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Clean Air, Clear Minds: How State Policies Shape Autism & ADHD/ADD Prevalence

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Introduction

Neurological developmental disorders such as ADHD and autism affect a growing number of children in the United States. In California, autism now impacts about one in twenty-two children, compared with a national rate of one in thirty-one. Prior research has linked early-life exposure to pollutants, such as particulate matter (PM_{2.5}) and nitrogen dioxide, with an increased risk of these conditions, suggesting that environmental factors play a significant role in child brain development. Nevertheless, despite having some of the strongest clean-air laws in the country, California's neurological health outcomes vary widely across regions. Some counties exhibit measurable improvements in air quality, while others continue to experience high pollution levels and increased exposure to hazardous pollutants.

This gap between strong legislation and its outcomes highlights a broader issue: the disparity between laws on paper and their actual implementation. Political capacity, a state's ability and willingness to adopt, enforce, and maintain strong clean-air policies, helps explain why seemingly similar states achieve such different results. Where comprehensive and enforceable clean-air rules exist, health benefits tend to follow. Where enforcement is weak or reporting systems are limited, those benefits may not materialize. California illustrates this tension clearly. Regional differences in enforcement and monitoring mean that not all children receive the full protection afforded by existing policies.

Significance & Context

What makes this puzzle more complex is that air quality alone does not tell the whole story. Oregon, for instance, consistently scores high on air quality but still reports steady or rising rates of autism and ADHD. New York shows varying patterns that do not align with changes in

their pollution levels. These contrasts suggest that reporting systems and enforcement capacity shape neurological outcomes in ways that go beyond the environmental conditions themselves.

This brings me to the central question driving this project: How do environmental conditions and policy capacity shape children's neurological health across states? Furthermore, to what extent can differences in state clean-air policies explain disparities in ADHD and autism prevalence? To explore this question, I compare prevalence rates for children ages three to seventeen across twenty states from 2016 to 2022. This approach enables me to determine whether variations in air quality contribute to differences in reported neurological outcomes and whether broader factors play a role beyond environmental conditions alone.

Understanding these dynamics requires examining environmental exposure and political decision-making together. The following section reviews existing research that informs the theoretical expectations guiding this project.

Literature Review

To address this question, I draw on existing research examining how pollution, inequality, and policy capacity interact to shape child neurological health, identifying the gaps this project seeks to fill:

A large body of epidemiological work has demonstrated that early-life exposure to fine particulate matter (PM_{2.5}) and nitrogen dioxide (NO₂) increases the risk of neurodevelopmental disorders, such as ADHD, ADD, and autism (Payne-Sturges et al., 2008). Payne-Sturges and colleagues synthesized more than 200 U.S. studies. They found that children from historically marginalized and low-income neighborhoods experience substantially higher concentrations of

these pollutants, and consequently exhibit worse neurodevelopmental outcomes (Payne-Sturges et al., 2008). Their review also highlights that controlling for demographic factors such as maternal age and state population size is essential because these variables independently affect disorder prevalence (Payne-Sturges et al., 2008).

However, understanding exposure alone is insufficient. Traditional clean-air policy analyses often overlook how social inequities amplify these risks. Morello-Frosch et al. argue that environmental hazards intersect with poverty, discrimination, and substandard housing, creating “cumulative impacts” that exacerbate health disparities (Morello-Frosch et al., 2011). Their framework stresses that policy effectiveness must be evaluated through an equity lens: the same statutory standard can yield very different health benefits depending on the capacity of local jurisdictions to enforce it (Morello-Frosch et al., 2011). This perspective directly informs our hypothesis that political capacity will moderate the relationship between policy stringency and child neurodevelopmental outcomes.

