

Children Taking Miralax Less Likely to Have Depression but More Likely to Have Anxiety in Certain Age Groups

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Key Findings:

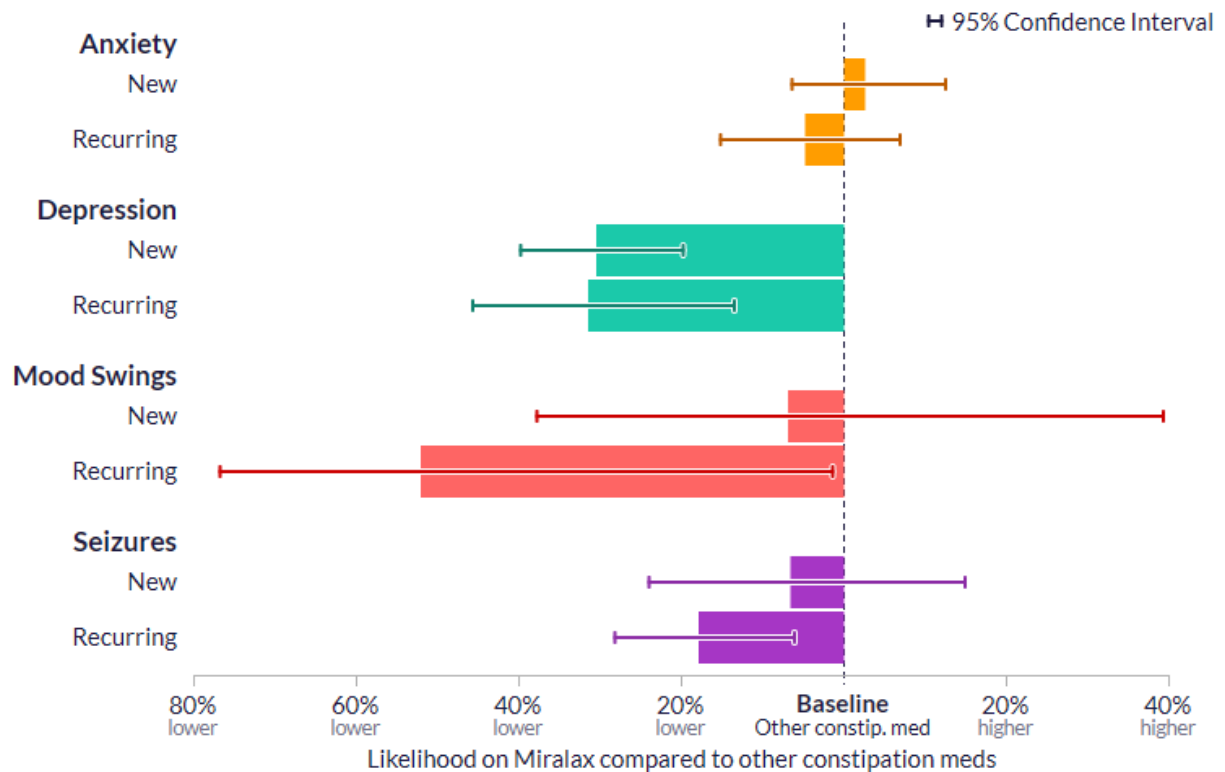
- Children aged 6 to 11 treated with Miralax (polyethylene glycol 3350; PEG 3350) are less likely to be diagnosed with new or recurrent symptoms of depression, new mood swings, or new seizures compared to those treated with a different constipation treatment.
- Children aged 12 to 17 treated with Miralax are less likely to be diagnosed with new symptoms of depression but are more likely to have new or recurring anxiety, new mood swings, and new or recurring seizures.

