

*Using electronic health records to identify
people at risk of future psychological
distress*



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with

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Fell, Dr Sam Robertson et al.

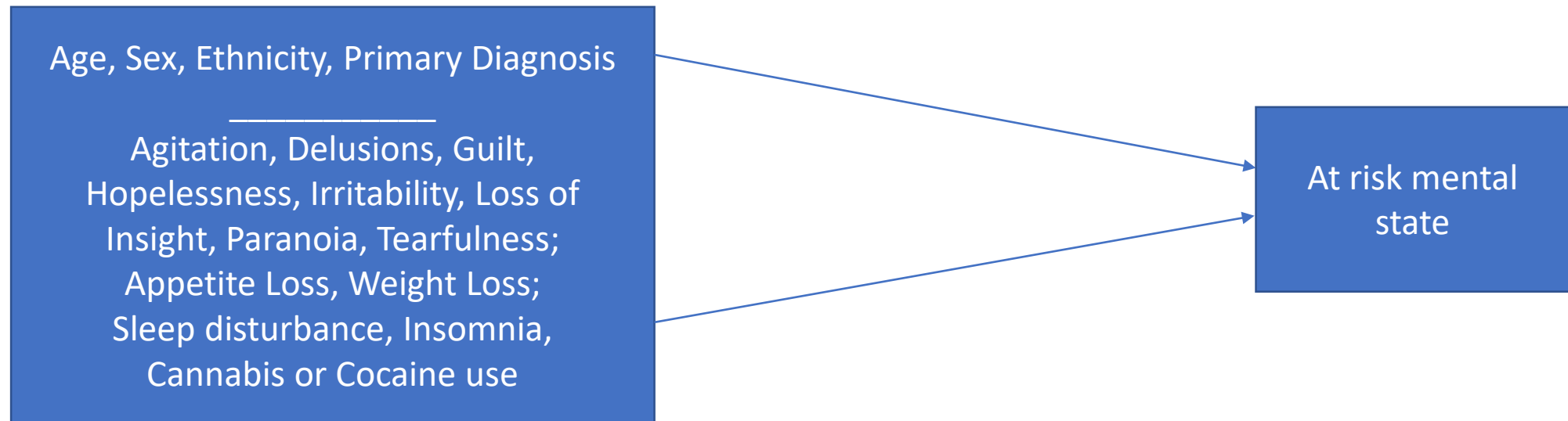


Study aims:

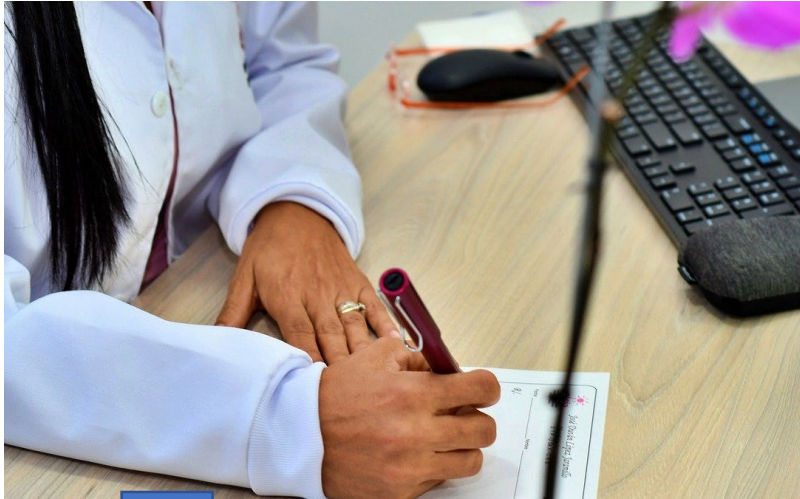
- To train a risk calculator to identify patients at high risk of psychosis using anonymised SPFT CareNotes data.
- If the calculator is accurate, to use it to identify people at risk, so that they can be offered an early intervention support package.

What is the risk calculator?

- Developed at KCL by P Fusar-Poli, D Oliver, J Irving and team.



