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Workshop

SECURE PROCESSING ENVIRONMENTS FOR FEDERATED HEALTH RESEARCH: THE PROTECT-CHILD APPROACH

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ABSTRACT

Collaborative health research requires access to sensitive data distributed across institutions, while preserving confidentiality, institutional control and accountability. These challenges are particularly relevant in paediatric transplantation, where combining clinical, genomic and epigenetic information across hospitals can support research into rare complications and long-term outcomes.

This proposed workshop will explore the Secure Processing Environment (SPE) approach being developed within PROTECT-CHILD, a European project supporting collaborative research in paediatric transplantation. The architecture brings computation to data through institution-controlled environments, or “capsules”, coordinated through a federated orchestration layer. Its objective is to enable authorised analyses across participating institutions without requiring a central repository of patient-level data.

The workshop will examine how this approach combines isolated execution environments, identity and access management, and Zero Trust principles with interoperable data services. Particular attention will be given to the relationship between local institutional governance and cross-site coordination: how an analysis is authorised, executed and traced, and how its outputs should be assessed before release. Clinical data harmonisation using OMOP and FHIR will provide the context for discussing federated statistical analysis, genomic and epigenetic workflows, and collaborative AI model development.

Using an illustrative research workflow, the workshop will connect architectural choices with practical implementation challenges, including heterogeneous hospital infrastructures, reproducibility, operational complexity and the risk of sensitive information being disclosed through analytical outputs.

The discussion will explore how these design choices can support alignment with the European Health Data Space and identify priorities for technical validation. Participants will gain a concrete architectural perspective on SPEs and a basis for discussing reusable approaches to secure, interoperable and accountable health research across institutions.

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