Prior Authorization and Inappropriate Antipsychotic Prescribing to Children on Medicaid

Janet Currie[1] and Kate Musen[2]
[1] Princeton University & NBER [2] Columbia University

January 4, 2025

The findings in this presentations are not necessarily those of IQVIA or any of its affiliated or subsidiary entities.

Background and Motivation

- Second generation ("atypical") antipsychotics (SGAs) came on the U.S. market in the 1990s.
- Antipsychotic prescribing to children increased with the development of SGAs, but the superiority of these drugs is increasingly unclear (Leucht et al., 2009).
- **No atypical antipsychotic is currently FDA approved for any diagnosis for children under the age of five.**
- State Medicaid programs started implementing prior authorization (PA) requirements for children, especially those <6, in 2005.
- Trends in SGA use among children enrolled in Medicaid reversed in 2010, declining by 43% between 2008 and 2016 (Bushnell et al., 2023).
  - **This decline was most pronounced among children ages 2-5.** In 2008, 4.7 out of 1000 boys ages 2-5 on Medicaid were on antipsychotics. By 2016, this figure has dropped to 1.6 out of 1000 boys.
- More than 60% of Medicaid children 0-5 on antipsychotics receive **no psychosocial services** prior to starting antipsychotics (Finnerty et al., 2016).

Research Questions

1. How did comprehensive pediatric prior authorization policies—which required PA for the prescribing of *all* antipsychotics to children under a specific age—affect prescribing of antipsychotics to children on Medicaid?
2. Can changes in prescribing be attributed to hassle costs or did PA requirements provide information which changed doctor behavior?
3. Was there substitution to other psychiatric medications for affected children?

Research Questions

Preview of findings:

- Comprehensive pediatric prior authorization policies reduced prescribing of antipsychotics to children ages 3-5 on Medicaid by 34 –43%.
- Older children and children on private health insurance were not affected, suggesting that hassle costs as a driving mechanism as information should have spilled over onto other groups.
- Some evidence of increased benzodiazepine use among Medicaid children 3-5, but these Rx are not prescribed by the providers who were prescribing antipsychotics.

Related Literatures

- Information vs. hassle costs in healthcare
  - Alpert et al. (2024), Burn and Ristovska (2024), Brot-Goldberg et al. (2023), Dillender (2018), Dunn et al. (2024)

  Our contribution: In addition to state-level analysis, we can look at antipsychotic prescribing to both Medicaid and privately insured children—by the same provider—to help identify these mechanisms.

- Interventions to reduce inappropriate prescribing
  - Ahomaki et al. (2020), Doctor et al. (2018), Sacarny et al. (2016), Sacarny et al. (2018)

  Our contribution: We study a policy tool used **nationally** and show that it was effective in reducing off-label prescribing to a vulnerable population.

- The importance of going back to source documents for establishing accurate and traceable policy timelines for health economics research
  - Alexander and Schnell (2019), Anderson and Rees (2014), Horwitz et al. (2021), Meyers (2022)

  Our contribution: We correct errors in previously published timelines of pediatric antipsychotic prior authorization policies and create a database of source documents spanning nearly two decades for public use.

Conceptual Framework & Mechanisms

- Prior authorization can reduce prescribing through (1) **information**, (2) **hassle costs**, or both. Each mechanism generates unique predictions about provider behavior.
- The **information** channel predicts:
  - Reduction in Rx to all children
  - Larger effects for providers with less specialized training
  - Larger effects for children with less severe behavioral issues
- The **hassle costs** channel predicts:
  - Reduction in Rx to children on Medicaid only
  - Larger effects for providers with a higher opportunity cost of time

Conceptual Framework & Mechanisms

- Prior authorizations can reduce prescribing through (1) **information**, (2) **hassle costs**, or both. Each of these mechanisms generate unique predictions with respect to provider behavior.
- The **information** channel predicts:
  - Reduction in Rx to all children
  - Larger effects for providers with less specialized training
  - Larger effects for children with less severe behavioral issues
- The **hassle costs** channel predicts:
  - Reduction in Rx to children on Medicaid
  - Larger effects for providers with a higher opportunity cost of time

Providers with more specialized training see children with more severe behavioral issues, so net effects are ambiguous.

Background on Medicaid Rx Policy

- Since 1993, every state Medicaid program is required to have a Drug Utilization Review (DUR) program with the specific aim of reducing inappropriate use of prescription drugs.
- Many states have implemented Preferred Drug Lists (PDLs) as part of their DUR Program.
- Some state PDLs explicitly state all prior authorization requirements, other states supplement their PDLs with additional clinical prior authorization requirements.
- **Pediatric antipsychotic PA requirements usually apply to both Medicaid FFS and MCO plans** (Kaiser Family Foundation, 2019).

