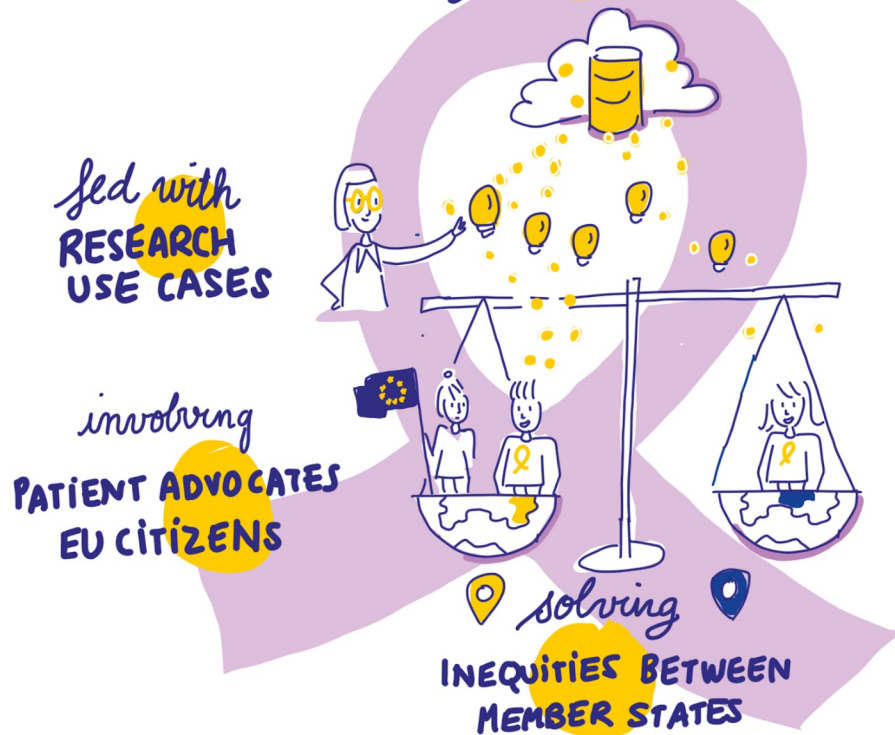
VHIO VALL D'HEBRON Institute of Oncology
Vall d'Hebron Institute of Oncology

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RÉPUBLIQUE FRANÇAISE
Institut National du Cancer
Institut National du Cancer

International Agency for Research on Cancer
World Health Organization
International Agency for Research on Cancer

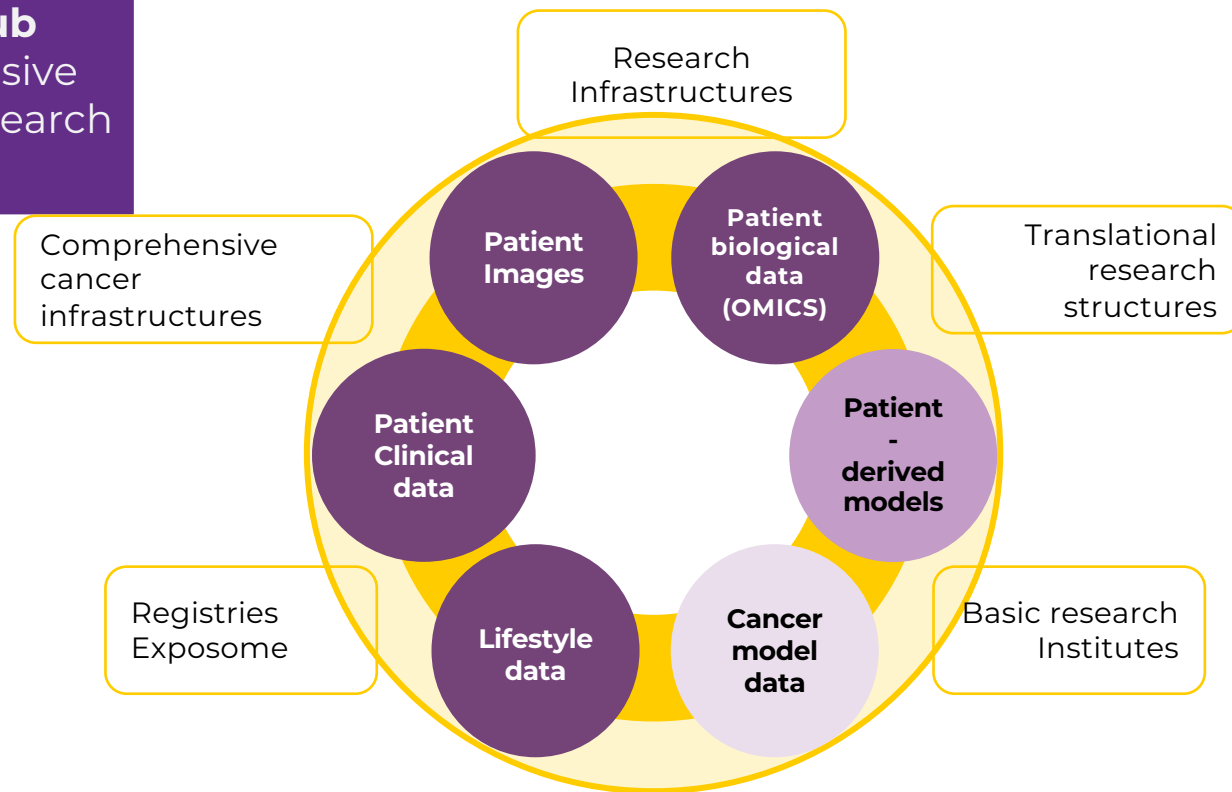
creating a FEDERATED CANCER RESEARCH DATA HUB