Children experiencing constipation may be treated with laxatives, enemas, or stool softeners, with one such treatment being Miralax.¹ Recently, concerns have grown regarding the use of Miralax in children and whether there may be a related onset of new neuropsychiatric conditions such as anxiety, mood swings, and seizures.^{2,3} The U.S. Food and Drug Administration (FDA) determined no changes to the label of Miralax were needed based on these reports.⁴ However, the relationship between Miralax and neuropsychiatric conditions is not well understood, and the interplay of behavioral and psychological conditions that lead to stool withholding and constipation complicates the picture.⁵

To further understand the relationship between Miralax and neuropsychiatric conditions, we studied 645,294 children who were prescribed Miralax and compared them to 105,963 children who were prescribed a different constipation medication. Other constipation medications were used as a control to adjust for the established relationship between constipation and neuropsychiatric conditions.⁶

We found that children aged 6 to 11 treated with Miralax were less likely to experience new or recurring symptoms of depression compared to those treated with a different constipation medication, as seen in Figure 1. Additionally, recurring symptoms of seizures and mood swings were also less likely among children aged 6 to 11 treated with Miralax. We did not find a statistically significant change in the likelihood of new seizures, new mood swings, new anxiety, or recurring anxiety.

Likelihood of Neuropsychiatric Conditions in Children Aged 6 to 11 Treated for Constipation

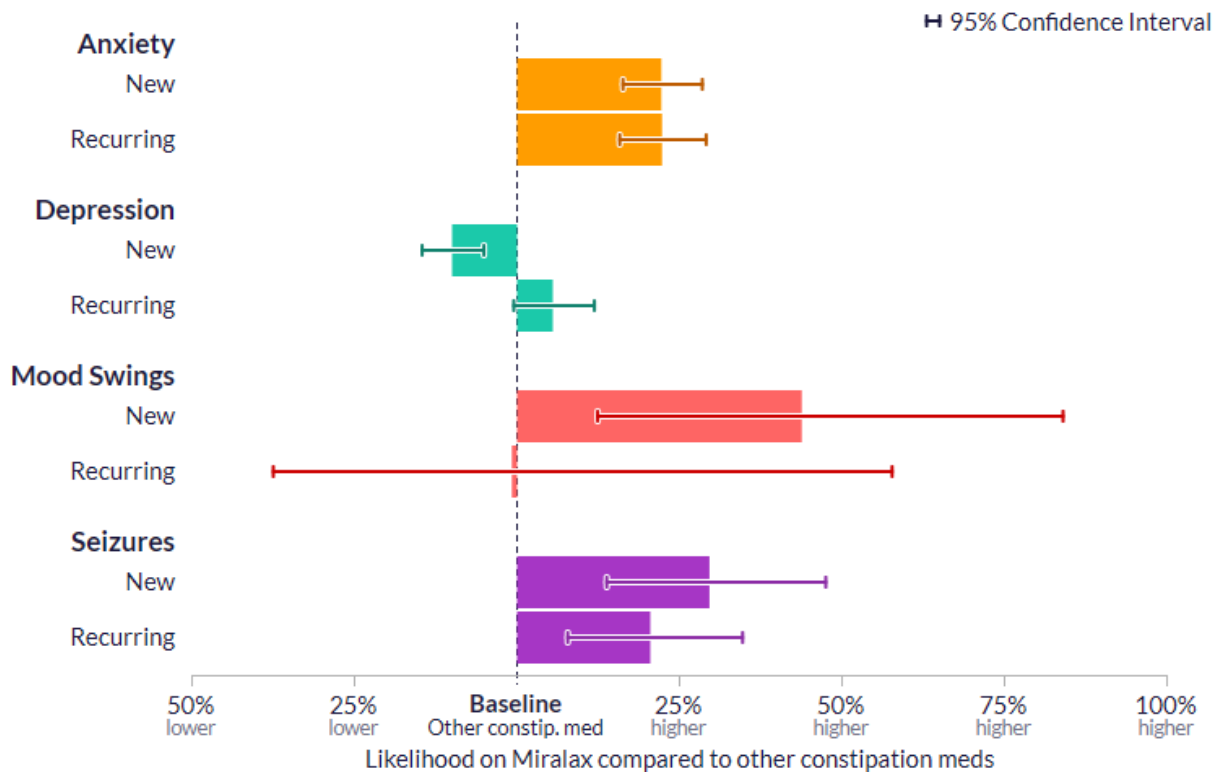


N=269,007 children "Likelihood of Neuropsychiatric Conditions in Children Aged 6 to 11 Treated for Constipation," 2025. EpicResearch.org

Figure 1. The likelihood of a child aged 6 to 11 experiencing a new or recurrent neuropsychiatric condition by constipation treatment.