Policy Database Creation

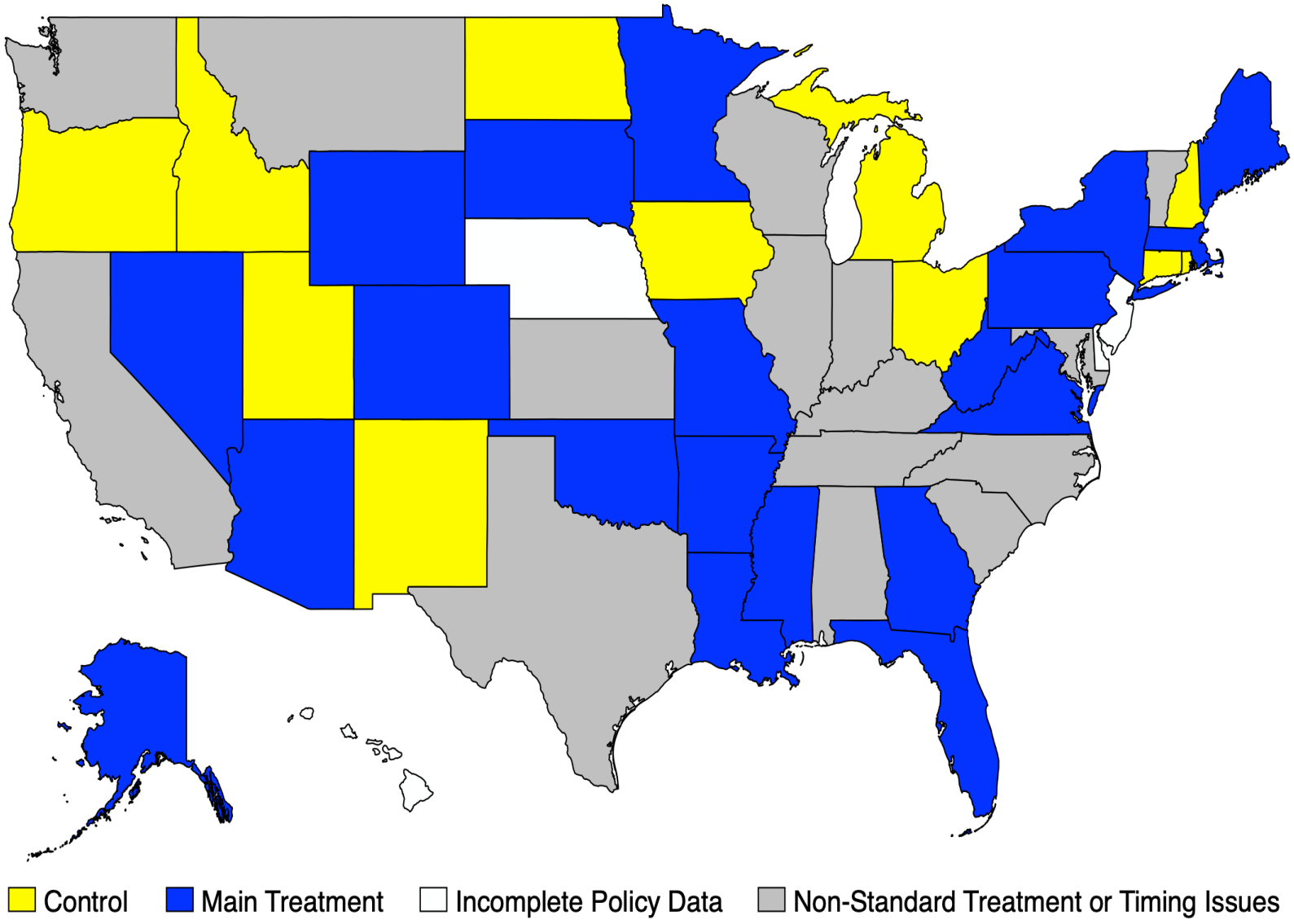
- For each state and year from 2005-2020, we hand collected documents from state Medicaid programs that either documented or communicated PA policy changes to providers.
- These documents include PDLs, DUR/P&T board meeting minutes, provider memos and letters, and provider handbooks. **Number over 10,000 pages in total.**
- Documents were collected from Medicaid websites, the Wayback Machine, and FOIA requests.
- This approach allowed us to either locate the **exact implementation date** of the first pediatric antipsychotic prior authorization policy or to **confirm that no such policy was in place** prior to 2019 for **46 out of 50 states**.
- **New database of policies and Medicaid documents will be released via openICPSR.**

Prescription Data

- IQVIA LRx database of antipsychotic (2006–2019), antidepressant (2006–2018), and benzodiazepine (2006–2018) prescriptions filled in retail pharmacies and by mail order.
- Data allow us to observe specialty and other characteristics.
- Anonymized patient IDs include ZIP 3, year of birth, and insurance status.
  - This allows us to measure effects of PA in the Medicaid population and any potential spillovers to privately insured children.

Sample Restrictions: States

- **Main treated states**: comprehensive PA policy targeting children <5 or <6 years old with 2 years of data pre/post treatment (20 states)
- **Control states**: no comprehensive PA policy targeting children before 2020 (11 states)
- 15 states with more restrictive or less restrictive PA policies or policy timing issues
  - 9 states added more restrictive comprehensive PA policies affecting older kids (<7, <8, <12, <14, <18, all enrollees)
  - 2 states added less restrictive comprehensive PA policies affecting kids <3 years old
  - 4 states implemented comprehensive PA policies too early for pre-period data or implemented multiple policies in quick succession
- 4 states with missing policy data



Sample Restrictions: Providers

- Restrict to providers whose patients under age 10 on Medicaid collectively filled at least 20 scripts for antipsychotics from 2006-2019
- Providers are considered treated the first quarter they are in a treated state.
- Drop treated providers who are not observed for at least 2 years pre/post treatment.
- Drop providers who practice in states with non-standard treatment prior to moving to states within the main treatment sample.
- Drop providers whose treatment status is ambiguous (e.g., missing location data prior to appearing in a treated state).

Empirical Strategy

Staggered difference-in-differences using Callaway & Sant'Anna (2021), both at the state and the provider-level. We take the balanced average treatment effect over the first 8 quarters after treatment:

$$\theta_{es}^{0,bal}(8) = \frac{1}{8+1}\sum_{e=0}^{8}\sum_{g\in\mathcal{G}}\mathbf{1}\{g+8\leq\mathcal{T}\}ATT(g,g+e)P(G=g\mid G+8\leq\mathcal{T})$$

where, for quarter =t,

$$ATT(g,t) = \mathbb{E}\left[Y_t - Y_{g-1} \mid G_g = 1\right] - \mathbb{E}\left[Y_t - Y_{g-1} \mid D_t = 0, G_g = 0\right]$$

and:
$D_t = 0$ if the unit is untreated,
G is the first quarter that a unit is treated (G = ∞ if control),
$\mathcal{G} = \text{supp}(G) \setminus \infty$,
e is time since treatment.