Focus on the future UNCAN.eu platform

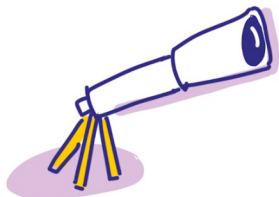
Federated Data hub

A unique comprehensive collection of cancer research data worldwide



6 USE CASES

6 AREAS of CANCER RESEARCH CHALLENGES



★ CANCER PREVENTION



★ EARLY DIAGNOSIS



★ SENSITIVITY & RESISTANCE



★ SURVIVORSHIP



★ PEDIATRIC CANCER



★ CANCER & AGING

LIFE →



UNCAN.eu Use Cases

Pediatric Cancer

Cancer and Ageing

Survivorship

Scientific scope:

Map the microenvironmental features in paediatric cancer subtypes and patients across regions and/or populations to interrogate their functional significance and actionability for cancer treatment.

Use case:

Characterization and therapeutic targeting of the tumour microenvironment in paediatric cancers.

Data Types and Sources:

- Multi-omic data from patients' samples and models
- Pharmacogenomics data
- Spatial imaging data
- Radiological and pathological imaging
- Clinical records and family history



Funded by the European Union

Pediatric cancer data in Europe



A Blue print for the creation of the UNCAN.eu platform

A European Childhood Cancer Data Initiative

- A Federated data hub with comprehensive data for research
- A pediatric cancer use case
- Involvement of parents, patients and survivors

That will collaborate with the US National Childhood Cancer initiative



Example of French Initiatives Pediatric Cancer Data Sharing

Funded in 2020 by [Institut National du Cancer \(INCa\)](#)
within “Data Sharing in Pediatric Oncology »





