Tracking Bipolar Mood States with Survey Data
Individual Project: Status #2

Timothy Crone
tcrone3@gatech.edu
GT GitHub Repository
Patient Interface
Provider Interface

1 BACKGROUND

The project is a pair of SMART on FHIR interfaces that supports treatment of bipolar patients. These interfaces collect patient- and provider-entered depression and mood state information using validated surveys (Berk, et al., 2007; Tsanas, et al., 2016); the provider interface also displays a collated graph of patient and provider data, as well as their individual components. For the purposes of this project historical data will be generated.

2 STATUS 2: ACTIVITIES

Work for week 12 was completed as planned through the submission on November 8. The following stories from the plan for week 13 have been completed:

- Provider portal: write QuestionnaireResponse to FHIR server
- Patient portal: write QuestionnaireResponse to FHIR server
- Generate QuestionnaireResponse 'history': patient mood data

The following story from the plan for week 13 is still in progress:

- Generate QuestionnaireResponse 'history': provider BDRS data

The following story from the plan for week 14 was completed during the course of development:

- Provider portal: Add button to populate generated data

3 STATUS 2: CHALLENGES

As suggested during the plan, generating apparently-valid data was a more complex task than could be accomplished during the week. I was able to generate mood and provider data randomly and force it to follow simple rules like the

published means and standard deviations; however, further development of the rules to coordinate the mood and BDRS data remains for week 14. As defined in the plan week 14 is relatively focused on the display of these data, so having this visualization and the already-defined rules encoded should continue to be manageable.

4 STATUS 2: PLANS

The activities for week 14 include:

- Complete the ruleset for coordinating historical mood and BDRS data
- Read the historical data from the FHIR server
- Display the historical data in chart format

As discussed, despite the delay on one story the completion of a week 14 story leads me to consider the plan still on track.

5 CONCLUSION

Bipolar disorder is a chronic illness that has a long-established standard of care yet continues to be characterized by poor outcomes and high direct and indirect medical cost. It is hoped that this data collection tool will improve patient understanding and help providers recognize and address critical mood transitions before they become catastrophic.

6 REFERENCES

1. Berk, M., Malhi, G. S., Cahill, C., Carman, A. C., Hadzi-Pavlovic, D., Hawkins, M. T., Tohen, M., & Mitchell, P. B. (2007). The Bipolar Depression Rating Scale (BDRS): its development, validation and utility. *Bipolar Disorders*, *9*(6), 571–579. https://doi.org/10.1111/j.1399-5618.2007.00536.x
2. Perez-Arribas, I., Goodwin, G. M., Geddes, J. R., Lyons, T., & Saunders, K. E. A. (2018). A signature-based machine learning model for distinguishing bipolar disorder and borderline personality disorder. *Translational Psychiatry*, *8*(1), 274. https://doi.org/10.1038/s41398-018-0334-0
3. Tsanas, A., Saunders, K. E. A., Bilderbeck, A. C., Palmius, N., Osipov, M., Clifford, G. D., Goodwin, G. M., & De Vos, M. (2016). Daily longitudinal self-monitoring of mood variability in bipolar disorder and borderline

personality disorder. *Journal of Affective Disorders*, *205*, 225–233. https://doi.org/10.1016/j.jad.2016.06.065