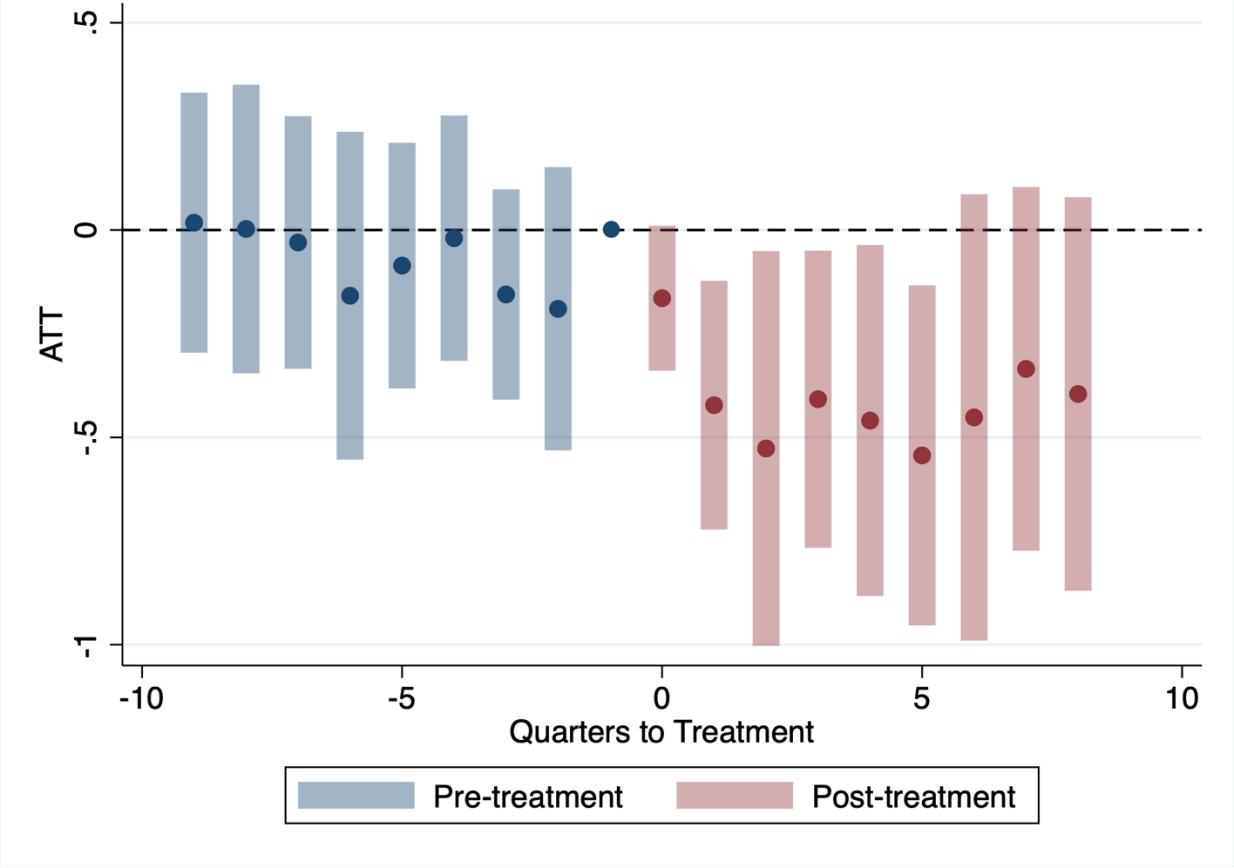
We weight by the relevant population when analysis is at the state level and cluster standard errors by state when the analysis is at the provider level.

Empirical Strategy: Two Different Estimation Strategies

- State-level analyses provide a measure of the aggregated effect of provider behavior and patient/parent behavior in response to the policy changes.
- Provider-level analyses provide a direct measure of provider behavior.
- Comparing the magnitudes of these two estimates provides a measure of doctor shopping by parents.

State-Level Analysis: Event Study of Antipsychotic Prescribing

Effect on Rx to Medicaid Patients Ages 3-5/Population 3-5 under 300% FPL



Off a mean prescribing rate of 1.2 Rx to Medicaid patients ages 3-5 / pop. 3-5 under 300% FPL, **prior authorization reduces Rx by 34.4%**

State-Level Analysis: 2-Year ATT for Children on Medicaid

Variable	Rx Ages 3-5/ 1 K Pop 3-5 Under 300% FPL	Rx Ages 3-5/ 1 K Pop 3-5 Under 300% FPL	Rx Ages 7-9/ 1 K Pop 7-9 Under 300% FPL	Rx Ages 7-9/ 1 K Pop 7-9 Under 300% FPL
ATT	-0.412	-0.279	0.380	0.397
SE	0.181	0.128	0.909	0.587
Rx Type	All	New	All	New
Outcome Mean	1.196	0.770	10.351	6.541
Percent Effect	-34.4	-36.2	3.7	6.1
N States	31	31	31	31

Notes. Analysis at the quarter-state level. Standard errors clustered at the state level. ATT is over the first two years post treatment.

State-Level Analysis: 2-Year ATT for Children on Medicaid

Variable	Rx Ages 3-5/ 1 K Pop 3-5 Under 300% FPL	Rx Ages 3-5/ 1 K Pop 3-5 Under 300% FPL	Rx Ages 7-9/ 1 K Pop 7-9 Under 300% FPL	Rx Ages 7-9/ 1 K Pop 7-9 Under 300% FPL
ATT	-0.412	-0.279	0.380	0.397
SE	0.181	0.128	0.909	0.587
Rx Type	All	New	All	New
Outcome Mean	1.196	0.770	10.351	6.541
Percent Effect	-34.4	-36.2	3.7	6.1
N States	31	31	31	31

Notes. Analysis at the quarter-state level. Standard errors clustered at the state level. ATT is over the first two years post treatment.

State-Level Analysis: 2-Year ATT for Children on Medicaid

Variable	Rx Ages 3-5/ 1 K Pop 3-5 Under 300% FPL	Rx Ages 3-5/ 1 K Pop 3-5 Under 300% FPL	Rx Ages 7-9/ 1 K Pop 7-9 Under 300% FPL	Rx Ages 7-9/ 1 K Pop 7-9 Under 300% FPL
ATT	-0.412	-0.279	0.380	0.397
SE	0.181	0.128	0.909	0.587
Rx Type	All	New	All	New
Outcome Mean	1.196	0.770	10.351	6.541
Percent Effect	-34.4	-36.2	3.7	6.1
N States	31	31	31	31

Notes. Analysis at the quarter-state level. Standard errors clustered at the state level. ATT is over the first two years post treatment.

