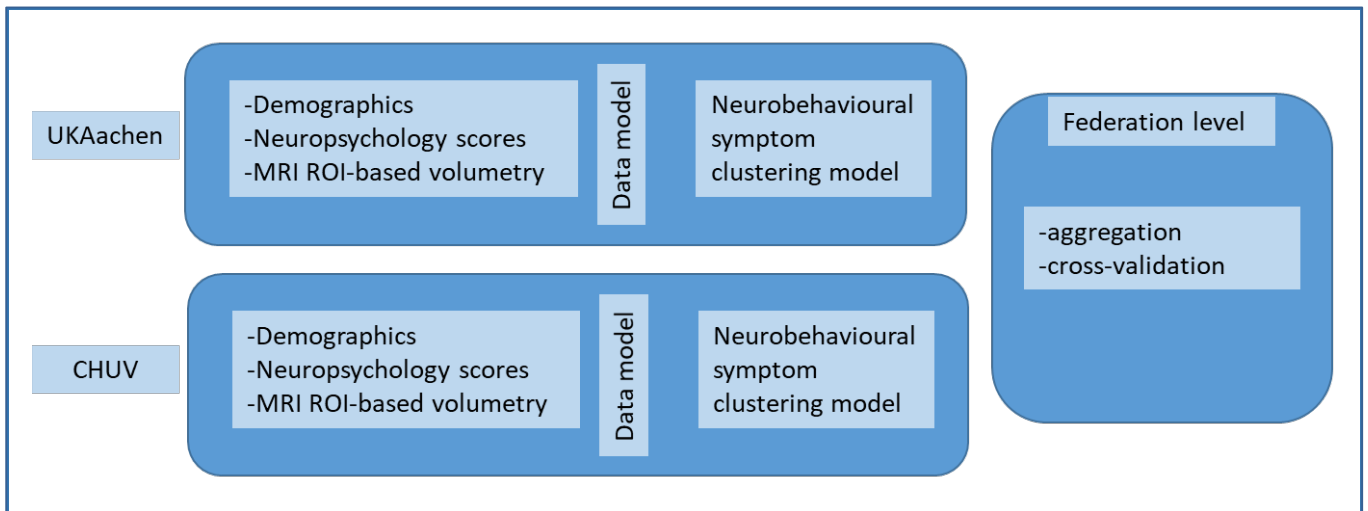# *Provide operational MIP infrastructures to UKAACHEN and CHARITE*
D8.10.1 – SGA2

Schematic representation of the data federation framework. The data model allows interacting with the analysis pipeline in the data factory.

Project Number:	785907	Project Title:	Human Brain Project SGA2

Document Title:	D8.10.1 Provide operational MIP infrastructures to UKAACHEN and CHARITE.
Document Filename:	D8.10.1 (D81.1 D127) SGA2 M24 ACCEPTED 200731.docx
Deliverable Number:	SGA2 D8.10.1 (D81.1, D127)
Deliverable Type:	Report
Work Packages:	WP8.10
Key Result(s):	KR8.2, KR8.3
Dissemination Level:	PU = Public
Planned Delivery Date:	SGA2 M24 / 31 Mar 2020
Actual Delivery Date:	SGA2 M25 / 28 Apr 2020; Accepted 31 Jul 2020
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Editorial Review:	Annemieke MICHELS, EPFL (P1)
Description in GA:	Provide operational MIP infrastructures to UKAACHEN (P73) and CHARITE (P122), to develop and implement a pathophysiological model for neurobehavioural symptom clustering. Test run and report of data analysis.
Abstract:	An operational MIP infrastructure has been provided to UKAachen and Charité. The latter has not yet been updated with the latest MIP version due to Charité's limitations. A data federation system (capturing depersonalised data (MRT, demographics, neuropsychology scores), data processing and harmonisation, data federation) between UKAachen and CHUV has been provided.)
Keywords:	MIP, Medical informatics Platform, mental health, UKAachen, Uniklinik Aachen, CHUV
Target Users/Readers:	Clinicians, neuroscience community, computer scientists, Consortium members, experts in mental health neuroimaging community, neuroinformaticians, neuroscientific community, neuroscientists, Platform users, researchers, scientific community, students.

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1.   Outline

We setup a federation framework that allows for statistical analysis of the main relevant data in the clinical mental health research, i.e. neuropsychological assessments and structural brain imaging.

2.   Data

IMAGEN Database (https://imagen-europe.com/resources/imagen-dataset/), which contains data collected by the Imagen Consortium from over 2,000 adolescents and their parents longitudinally, has been chosen as a representative sample of mental health data. Three measurements (BL, FU1 and FU2[1]) including demographics, neuropsychological assessments and MR neuroimaging have been repeated over 6 years, so that 1,400 participants have completed the MR imaging protocol in FU2. MR neuroimaging ($N_{imaging}$=1,400) has been chosen as a representative sample of mental health data.

3.   Data processing

MRI data were processed using the MIP "image processing pipeline". A (hierarchical) data model has been created containing the variables from demographics, neuropsychological measurement scores and MRI data. Data has been split randomly in 2 equally big datasets and stored in UKAachen and CHUV. The CHUV location was chosen to remedy the locally-induced delay at Charité.

4.   Federation

To allow data federation that brings data from multiple locations together, where the data can be queried and analysed without centralisation, this database has been locally stored in UKAachen and CHUV, respectively.

The MIP Federation node has been installed in UKAachen.

5.   Ethics and regulatory processes

A proposal describing this study has been submitted to the Imagen Consortium, based on which data access has been granted. Informed consents of the participants are available. Data sharing agreements have been signed in UKAachen and CHUV. Local ethics committee of UKAachen, as consortium lead has approved this research.

6.   Federated analyses

The federated analyses of our mental health use case were planned to be performed once all above activities will have been finalised, i.e. during February and March 2020. Due to the COVID-19 health crisis, some activities were delayed, which led to postpone the federated analyses to April-May 2020. These analyses are thus ongoing and will be available for reviewing in June 2020.

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[1] According to IMAGEN: "Data have been collected over a period of 10 years in 8 recruitment centers and over 4 successive time points: baseline at age 14 (BL), follow-up 1 at age 16 (FU1), follow-up 2 at age 19 (FU2) and follow-up 3 at age 23 (FU3)."

7.   Conclusion

WP8.10 provided a framework for federated research approach in mental health by linking the most relevant data types, compiling a data model and integrating the data into the specified analysis tool in the MIP data factory. This framework is ready to be (if necessary modified and) extended to other mental health research centres and clinics.