# Group-Based Trajectory Modeling to Identify Patterns of Antipsychotic-Induced Weight Gain Among Children and Adolescents

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## BACKGROUND

Weight gain is one of the most common metabolic side effects among children and adolescents taking second-generation antipsychotics (SGA), which affects up to 80% of pediatric SGA recipients. Antipsychotic-induced weight gain (AIWG) can not increase the risk of diabetes, hypertension, dyslipidemia, and cardiovascular disease, as well as affect the mental health of children and adolescents.

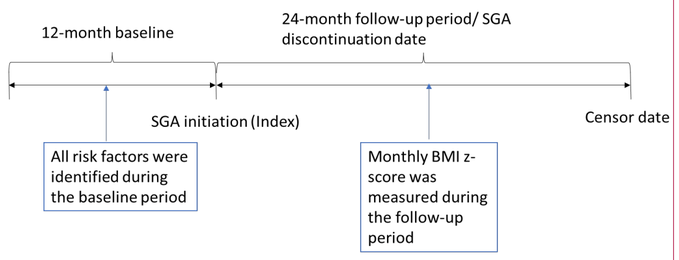
## OBJECTIVES

To model the change of BMI z-score and the development of significant weight gain in a large national cohort of children and adolescents taking SGAs and to examine the risk factors associated with the identified trajectories.

## METHOD

**Data:** This study was based on the IQVIA National Electronic Medical Record database from 2016 to 2021. IQVIA ambulatory electronic medical record (IQVIA AEMR-US) is one of the largest linkable, de-identified, HIPAA-compliant longitudinal databases.

**Study Design:** A retrospective, longitudinal study included pediatric SGA recipients aged 6 to 19 who received at least 90 days of continuous SGA treatments.

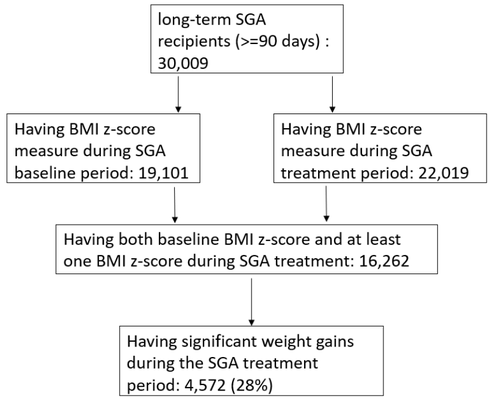



**Method:**

- Group-based trajectory models (GBTM) were used to model the absolute change in BMI z-score and the development of significant weight gain defined as an increase of BMI z-score >=0.5 during SGA treatment.
- Multinomial logistic regression models were used to examine the association between the baseline predictors and identified trajectory groups.

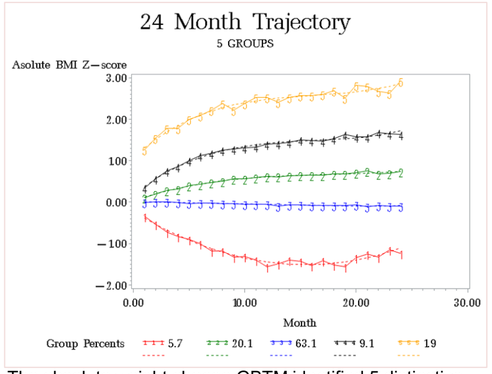
## RESULTS

### Figure 1. Study Cohort



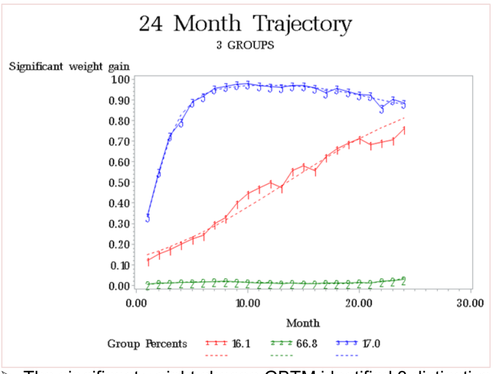

- Of the 16,262 patients meeting inclusion criteria, 4,572 (28%) experienced significant weight gain during SGA treatment.

### Figure 2. Absolute Weight Change Trajectory




- The absolute weight change GBTM identified 5 distinctive trajectories for AIWG: rapid weight gain (1.9%); gradual weight gain (9.1%); slight weight gain (20.1%); stable weight (63.1%; (reference group)), and gradual weight loss (5.7%).

### Figure 3. Significant Weight Change Trajectory




- The significant weight change GBTM identified 3 distinctive trajectories: rapid significant weight gain (17.1%), gradual significant weight gain (16.1%), and nonsignificant weight gain (66.8%;(reference group)).

### Table 1. Multinomial Regression Analysis for Absolute Weight Change

| Predictor | Rapid weight gain vs Stable weight | Gradual weight gain vs Stable weight | Slight weight gain vs Stable weight | Gradual weight loss vs Stable weight |
|---|---|---|---|---|
| | OR (95%CI) | OR (95%CI) | OR (95%CI) | OR (95%CI) |
| **Age** 12-17 vs 5-11 | 0.647 (0.489-0.856) | 0.715 (0.623-0.82) | 0.798 (0.723-0.882) | 0.855 (0.729-1.003) |
| **Prescriber specialty** Mental health specialist vs PCP | 1.276 (0.888-1.834) | 1.069 (0.889-1.286) | 1.04 (0.911-1.188) | 0.692 (0.532-0.899) |
| **Type of index SGA** Olanzapine Yes vs No | 1.718 (1.06-2.784) | 1.492 (1.147-1.94) | 0.998 (0.816-1.222) | 1.321 (0.956-1.825) |

- Using the stable weight group as the reference, those younger, nonobese at baseline, receiving SGA from specialists, and receiving olanzapine were more likely to be in the rapid weight gain group than their counterparts.

### Table 2. Multinomial Regression Analysis for Significant Weight Change

| Predictor | Rapid significant weight gain vs Nonsignificant weight gain | Gradual significant weight gain vs Nonsignificant weight gain |
|---|---|---|
| | OR (95%CI) | OR (95%CI) |
| **Baseline Weight** Obese vs Nonobese | 0.060 (0.052-0.070) | 0.084 (0.069-0.103) |
| **Gender** Male vs Female | 1.204 (1.093-1.327) | 1.015 (0.891-1.157) |
| **Age** 12-17 vs 5-11 | 0.712 (0.645-0.785) | 0.696 (0.609-0.797) |
| **SGA switch** Low-risk SGA to High-risk SGA vs Others | 1.381 (1.116-1.710) | 1.923 (1.47-2.516) |
| **Type of index SGA** Olanzapine Yes vs No | 1.496 (1.234-1.813) | 1.254 (0.963-1.634) |

- Using the non-significant weight gain group as the reference, those males, younger, switching from low-risk SGA to high-risk SGA and receiving olanzapine were more likely to be in the rapid significant weight gain group than their counterparts.

## CONCLUSIONS

Based on current findings, longer-term analysis with more data points across time is warranted. Added to the growing body of research on the effects of SGA and highlighted the need for personalized treatment approaches that consider individual variation. It is important for healthcare providers to monitor patients closely for weight changes and to work with patients to develop individualized treatment plans that minimize the risks of AIWG.

## REFERENCES

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