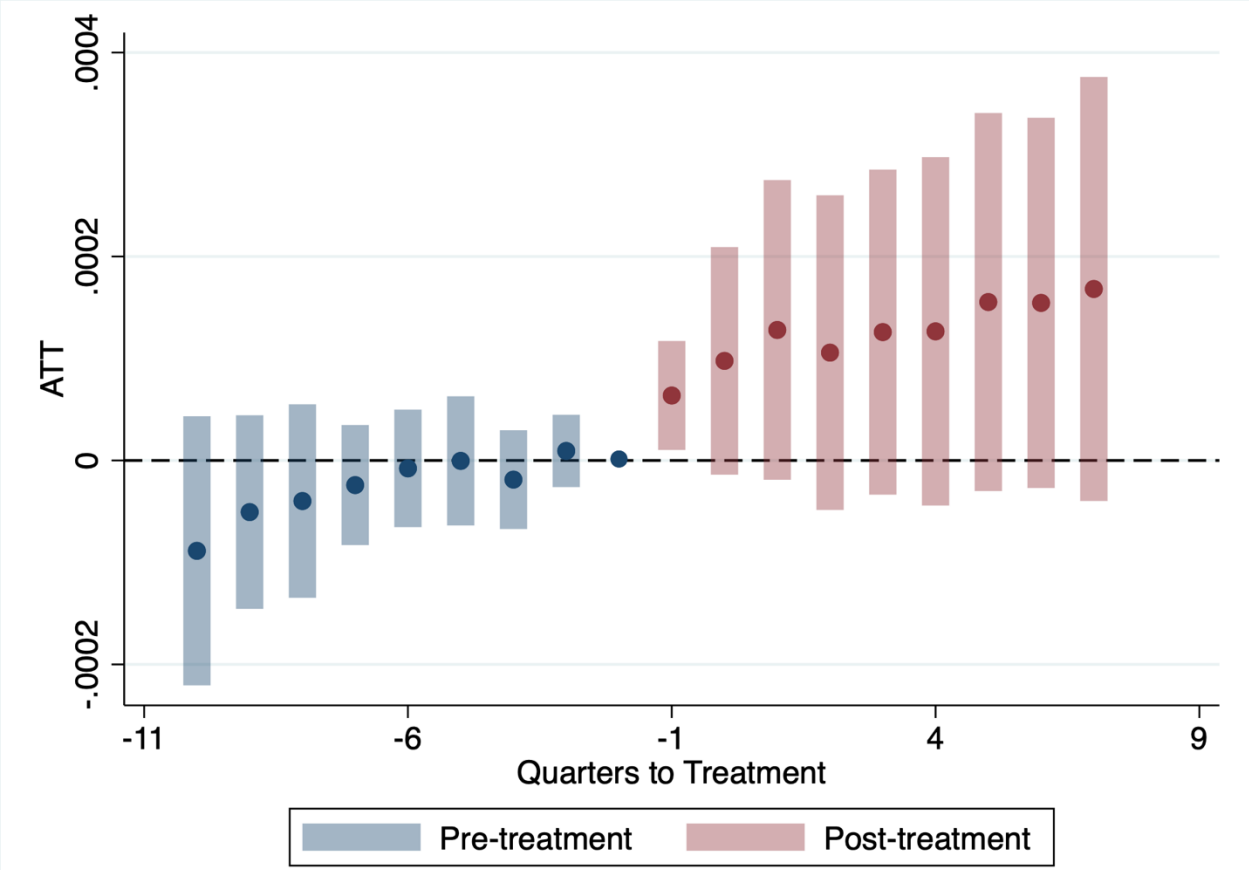
State-Level Analysis: 2-Year ATT for Children on Private Insurance

Variable	Rx Ages 3-5/ 1 K Pop 3-5 Over 300% FPL	Rx Ages 3-5/ 1 K Pop 3-5 Over 300% FPL	Rx Ages 7-9/ 1 K Pop 7-9 Over 300% FPL	Rx Ages 7-9/ 1 K Pop 7-9 Over 300% FPL
ATT	-0.141	-0.080	-0.915	-0.664
SE	0.277	0.183	1.329	0.895
Rx Type	All	New	All	New
Outcome Mean	2.676	1.705	22.782	14.154
Percent Effect	-5.3	-4.7	-4.0	-4.7
N States	31	31	31	31

Notes. Analysis at the quarter-state level. Standard errors clustered at the state level. ATT is over the first two years post treatment.

State-Level Analysis: Some Evidence of (Anticipatory) Increase in Benzo Rx

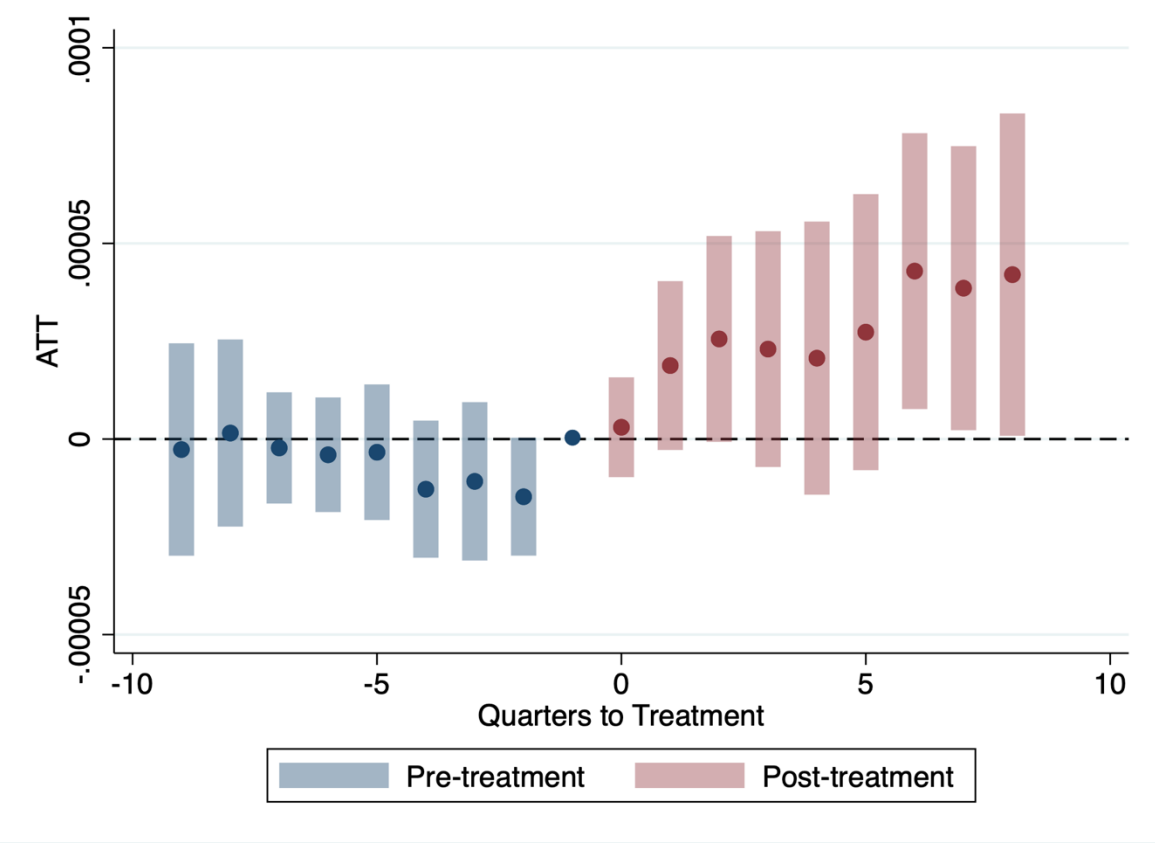
Effect on Rx to Medicaid Patients Ages 3-5/Population 3-5 under 300% FPL



Starting the quarter before the implementation of antipsychotic prior authorization policies, benzo prescribing increases by 22%.