This equity-focused framework raises an important question: can strong policy actually deliver these benefits in practice? Historical evidence from the United States Clean Air Act (CAA) suggests that stricter national air quality standards yield measurable health benefits. Ross, Chmiel, and Ferkol documented significant reductions in PM and sulfur-dioxide emissions after the CAA’s implementation. The author linked these reductions to declines in pediatric respiratory illnesses, premature mortality, and, by extension, lower exposure to neurotoxins (Ross et al., 2012). Although their focus is on respiratory health, the same pollutants identified as harmful in the Payne-Sturges review are the primary targets of CAA regulations, suggesting that robust clean-air laws can also improve neurodevelopmental outcomes when effectively enforced (Ross et al., 2012).

However, interpreting changes in rates of neurological disorders requires caution. The recent article in *The Transmitter* reports that the rise in autism prevalence mirrors simultaneous increases in other neurodevelopmental disorders, including ADHD, obsessive-compulsive disorder, and Tourette syndrome across multiple regions, including the United States, between 2000 and 2011 (*The Transmitter*, 2023). During this period, national diagnoses rose sharply, reflecting significant changes in diagnostic guidelines, insurance coverage, and school-based screening policies. While international data, such as the 121% increase in Western Australia and the 354% increase in Sweden, demonstrate the global scale of the trend, similar diagnostic surges have been documented in U.S. states, including California, where autism case identification now exceeds one in twenty-two children (*The Transmitter*, 2023). The authors attribute these increases primarily to heightened awareness, broader diagnostic criteria, and earlier identification rather than to new genetic or environmental risk factors (*The Transmitter*, 2023).

These diagnostic changes complicate efforts to isolate environmental effects, but they do not diminish the importance of exposure disparities. The American Lung Association's "Breathing in Danger" report provides further evidence that uneven air quality reflects a more profound structural and political inequality (American Lung Association, 2023). The report indicates that communities of color and low-income neighborhoods are disproportionately affected by high levels of fine particulate matter and ozone pollution, even as statewide averages improve (American Lung Association, 2023). These exposure gaps are driven by political choices, including where states allow major emitters to operate and how strict their statutory protections are (American Lung Association, 2023). The report also highlights that many of the counties with the worst air quality are located in California, which underscores the limits of relying on statewide averages rather than regional political capacity and enforcement (American

Lung Association, 2023). These patterns support the idea that child neurological outcomes will differ across states and counties, not only because of pollution levels but also due to the underlying political decisions that shape air quality protections. This aligns with the central argument of this study, which views political capacity, captured in the number and strictness of clean air laws, as a key factor that conditions the relationship between air quality and child neurological health.

If political choices shape these exposure gaps, then targeted policy interventions should reduce them. Recent evidence from California supports this possibility. A recent state report from the California Air Resources Board (July 2025) indicates that the California Cap-and-Invest Program (also known as Cap-and-Trade) and associated community air protection grants are improving air quality in some of the state's most polluted communities (California Air Resources Board, 2025). The program has invested more than \$600 million in over 9,000 projects since 2017, with 85% of the funding directed to disadvantaged and low-income neighborhoods (California Air Resources Board, 2025). Governor of California Initiatives include replacing high-pollution vehicles, paving and greening school parking lots, and installing air filtration systems. These efforts have delivered measurable reductions in nitrogen oxides and diesel particulate matter pollutants, also implicated in neurological harm to children (California Air Resources Board, 2025). Governor of California. This evidence reinforces the idea that improving air quality through focused policy and investment can reduce children's environmental health risks and suggests that California's regions lagging in outcomes may benefit from similarly targeted legislative and investment strategies (California Air Resources Board, 2025).

Connecting this evidence to the present project

Taken together, these studies establish that early exposure to pollution harms neurodevelopmental health, that social and political inequities exacerbate exposure risks, and that targeted policies can mitigate those risks. However, they also reveal two important considerations for this project. First, the rising prevalence of autism and ADHD may not always reflect worsening environmental conditions. Much of the increase is driven by changes in diagnostic practices, including the broader expansion of diagnostic criteria, increased school-based screening, and improved public awareness. This means that observed differences in disorder rates across time may partly reflect changes in how diagnoses are made rather than changes in air quality. To address this, my analysis will include year-fixed effects and, where possible, incorporate controls linked to diagnostic trends.