What is CRIS? (Clinical Records Interactive Search)

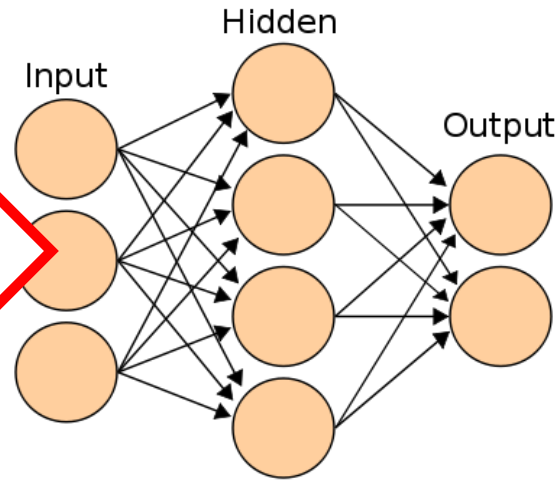


Patient, 78, male, retired constructions worker. Prior history of depression on his 50s with intrusive thoughts, which has been properly controlled with SSRI, citalopram 20 mgs daily. Complains now about memory deficits and confusion in the morning. MMSE today was 24 out of 30. Score was 27/30 on May 2015. Possible Alzheimer's.



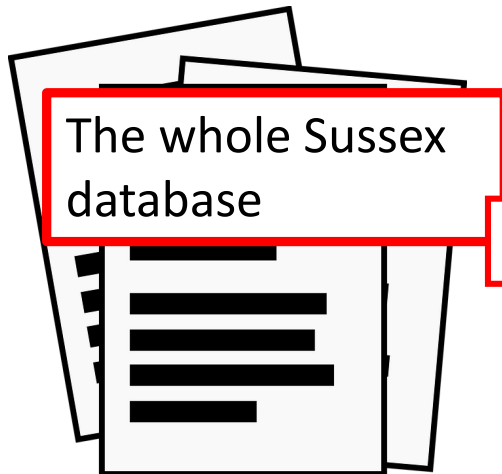
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Feed in text to ML algorithm



Diagnosis	Signs & Symptoms	Medication	Dosage	Time
depression	intrusive thoughts	citalopram	20 mgs	daily
Alzheimer's	memory deficits			
	confusion			

Language processing algorithm output: accuracy checked against marked up



The whole Sussex database

Concepts			
drugs	symptom	score	diagnosis
citalopram	intrusive thoughts	24	depression
	memory deficits	27	Alzheimer's
	confusion		

Age, Sex, Ethnicity, Primary Diagnosis
 Agitation, Delusions, Guilt, Hopelessness, Irritability, Loss of Insight, Paranoia, Tearfulness; Appetite Loss, Weight Loss; Sleep disturbance, Insomnia, Cannabis or Cocaine use

At risk mental state

Accuracy of Akrivia's NLP algorithms (at 14/12/21; still under development)

Irving Concept	Training Samples	Validation Samples	Precision	Recall	F1
Hopelessness	72	21	90%	86%	88%
Poor insight	106	22	64%	82%	72%
Tearfulness	205	59	97%	100%	98%
Irritability	116	33	91%	94%	93%
Agitation	305	65	91%	91%	91%
Guilt	79	31	90%	90%	90%
Paranoia	217	50	80%	83%	81%
Delusions	214	46	84%	89%	86%
Appetite (loss)	302	70	92%	92%	92%
Weight (loss)	175	49	91%	82%	86%
[Sleep Quality - Good]	381	85	78%	88%	83%
[Sleep Quality - Poor]	1412	351	73%	88%	80%
Substance use - cocaine	78	24	93%	89%	91%
Substance use - cannabis	226	52	94%	91%	92%

F1 Score is an estimation of accuracy: perfect would be 100%

Next steps ...

- Find the diagnoses!
 - We need diagnoses both as predictors and as the outcome for patients
 - Sussex diagnosis codes are sparse, may need to extract these from text also.
 - More NLP algorithm development!
- Lived experience panel engagement and steering group
 - Make sure the project works for patients.
- Tailored intervention package – future service delivery
 - Led by Kathy.



Thank you!

Irving, J., Patel, R., Oliver, D., Colling, C., Pritchard, M., Broadbent, M., ... & Fusar-Poli, P. (2021). Using natural language processing on electronic health records to enhance detection and prediction of psychosis risk. *Schizophrenia bulletin*, 47(2), 405-414.

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