State Level Analysis: One Third of this Increase is from Internal Medicine

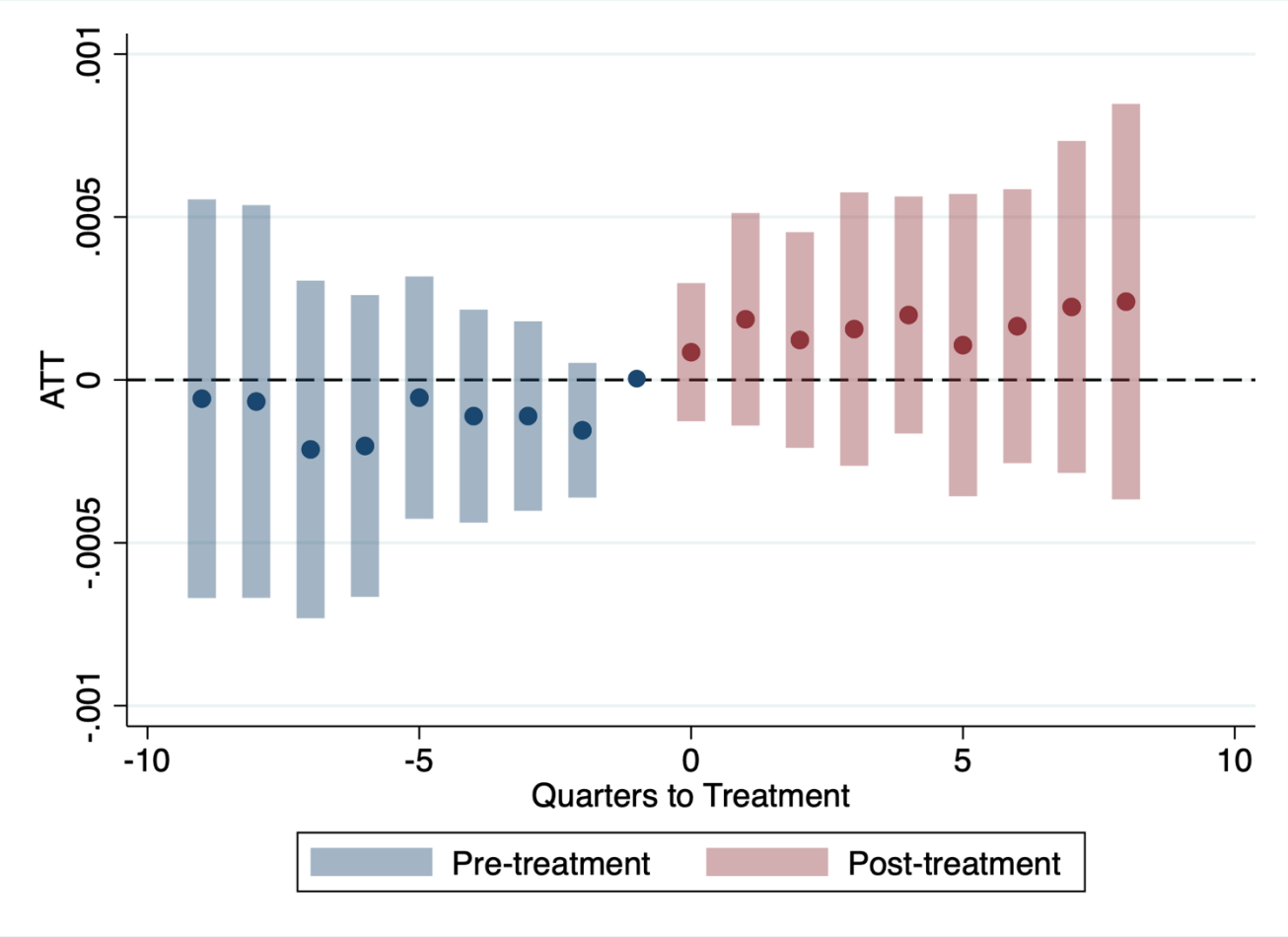
Effect on Rx to Medicaid Patients Ages 3-5/Population 3-5 under 300% FPL



Internal medicine doctors are not a major prescriber of antipsychotics to children. Children shift to being prescribed benzos from internal medicine doctors as new providers. **Rx from family medicine doctors, pediatricians, psychiatrists, and nurse practitioners do not change.**