Second, even when clean-air policies lead to measurable improvements in air quality, the recorded prevalence of neurological disorders may continue to rise if detection rates improve faster than pollution levels decline. This policy implementation gap is particularly relevant to California, where strong clean-air statutes exist on paper, yet enforcement intensity and policy uptake vary significantly across regions. By interpreting political capacity, defined as both the number and strictness of clean-air laws adopted by a state, this study will test whether states with stronger policy environments experience greater health benefits from similar improvements in air quality. This distinction enables the analysis to move beyond pollution levels alone and examine whether policy design and political capacity influence how environmental exposure ultimately affects child neurological health.

California's specific challenge

California reports some of the nation's highest autism prevalence rates, over 1 in 22 children diagnosed, compared with the national average of 1 in 31 (California Health and Human

Services, 2023), highlighting a pressing public-health disparity. However, the state's strict clean-air statutes have not uniformly translated into better air quality or lower disorder rates across all regions (American Lung Association, 2024). This "policy-implementation gap" appears to be linked to variation in local political capacity, such as district budgets, staffing levels, and the presence of environmental NGOs (Morello-Frosch et al., 2011). The Transmitter article emphasizes the importance of distinguishing genuine exposure-driven incidence changes from diagnostic artifacts when interpreting regional differences (The Transmitter, 2024).

Synthesis and research gap

Together, these strands of scholarship establish two key points that shape my research design: (1) pollutant exposure is a credible risk factor for ADHD and autism (Payne-Sturges et al., 2019); the health impact of clean-air policies is moderated by local capacity and broader socioeconomic inequities (Morello-Frosch et al., 2011); and (2) rising diagnosis rates primarily driven by awareness and diagnostic expansion and size of state population (The Transmitter, 2024). No existing study has jointly quantified how the strength of state-level clean-air policy and enforcement capacity interact to explain interstate disparities in child neurodevelopmental health, while controlling for national trends in the diagnostic population size. Addressing this gap will provide policymakers in California with empirically grounded guidance for closing regional air-quality inequities. The theoretical framework guiding this analysis draws on the literature of environmental health research and policy capacity.

Theory

This project draws on established research in environmental health and environmental policy. The central premise is that exposure to polluted air affects early neurological development in ways that increase the risk of ADHD and autism (Payne-Sturges et al., 2008).

Fine particulate matter and nitrogen dioxide enter the respiratory system, pass into the bloodstream, and can interfere with brain development during pregnancy and early childhood. Because exposure is shaped by the broader policy environment that governs air quality, differences in state clean air laws will produce corresponding differences in child neurological outcomes (American Lung Association, 2024).

Political capacity is another significant component of this framework. States vary in the number of clean air laws they adopt, the strictness of those laws, and how those laws define emission limits, monitoring requirements, and penalties for violations (Morello-Frosch et al., 2011). These choices reflect a state's political capacity and influence its long-term air quality, and by extension, the health of children in that state (American Lung Association, 2024). Understanding this context is essential for interpreting state-level variation in air quality. However, given the complexity of measuring political capacity and data constraints, this study focuses on air quality as the primary independent variable, recognizing that observed air quality levels reflect underlying differences in state policy environments.

Hypotheses and Causal Mechanisms

My conceptual hypothesis is that improved air quality reduces the prevalence of ADHD and autism among children. I expect states with consistently better air quality to show lower rates of neurodevelopmental disorders, controlling for population characteristics and diagnostic trends. My operational hypothesis is that states with higher air quality scores will report lower rates of ADHD and autism in children aged three to seventeen, and that this pattern will be stronger in states with stronger clean air laws. The null hypothesis states that air quality will have no meaningful association with neurological health outcomes after accounting for demographic factors.