Among children aged 12 to 17, we found that those treated with Miralax were less likely to have new symptoms of depression compared to those treated with other constipation medications, as seen in Figure 2. However, they were more likely to experience new and recurring seizures, new mood swings, and new and recurring anxiety. We did not find a statistically significant change in the likelihood of recurring depression or mood swings.

Likelihood of Neuropsychiatric Conditions in Children Aged 12 to 17 Treated for Constipation



N=229,965 children "Likelihood of Neuropsychiatric Conditions in Children Aged 12 to 17 Treated for Constipation," 2025. EpicResearch.org

Figure 2. The likelihood of a child aged 12 to 17 experiencing a new or recurrent neuropsychiatric condition by constipation treatment

These data come from Cosmos, a dataset created in collaboration with a community of Epic health systems representing more than 294 million patient records from 1,600 hospitals and more than 37,000 clinics from all 50 states, Lebanon, and Saudi Arabia. This study was completed by two teams that worked independently, each composed of a clinician and research scientists. The two teams came to similar conclusions. Graphics by Brian Olson.

References

1. Paul A, Punati J. What is the evidence for over the counter laxatives to treat childhood constipation? *Curr Gastroenterol Rep.* 2021;23(11). doi:10.1007/s11894-021-00818-1
2. Becker HA. Is Miralax really safe for kids? *Parents.* January 7, 2015. <https://www.parents.com/parents-magazine/parents-perspective/is-miralax-safe-for-kids-an-expert-weighs-in/>. Accessed November 20, 2024.
3. Hussain SZ, Belkind-Gerson J, Chogle A, Bhuiyan MAN, Hicks T, Misra S. Probable neuropsychiatric toxicity of polyethylene glycol: roles of media, internet and the caregivers. *GastroHep.* 2019;1(3):118-123. doi:10.1002/ygh2.336
4. October - December 2011. U.S. Food and Drug Administration. January 30, 2020. <https://www.fda.gov/drugs/fdas-adverse-event-reporting-system-faers/october-december-2011-potential-signals-serious-risksnew-safety-information-identified-adverse-event>. Accessed November 20, 2024.

5. Rajindrajith S, Devanarayana NM, Benninga MA. Childhood constipation: Current status, challenges, and future perspectives. *World J Clin Pediatr.* 2022;11(5):385-404. Published 2022 Sep 9. doi:10.5409/wjcp.v11.i5.385
6. Hosseinzadeh ST, Poorsaadati S, Radkani B, Forootan M. Psychological disorders in patients with chronic constipation. *Gastroenterol Hepatol Bed Bench.* 2011;4(3):159-163.

Data Definitions

Term	Definition
Study period	<p>Index dates:</p> <ul style="list-style-type: none"> • Pre-pandemic: 1/1/2017 to 3/1/2019 • Post-pandemic: 1/1/2022 to 8/28/2023 <p>These study periods were selected to control for the impact of the pandemic on pediatric mental health conditions and to allow for a one-year follow-up period.</p>
Study population	<p>Inclusions:</p> <ul style="list-style-type: none"> • Pediatric patients, aged 6 to 17, with an order for polyethylene glycol 3350 or a different constipation medication • Patients must have at least one face-to-face visit one year after the original medication order <p>Exclusions:</p> <ul style="list-style-type: none"> • Patients with stomach or colon removal within a year of medication start • Patients whose first order was a different constipation medication who were then prescribed polyethylene glycol 3350 in the year following the first order
Miralax (Polyethylene glycol 3350)	A prescription with RxNorm code 221147
Different constipation medication	<p>A prescription with one of the following RxNorm codes:</p> <ul style="list-style-type: none"> • Magnesium citrate: 52356 • Magnesium oxide: 6582 • Mineral oil: 6972 • Bisacodyl: 1596 • Sennosides: 36387 • Psyllium: 8928 • Glycerin suppository: 1156856
Stomach or colon removal	A procedure with any of the following CPT codes. Gastrectomy CPT codes: 43631, 43632, 43633, 43620. Colectomy CPT codes: 44140, 44141, 44147, 44150.
Face-to-face visit	The following encounter types: Emergency, Hospital Encounter, Office Visit, Well Child, Follow-Up, Telemedicine, Urgent Care, Walk-In.
Outcomes	<p>Outcomes within one year of exposure</p> <p>Anxiety: Diagnosis with ICD-10-CM code F40*, F41*, F06.4*, F93.0*, or F94.0*</p> <p>Depression: Diagnosis with ICD-10-CM code F32*, F33*, F06.31*, F06.32*, or F34.1*</p> <p>Seizure: Diagnosis with ICD-10-CM code G40*, R56.9, F44.5</p> <p>Mood swings: Diagnosis with ICD-10-CM code R45.8</p>
Confounders	<p>Legal sex</p> <p>Patient age:</p>