Little Evidence of Substitution to Antidepressants

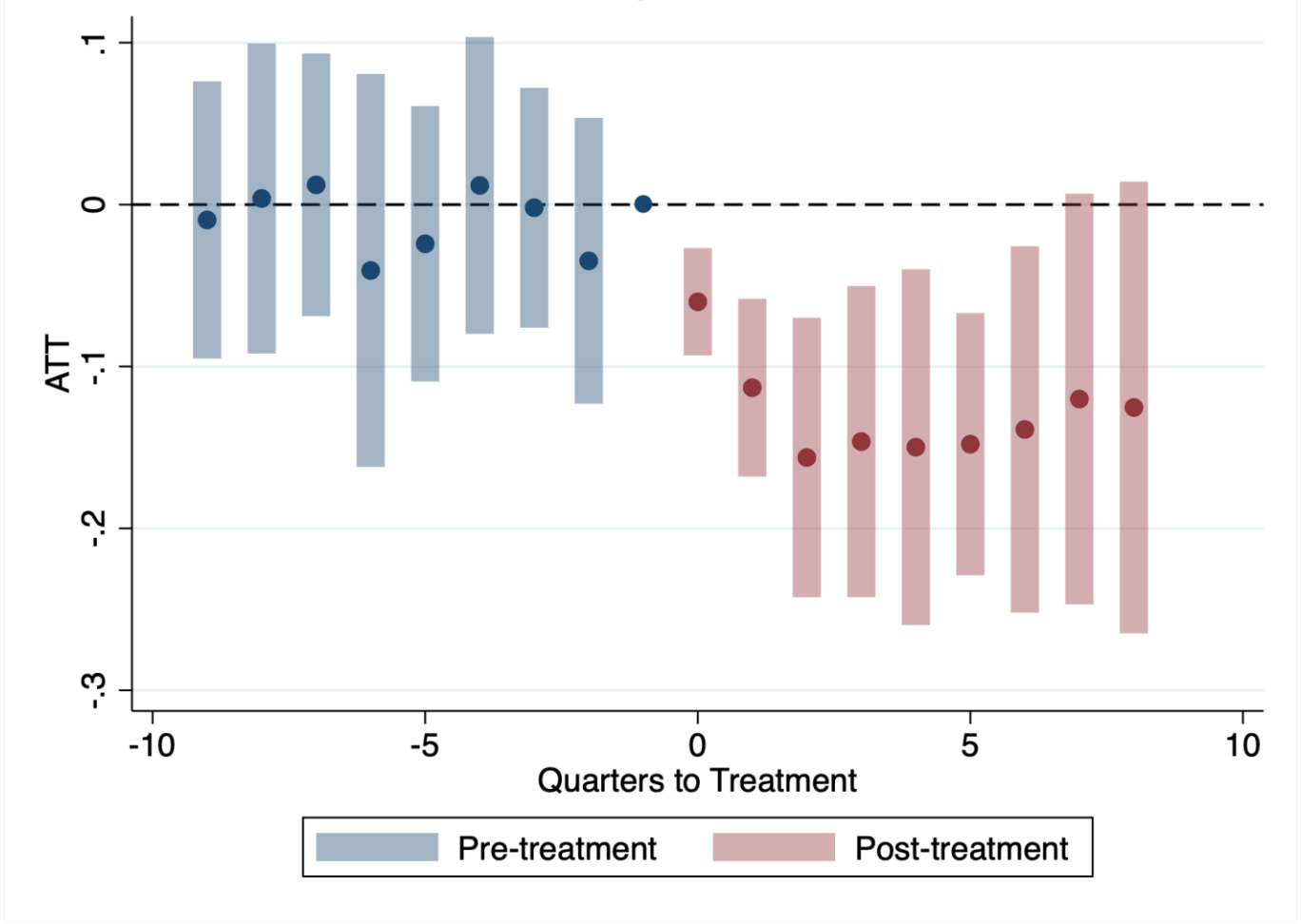
Effect on Rx to Medicaid Patients Ages 3-5/Population 3-5 under 300% FPL



Antidepressants prescribing increases by a non-significant 4%.

Provider-Level Analysis: Antipsychotic Prescribing

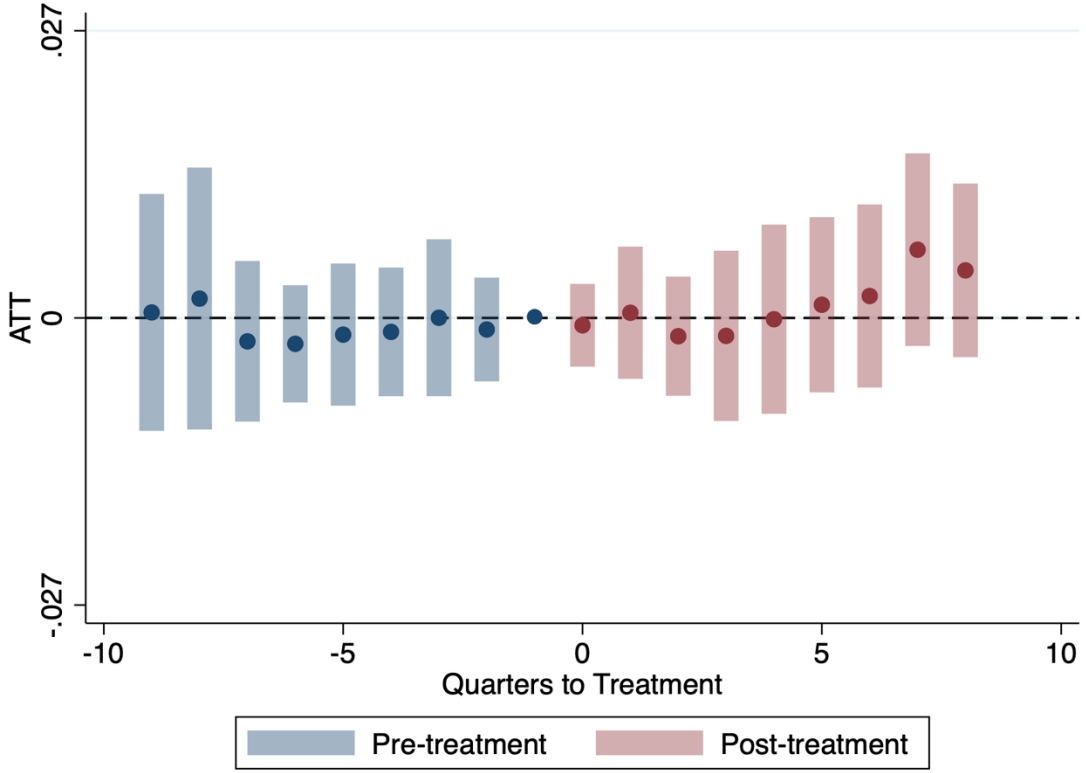
Effect on Rx to Medicaid Patients Ages 3-5 at the Provider-Quarter Level



