Background and aims

- Patients with neuroblastoma (NB) and diffuse intrinsic pontine glioma (DIPG) suffer from relapse and death, partly due to insufficient knowledge of tumour properties and the lack of tools to integrate this knowledge into clinical decision-making.
- Children with NB and DIPG are enrolled in European clinical trials with standardized acquisition of patient-related imaging and molecular diagnostics, treatment and outcome data.
- These tumour types represent ideal use cases for the development of new integrated artificial intelligence (AI) models for medical imaging-based diagnosis and optimized individual risk assessment.
- PRIMAGE’s goal is the development and validation of the methodology and a platform to support decision making in the management of NB and DIPG.

Methods

- Patients enrolled in SIOPEN (LINES, HR-NBL1) and GPOH (NB97, NB2004, NB2004-HR, NB2016-Registry) neuroblastoma trials were included. Imaging studies (MRI, CT, PET, mIBG) obtained at time of diagnosis and at first follow-up after initial treatment were collected from local centers and analyzed using machine/deep learning methods.

Clinical data and molecular biomarker, e.g. MYCN amplification status, are provided through centralized databases (SIOPEN-R-NET) or patient-by-patient including manual curation to ensure quality controlled datasets.

Results

- A PRIMAGE repository was built with imaging, molecular and clinical data. Clinical and molecular variables and corresponding e-forms were defined in line with existing trial databases. Amongst others, data was collected from approximately 50 SIOPEN centers in around 10 countries and pseudonymised using the European Patient Identifier (EUPID) service.

- At the end of September 2022 there are 776 NB cases uploaded in the PRIMAGE platform and 2053 NB imaging studies.

Conclusions

PRIMAGE platform will support medical image processing and will assess imaging-derived biomarkers in the context of molecular and clinical variables, which is expected to guide diagnosis and individual risk assessment of patients with NB and DIPG in the future.