Genetic Testing

Case Study

Following the genetic testing in June 2009, the student's psychotropic medication regimen included two medications, Abilify and Seroquel, which are metabolized through the CYP2D6 pathway, respectively, at high and moderate substrate affinity, and one medication (Lamictal) that is not metabolized through CYP2C9, CYP2C19, or CYP2D6. Multiple medication changes ensued to achieve a more effective treatment response, but with mixed results. In late February, 2011, the student received two significant medication changes: the dosage for Abilify was split into two smaller doses to achieve a therapeutic steady-state response. Additionally, Lithobid (not metabolized through CYP2D6) was added. Throughout January and February 2011, Depakote was reduced, and then discontinued in late March. From February to June, 2011, further downward adjustments in the level of Abilify occurred. The ultra-rapid status indicated a need to increase dosing in the steady state, which was achieved initially by twice-a-day prescription of Abilify. The significant alteration in CYP2D6 indicated a need to avoid drugs dependent on this pathway for metabolism, which was achieved by the eventual phasing out of Abilify.

Over this same time period (January 2011 to June 2011), behavioral data revealed an improvement in multiple areas. For example, Inability to Follow Directions decreased from 121 at baseline to 68 (43.8% decrease); Academic Incomplete Work

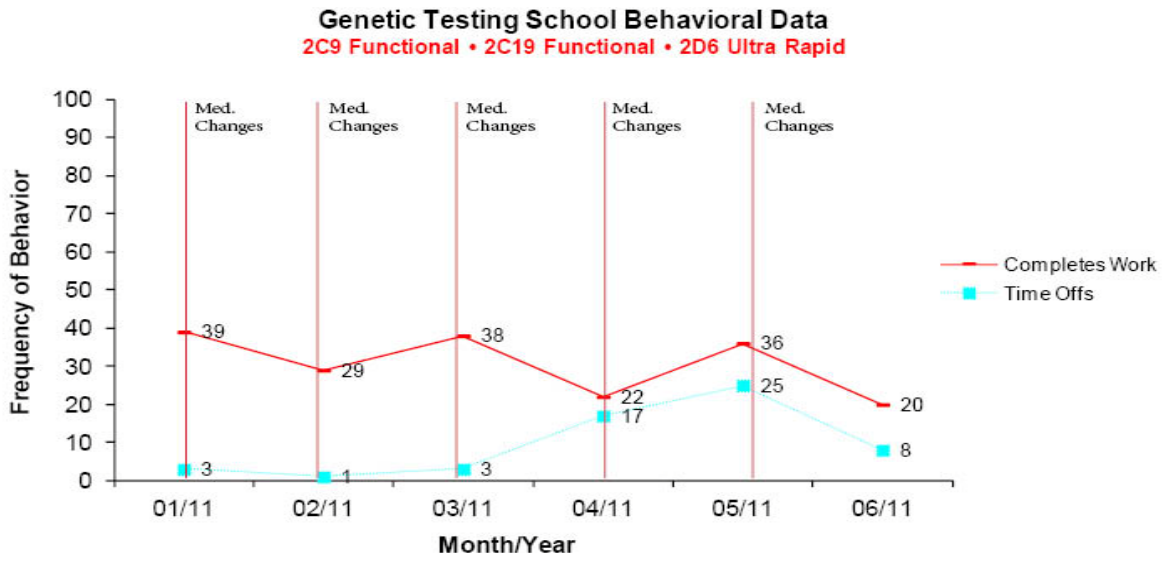
decreased from 125 at baseline to 65 (48% decrease); self-imposed Time-Offs (self-control indicator) increased from 11 at baseline to 45 (309% increase); Negative Attention Seeking behaviors decreased from 41 at baseline to 18 (56% decrease). Although Anxious Coping increased to 44 from a baseline of 13, the frequency had decreased over the 5 month period from January to June 2011. The student remained dependent on staff support (Prompts, Redirections, Warnings), but the general trend was decreasing.