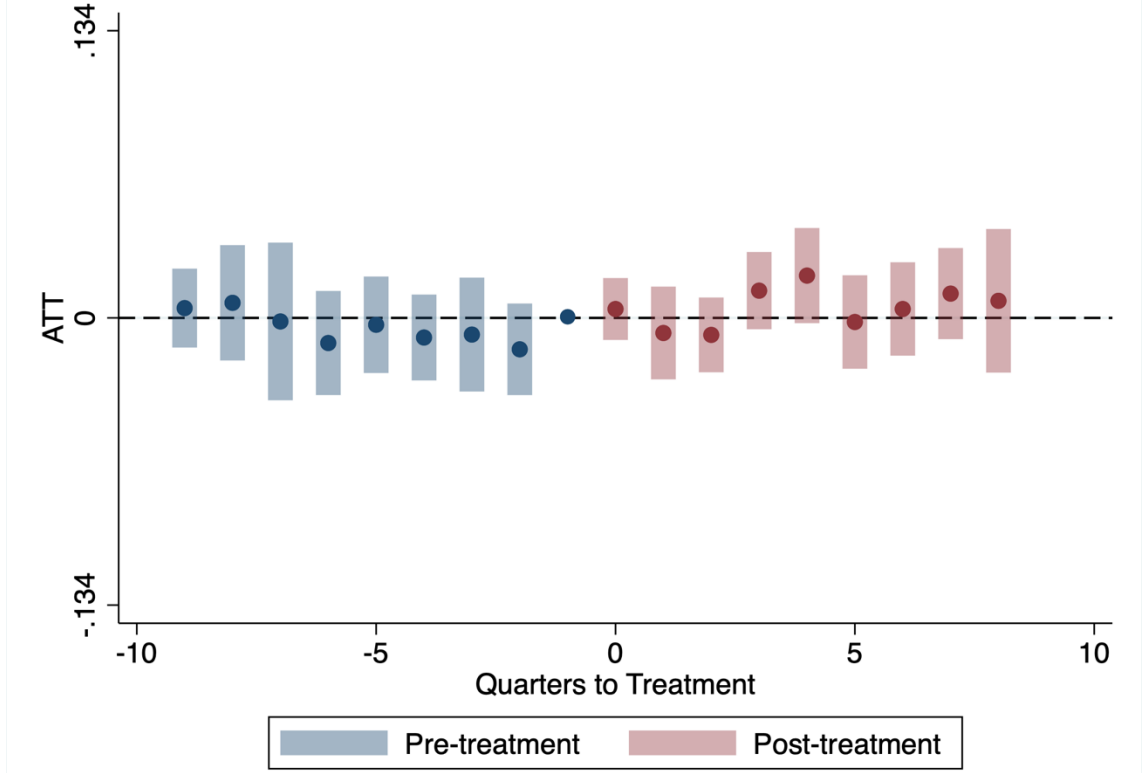
Prior authorization reduces Rx by 42.6% relative to a mean of 0.3 per quarter over the sample.

