To know what we must know to help our patients, we have relied on randomized clinical trials (RCTs) to determine average overall effects of interventions for the “average” patient above and beyond average overall effects of placebo. Although informative, RCTs do not address our clinical challenges of finding the right treatment for the right patient at the right time. As clinicians, we ask the question, “what does the specific patient in front of me need?” Currently we do not have enough clinical data or biomarker data to determine precisely (precision psychiatry) what may work best. But we do hope that in the future we will move in that direction.

Several streams of research may help us get to the promised land of precision psychiatry. Starting big, carefully constructed, well-characterized, large-scale longitudinal cohorts of patients with harmonized outcomes data could help to determine clinical trajectories. Predictive analytics, machine learning, and artificial intelligence approaches could then be applied to make sense of the data so that specific variables will determine how individual patient’s disorders will evolve or respond to treatment over time. Once these models are constructed, then they can be applied to other datasets and their clinical utility can be assessed. Additionally, outcomes with specific treatments can be organized so that the variables associated with outcomes can be specified. Ultimately, if our systems served us well, we would have our electronic medical record have a decision support system that would tell us, “here are 10,000 patients just like yours and here are their outcomes to these treatments adjusted for relevant variables—and here is the relevant literature to help inform your decision-making.” Then the treatment outcomes go back into the system so that the system becomes self-learning.

Focusing on the small, individual genes, polygenic risk scores, longitudinal biomarkers, along with epigenetic changes, developmental variables (including childhood adversity and resilience) will be used as a signature. Such a signature can then be used for comparative effectiveness studies to match patients to treatments. And just as been done with Alzheimer’s disease, we will move closer to a biomarker-based set of disorders that could inform treatment.

To get to the promised land, we will have to re-engineer how we work and how we can have large-scale collaborations. Meanwhile, we can learn from our colleagues in other fields such as Alzheimer’s disease (http://adni.loni.usc.edu/#gov-container) to move the field forward.

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