Nathalie Gaspar
MD, PhD
Pediatric oncologist

Antonin Marchais
MD, HDR
Researcher

Osteosarcoma
Deep cohort



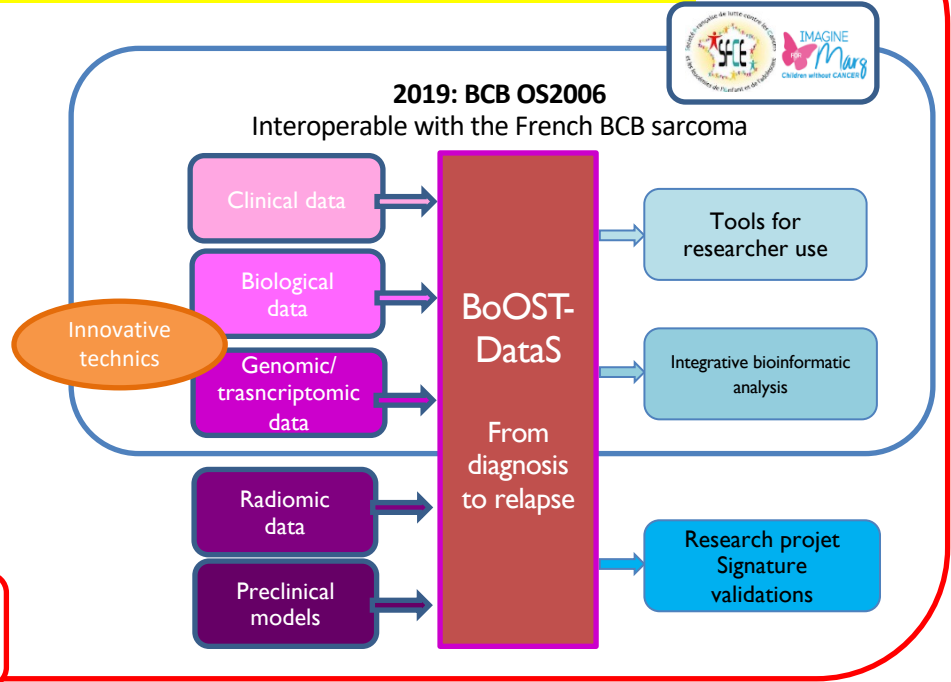
BoOST-DataS
ParPedia19-001



All osteosarcoma trial at diagnosis and relapse
With clinical, biological, genomic, transcriptomic, proteomic and radiomic data

Diagnosis
OS2006
Sarcome 13
MICCHADO

Relapses
MAPPYACTS
OSII-TTP
REGOBONE
CABONE
PEMBROSARC ...



Collaboration





Arnaud Petit
MD, PhD
Pediatric oncologist

DOREMy

Base de **DO**nnées cliniques et biologiques harmonisées pour une **RE**cherche intégrée à la prise en charge des leucémies aiguës **MY**éloïdes pédiatriques

Harmonized Clinical and Biological Data Bases for an Integrated research dedicated to Pediatric Acute Myeloid leukemia

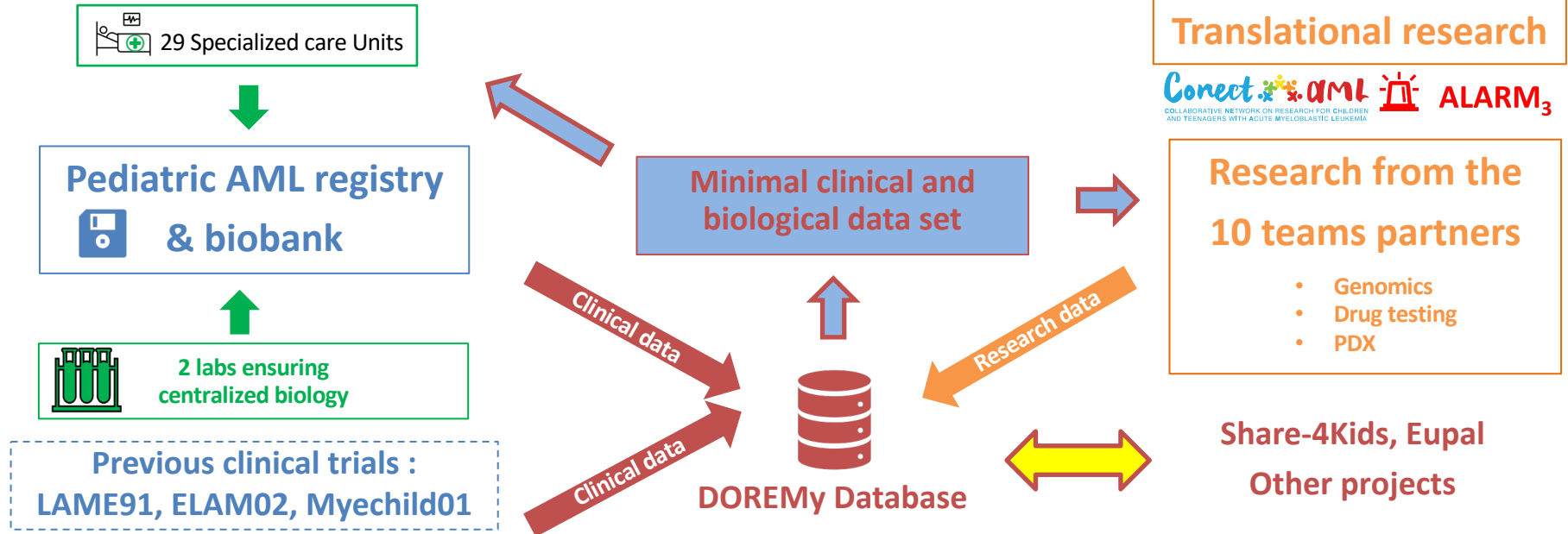
DOREMy is supported by a grant from InCa (parpedia19-008)
CONECT-AML is supported by a grant from InCa, Fondation ARC, Ligue nationale contre le cancer (InCa-ARC-LIGUE_11905), and the following partners