- 6-11
- 12-17

History of outcome condition

Race and ethnicity: Nonexclusive flags for Black and Hispanic/Latino patients

Premature birth (birth <37-week gestational age)

Social Vulnerability Index

RUCA

Complex GI history

- Hospitalized for encopresis: ICD-10-CM code R15.9
- Hospitalized for constipation or impaction: ICD-10-CM code K59.0* or K46.41

History of Hirschsprung's: ICD-10-CM code Q43.1

History of:

- A diagnosis with:
 - Anxiety: ICD-10-CM code F40*, F41*, F06.4*, F93.0*, or F94.0*
 - Depression: ICD-10-CM code F32*, F33*, F06.31*, F06.32*, or F34.1*
 - Seizure: ICD-10-CM code G40*, R56.9, F44.5
 - Mood swings: ICD-10-CM code R45.8.
 - Self-harm: An ICD-10-CM code included in the CCSR category MBD012 (suicidal ideation/attempt/intentional self-harm)
 - OCD: ICD-10-CM code F42*, R46.81, F98.4, F98.8, F98.9
 - Paranoia: ICD-10-CM code F60.0, F22, F23
 - Tics: ICD-10-CM code F95*
 - Headache: ICD-10-CM code R51*
- An encounter with a department specialty of:
 - Adolescent Behavioral Health Ward, Behavioral Health, Behavioral Health Clinic, Pediatric Behavioral Health Ward, Psychiatry, Psychology.
- An encounter with a chief complaint of:
 - Behavior Problem, Aggressive Behavior, Altered Mental Status, Mental Health Problem, Manic behavior, behavioral health, agitation, seizure disorder, seizure, seizures, obsessive-compulsive disorder, paranoia, tics, headache, anxiety

Whether the inclusion date occurred in the pre-pandemic period or post-pandemic period

Social Vulnerability Index	The social vulnerability quintile for the ZIP Code of the patient's most recent address
RUCA	Rural-Urban Commuting Area is a classification of geographic areas based on population density, urbanization, and daily commuting. It ranges from 1 to 10, with lower values indicating more urban areas and higher values indicating more rural areas.
Model	Logistic regression with Bonferroni correction

Table 1: Likelihood of Neuropsychiatric Conditions in Children Aged 6 to 11 Treated for Constipation

	Odds Ratio	Lower Bound CI	Upper Bound CI
Anxiety			
New	1.03	0.94	1.13
Recurring	0.95	0.85	1.07
Depression			
New	0.70	0.60	0.80
Recurring	0.69	0.54	0.87
Mood Swings			
New	0.93	0.62	1.39
Recurring	0.48	0.23	0.99
Seizures			
New	0.93	0.76	1.15
Recurring	0.82	0.72	0.94

Table 2: Likelihood of Neuropsychiatric Conditions in Children Aged 12 to 17 Treated for Constipation

	Odds Ratio	Lower Bound CI	Upper Bound CI
Anxiety			
New	1.22	1.16	1.29
Recurring	1.22	1.16	1.29
Depression			
New	0.90	0.85	0.95
Recurring	1.06	1.00	1.12
Mood Swings			
New	1.44	1.12	1.84
Recurring	0.99	0.63	1.58
Seizures			
New	1.30	1.14	1.48
Recurring	1.21	1.08	1.35