These Same Providers Do Not Start Prescribing Other Meds

Effect on Benzo Rx to Medicaid Patients Ages 3-5 at the Provider-Quarter Level

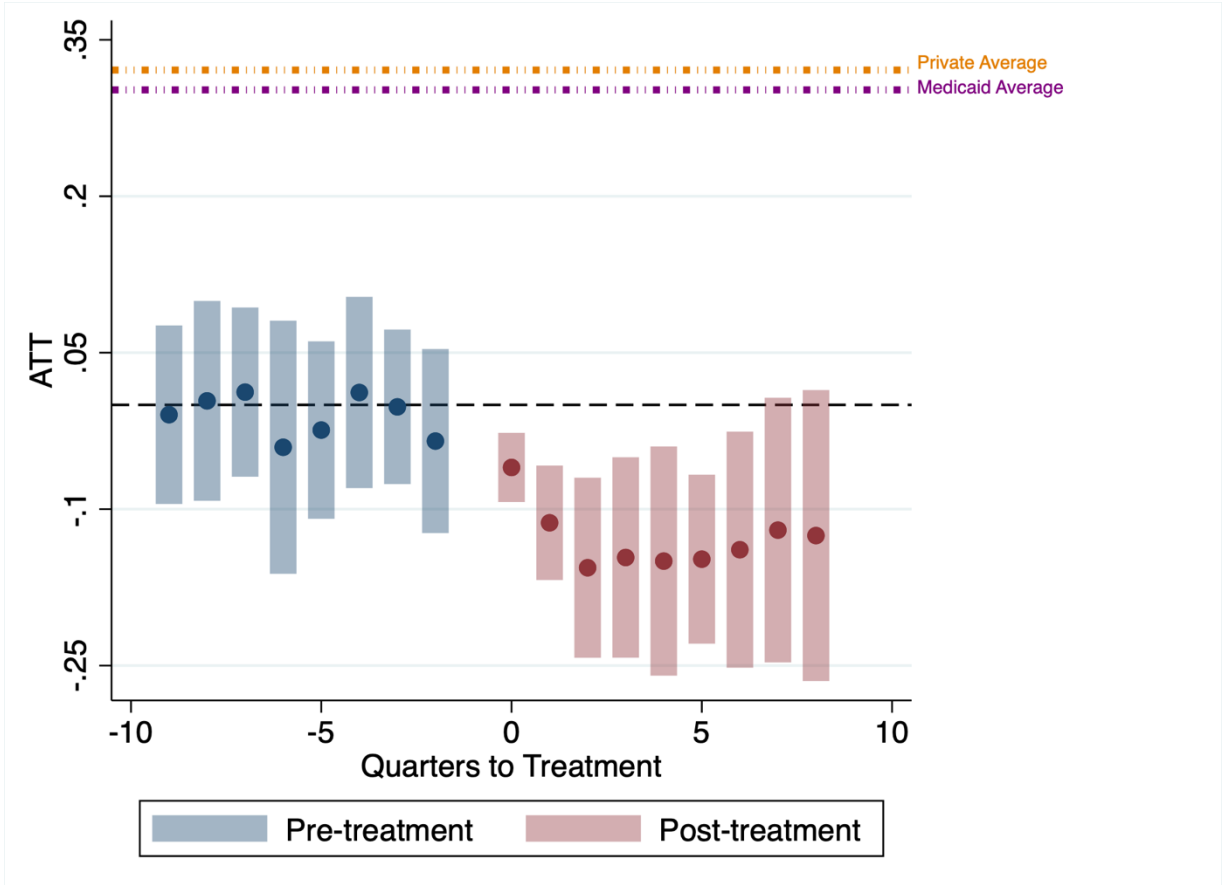


Effect on AD Rx to Medicaid Patients Ages 3-5 at the Provider-Quarter Level

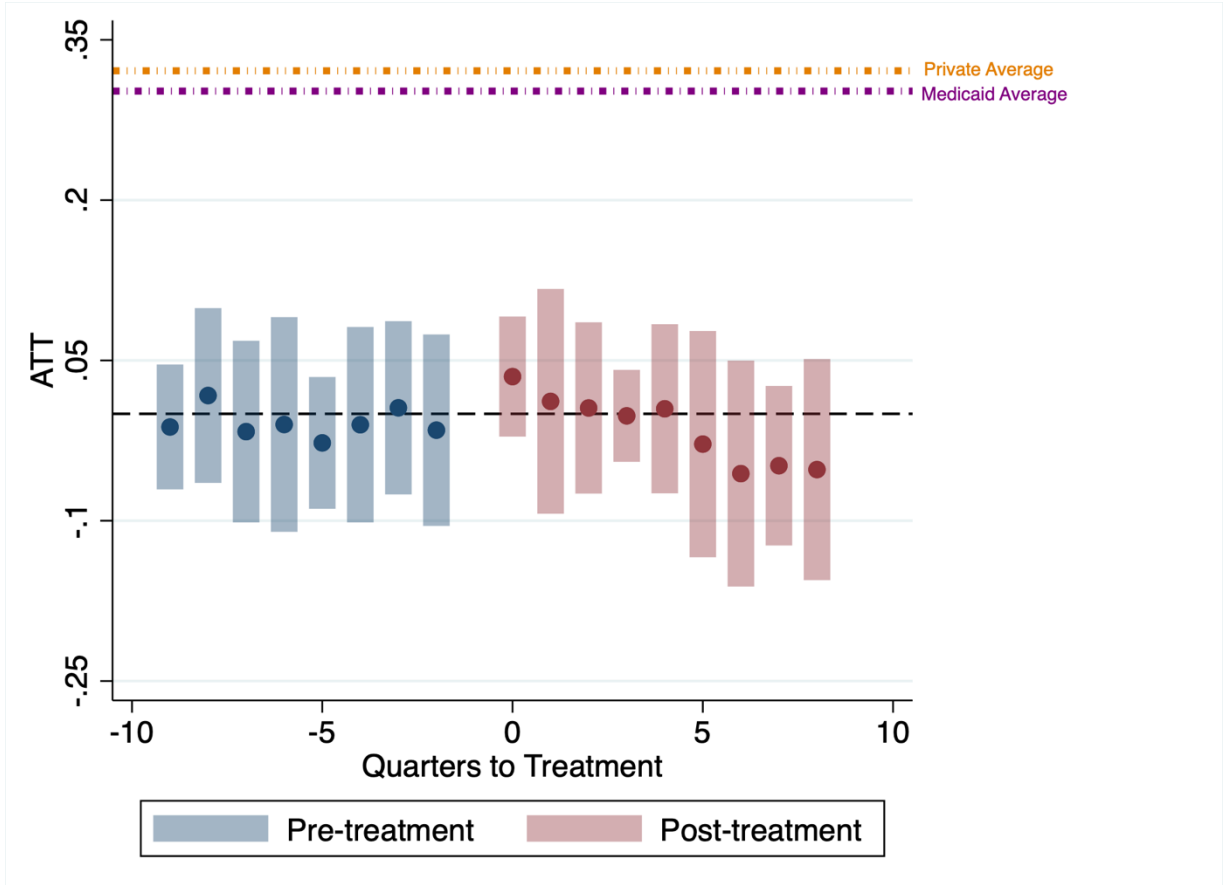


Providers Do Not Change Behavior with Privately Insured Patients

Effect on Rx to Medicaid Patients Ages 3-5



Effect on Rx to Private Patients Ages 3-5



With 95% confidence, we can rule out providers reducing Rx to private patients by any more than half of the estimated reduction in Rx to their Medicaid patients.

Treatment Effects by Specialty: Medicaid

Specialty	PEDIATRICS	PSYCHIATRY	CHILD & AD PSYCH	NP	FAMILY MEDICINE	OTHER
ATT	-0.143	-0.173	-0.098	-0.082	-0.074	-0.124
SE	0.057	0.090	0.062	0.026	0.022	0.051
Outcome Mean	0.320	0.340	0.381	0.206	0.098	0.357
% Effect	-44.6	-50.8	-25.6	-39.9	-75.8	-34.9
N Providers	2680	2625	2223	1922	1209	1849

Notes. Analysis at the quarter-provider level. Sample restricted to providers who have prescribed at least 20 antipsychotic prescriptions to children on Medicaid under the age of 10 between 2006 and 2019. Standard errors clustered at the state level. ATT is over the first two years post treatment.

The smallest effects are for child and adolescent psychiatrists, which could indicate either a) that C&A psychiatrists learn less from PA policy since they have more advanced training or that b) they see the most severe patients (or both).

Treatment Effects by Specialty: Private Insurance

Specialty	PEDIATRICS	PSYCHIATRY	CHILD & AD PSYCH	NP	FAMILY MEDICINE	OTHER
ATT	-0.033	0.012	-0.074	-0.052	-0.037	0.062
SE	0.041	0.055	0.074	0.046	0.031	0.044
Outcome Mean	0.310	0.372	0.457	0.202	0.049	0.404
% Effect	-10.5	3.1	-16.2	-25.8	-76.1	15.4
N Providers	2680	2625	2223	1922	1209	1849

Notes. Analysis at the quarter-provider level. We use the same sample of providers as with the Medicaid analysis. Sample restricted to providers who have prescribed at least 20 antipsychotic prescriptions to children on Medicaid under the age of 10 between 2006 and 2019. Standard errors clustered at the state level. ATT is over the first two years post treatment.

No significant effects for any specialty suggesting no spillover effects of information from PA requirements onto private patients.

Taking Stock: Mechanisms

- Similar estimates for state-level and provider level analyses.
- Providers decrease the number of antipsychotics prescribed to patients on Medicaid but do not change their behavior with respect to privately-insured patients.
- No significant effects on Medicaid prescribing for child and adolescent psychiatrists, but negative effects on antipsychotic prescribing for all other providers, including general psychiatrists and no effects on prescribing for the privately insured for any group.

→ **These results provide stronger evidence for hassle costs as a mechanism than information.**

Policy Implications & Conclusions

- These relatively narrowly defined **prior authorization policies targeting the youngest children clearly succeed in reducing off-label prescribing.**
- The similarity in effect sizes in state-level and provider-level analyses suggest little doctor shopping for antipsychotics, but we do see some evidence of increased demand for benzos, largely from internal medicine doctors who are not a major provider of child mental health care.
- An important limitation of this study is that we cannot observe downstream outcomes so welfare effects are ambiguous.
- Future work needs to consider health effects (e.g., psychiatric hospitalizations and metabolic effects) and social consequences (e.g., school performance and CPS involvement).

Thank You to Our Amazing RA Team

Lillian Han
(Columbia University)

Augusta Miller
(Columbia University)

Lucy Tobier
(Swarthmore College)

Ninon Gailhardou
(Columbia University)

Charlotte O'Toole
(Columbia University)

Donna Qi
(Columbia University)

Sooji Kang
(Columbia University)

Ariel Portnoy
(Barnard College)

Kiara Wassoodew
(Princeton University)