DOREMy



Harmonized Clinical and Biological Data Bases for an Integrated research dedicated to Pediatric Acute Myeloid leukemia

- Better characterize rare high-risks subgroups of AML
- Identify new prognosis or therapeutic markers
- To identify new therapeutic targets
- The ultimate goals are to reduce relapse and improve survival



2018
2023
>400 members
>45 teams



1. Led by the national network for basic research in pediatric oncology React4Kids
(PI: Dr M. Castets, Lyon)

Scientific board

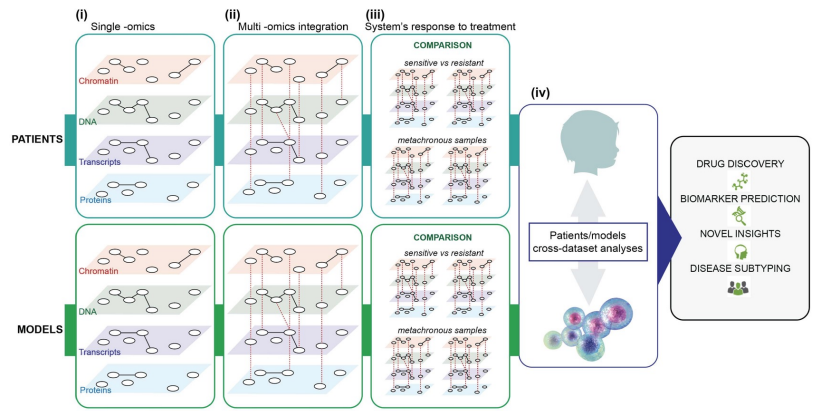
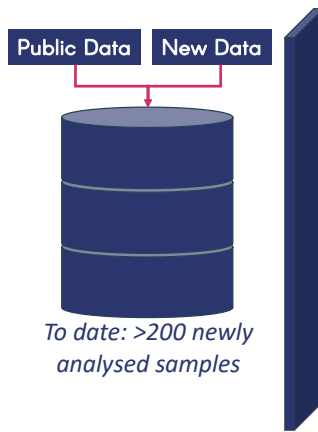


Technical and bioinformatics team



2. Pan-cancers cohort

Multi-omic bulk/single-cell data on patients/models at diagnosis/relapse accessible via an interface + analysis tools



International Pediatric Cancer Data Sharing - Conclusion

An history of international collaborations on clinical trial data but with limitations – The future will require integration of modern biology data

A current **clinical trial database sharing in different disease (PCDC):**
Neuroblastoma, Soft Tissue Sarcoma, Germ cell Tumors, etc

An European Childhood Cancer Data Initiative with mapping of the different EU and National databases for Machine-Learning and AI technologies and a Blueprint for the creation of the UNCAN.eu platform

Different objectives to be defined in advance and a lot of **challenges ahead to be discussed in the meeting!**

Key to advancing our understanding of childhood cancers and improving survival

Thank you

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