Temporal Distribution of Suicidality Mentions in Electronic Health Records

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Introduction

Documentation of suicidality in EHRs varies considerably between patients and according to individual patients' clinical progression, and how this correlates with recorded suicidal behaviour is as yet unknown.

Aims

• Use temporal data in Electronic Health Records (EHRs) to visualise suicidality mentions (SM) at a patient level
• Identify patterns of data relevant to suicide risk assessment during a patient's contact with mental health services

ASD Cohort

• 1,950 patients with Autism Spectrum Disorder (ASD)
• 14-18 years, mean=15.9y, SD=1.36
• Screened using SMD tool
• Manual annotation: Non-suicidal, Suicidal, Uncertain

• Subgroup B
- Hospital Episode Statistics (HES) recorded suicide attempt
- 46 patients, 14-18 years, mean=16.3y, SD=1.36

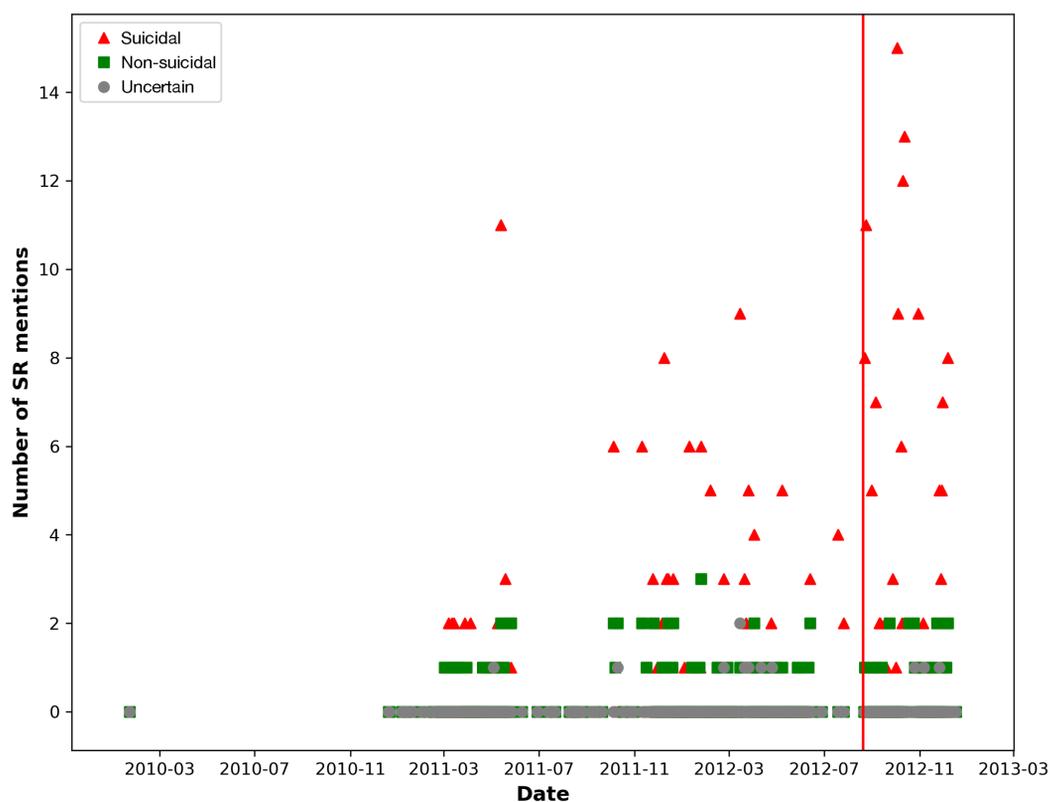|	Subgroup A: no recorded suicide attempt (203,326 docs, 8,950 annotated docs, 194,396 docs with 0 annotations, 2,427 unique dates, n=1,904 patients)			Subgroup B: recorded suicide attempt (22,251 docs, 1,653 annotated docs, 20,598 docs with 0 annotations, 1,582 unique dates, n=46 patients)		
	Non-suicidal	Suicidal	Uncertain	Non-suicidal	Suicidal	Uncertain
# mentions (%)	6739 (31%)	12928 (59%)	2180 (10%)	1003 (21%)	3418 (70%)	432 (9%)
Mean per doc (SD)	0.033 (0.235)	0.064 (0.573)	0.011 (0.162)	0.045 (0.285)	0.154 (0.951)	0.019 (0.246)
Max per doc	7	44	23	12	28	12

Suicide Mentions Over Time

Figure 1: Distribution of suicidality mentions over time for a single patient.

Conclusions & Future Directions

• Visualising suicidality mentions over time is a first step in developing a system to show a patient's EHR details graphically
• Having free text data in a visually analysable format could help in the future with clinical decision making
• In future, integrate other dynamic factors relevant to a patient's risk of suicidal behaviour into a visual schema

References

1. Gkotsis G, Velupillai S, Oellrich A, Dean H, Liakata M, Dutta R. *Don't Let Notes Be Misunderstood: A Negation Detection Method for Assessing Risk of Suicide in Mental Health Records*. In: The Third Computational Linguistics and Clinical Psychology Workshop (CLPsych). 2016: 95–105.
2. Downs JM, Velupillai S, Gkotsis G, Holden R, Kikoler M, Dean H, Fernandes A, Dutta R. *Detection of Suicidality in Adolescents with Autism Spectrum Disorders: Developing a Natural Language Processing Approach for Use in Electronic Health Records*. Proceedings / AMIA. 2017 Jul 5.
3. Perera G, Broadbent M, Callard F, Chang C-K, Downs, J, Dutta R et al. Cohort profile of the South London and Maudsley NHS Foundation Trust Biomedical Research Centre (SLaM BRC) Case Register: current status and recent enhancement of an Electronic

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