Frequency of School Behaviors

Behavior	4/2/10-6/2/10 (Baseline)	1/22/11-4/1/11	4/2/11-6/10/11
Inability to Follow Directions	121	98	68
Incomplete Work	125	89	65
Time Offs	11	6	45
Warnings	123	72	79
Redirections	55	341	269
Prompts	254	288	245
Restricted Day	11	3	2
Anxious Coping	13	68	44
Negative Attention Seeking	41	60	18

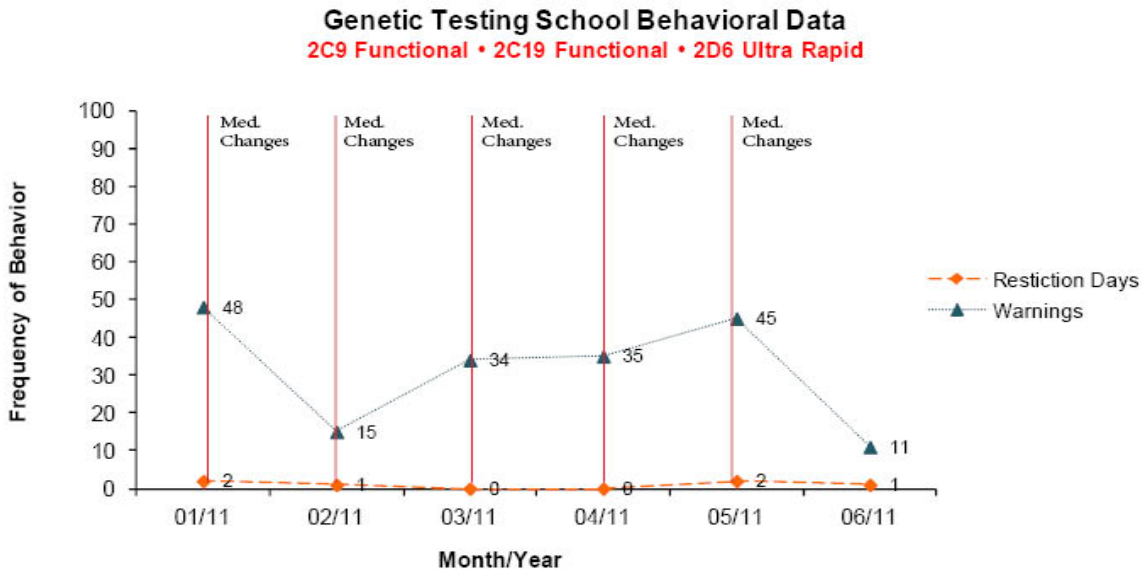
Behavioral Data following genetic testing for medication metabolization.

The Learning Clinic, 2011 The Learning Clinic, 2011, “Behavioral Data Findings for TLC Applied Research,” thelearningclinic.org



Behavioral Data (Completes Work and Time-Offs) following genetic testing for medication metabolization.

The Learning Clinic, 2011 The Learning Clinic, 2011, “Behavioral Data Findings for TLC Applied Research,” thelearningclinic.org



Behavioral Data (Restricted Days and Warnings) following genetic testing for medication metabolization.

The Learning Clinic, 2011 The Learning Clinic, 2011, “Behavioral Data Findings for TLC Applied Research,” thelearningclinic.org

The study reveals the complexity of coordinating medication regimens with clinical interventions to achieve a therapeutic effect. It is not a simple, straight-forward process. The salient message to learn from the case is that personalized medicine is not just a preferred method; it is a pre-requisite to achieve the intended therapeutic results. Co-morbidity increases the complexity of medication regimens. The compromised ability to metabolize medications presents a unique present a problem

that requires a personalized approach to select psycho-pharmacological treatments to match available “genetic addresses.” The aim is to adjust treatment so that the person may effectively metabolize medication. Instructional methods, task selection, and clinical strategies also need a personalized approach, rather than a “one size fits all” approach to the person’s diagnosis.

Research methods, like single subject design, fit the need to assess the results of medication management. The medication influence on instructional and clinical outcomes may also be observed and measured. A multiple baseline data base enables the treatment team to monitor positive effects and the unintended outcomes of interventions, in both educational and treatment settings. The single subject research methodology may be most appropriate for school based mental health service delivery.