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Privacy-Enhancing Technologies: Unlocking Responsible Cross-Border Data Research

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International data transfer rules, designed to protect individuals, often create barriers to collaborative research by imposing constraints misaligned with modern data ecosystems. Frameworks like GDPR and UK GDPR can unintentionally hinder scientific progress by failing to recognise the safeguards provided by emerging technologies. More nuanced legal approaches are needed to preserve privacy while enabling responsible international research. We will examine how privacy-enhancing technologies (PETs) can help address these challenges. Informed by insights from pilot projects under the Alzheimer's Disease Data Initiative which seek to address critical dementia questions, while expanding dataset access. With dementia cases projected to rise globally from 57 million to 153 million by 2050, this work demonstrates the urgent need for cross-border data sharing in brain health research. Specifically, we will explore how PETs offer pathways through regulatory barriers, and how Trusted Research Environments (TREs), aligned with the Five Safes Framework, provide strong safeguards to prevent identifiable data disclosure. We will demonstrate how remote querying techniques enable international analysis without data transfers, as researchers receive only aggregate results. The presentation will address persistent challenges: under European Data Protection Board guidance, even viewing data across borders constitutes a transfer, meaning TRE access may trigger complex compliance requirements despite technical safeguards. We will explore the rapidly evolving landscape through new UK legislation, the European Health Data Space, and emerging case law. Finally, we will discuss whether PETs can bridge the gap between privacy protection and scientific progress, and what regulatory adaptations are required to recognise the protections they provide.

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