

Anticipating and mitigating adverse drug reactions through machine learning and privacy-preserving data sharing

\*Access to a breadth of high-quality data is the most difficult challenge in a pharmaceutical drug discovery setting due to the confidential nature of the data.

Use of appropriate machine learning algorithms

Application of suitable descriptors



Access to good quality data\*

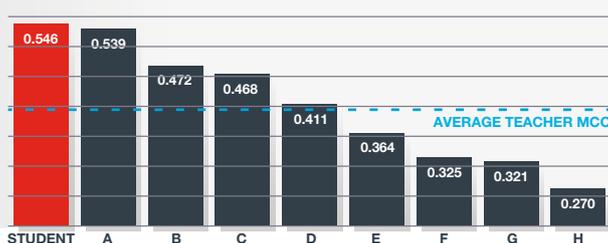


Effiris utilises a methodology based on the student-teacher<sup>1</sup> approach to enable the transfer of knowledge from private data into sharable models, without disclosing any of the underlying data.

**How does the federated/multi-party model perform against an external test set?**

### Performance of student hERG model compared to teacher models (MCC)\*\*

\*\*The Matthews correlation coefficient (MCC) is used in machine learning as a very harsh measure of performance.



Lhasa's multi-party Student model outperforms each individual Teacher model when using a consolidated, publicly available test set (Preissner hERG<sup>2</sup>).

**How do Effiris models perform against proprietary data?**

Introducing the hybrid Effiris model



Effiris members observed a

## 5-15%

improvement in MCC across their internal hERG data when using the Hybrid Effiris model, in comparison with a model trained using private data alone!

Lhasa have applied the Effiris methodology to an extensive range of secondary pharmacology endpoints. If you are interested in exploring the value of this approach within your organisation, **please get in touch.**

Find out more

**Effiris web page**

**Poster:** From Private Data to Shared Knowledge

**Blog Article:** A secondary pharmacology model suite powered by privacy-preserving data sharing

**Request a demonstration**

#### References

- Papernot *et al.* (2016) 'Semi-supervised knowledge transfer for deep learning from private training data', arXiv preprint arXiv:1610.05755
- R. Preissner *et al.* (2018) 'The Catch-22 of Predicting hERG Blockade Using Publicly Accessible Bioactivity Data', Journal of Chemical Information and Modeling, vol. 58, no. 6, pp. 1224-1233. <https://doi.org/10.1021/acs.jcim.8b00150>