The expected causal mechanism begins with exposure. When a state has cleaner air, children are exposed to lower levels of harmful pollutants (Payne-Sturges et al., 2008). Lower exposure reduces the chance that these pollutants will affect early brain development. While political capacity helps shape a state's air quality over time, my study focuses on the air quality outcomes themselves (Morello-Frosch et al., 2011; American Lung Association, 2024). States with better air quality, regardless of the specific policy pathways that led to those conditions, should experience lower exposure to neurotoxic pollutants. The final step is the health outcome. With cleaner air, fewer children will be exposed to harmful pollutants, which should lower the prevalence of ADHD and autism. Maternal age and population size also influence prevalence and must be controlled to isolate the environmental effect (CDC, 2023). These mechanisms guide the empirical tests that follow. The next section explains how the variables in this study are measured and compared across states.

Research Design

The independent variable in this study is air quality. I measure air quality using the American Lung Association's State of the Air report, which provides annual letter grades that reflect ozone pollution and acceptable particulate matter concentrations (American Lung Association, 2016, 2018, 2020, 2022). I convert these letter grades to a numeric scale from zero to one. A grade of A+ receives a score of one. A grade of F gets a score of two-tenths. This conversion enables direct comparison across states and years. I chose this measure because it captures the actual exposure environment that children face and aligns with established epidemiological research linking air pollution to neurological outcomes. The data come from the American Lung Association's annual State of the Air reports.

The dependent variable is the child's neurological health outcomes. I measure this using state-level prevalence rates of ADHD and autism among children ages three to seventeen. These prevalence rates are based on the National Survey of Children's Health (NSCH) reports. I use these specific disorders because they are the most widely studied neurodevelopmental conditions linked to environmental exposure in early childhood. I include four time points, which match the availability of both air quality and prevalence data. These years are 2016, 2018, the combined 2020-2021 period, and 2022. I measure each disorder by the number of children per 1000 children who fall under that diagnosis.

I include two control variables. The first control variable is maternal age. Research consistently finds that births to mothers aged thirty-five or older carry higher risks of autism and related developmental conditions (CDC, 2023). I measure maternal age using the CDC Vital Statistics report files. I measure this for every 1,000 births in the state and add up all the births to mothers aged 35 and over. The second control variable is population size. State population influences patterns of industrial activity, traffic density, energy use, and emissions (U.S. Census Bureau, 2023).

Each observation represents one state measured in one of the four study years. This is a panel design. The temporal scope encompasses the years 2016, 2018, the combined period of 2020 and 2021, and 2022. The geographic scope includes twenty states.

Methods

I analyze these data using a two-stage approach. The first stage of analysis involves evaluating the relationship between air quality and child neurological outcomes. The first stage

will focus on simple correlations. The second stage will estimate regression models that test both the direct effect of air quality, while accounting for key demographic controls.

The first step will be to use Pearson's r to assess the correlation between state air quality scores and the prevalence of ADHD and autism among children aged three to seventeen. Both air quality scores and prevalence rates are continuous variables, which makes Pearson's r an appropriate choice. Pearson's r will allow me to see whether states with higher air quality scores tend to have lower neurological prevalence. I will also run Spearman's ρ as a secondary test. Spearman's ρ treats the variables as ranked rather than linear. This test is beneficial when working with state-level health data, as reporting methods vary across states and can create patterns that are not strictly linear. Using both tests will strengthen the validity of the early analysis.

The second stage uses box-and-whisker plots to visualize the distribution of ADHD and autism prevalence across states with different air quality levels. These plots allow me to compare how prevalence rates vary between states with cleaner versus more polluted air. By grouping states based on their air quality scores, the box plots reveal whether states with better air quality tend to cluster at lower prevalence rates, and whether there are outliers that deviate from expected patterns. The regression will also include two demographic controls, maternal age and state population size. Maternal age influences the risk of autism and related conditions. Population size influences pollution levels and diagnosis patterns. Including these controls helps isolate the effect of air quality on ADHD and autism prevalence.

This combination of correlation tests and box-and-whisker plots provides both statistical and visual evidence of the relationship between air quality and neurodevelopmental outcomes.

The correlations quantify the strength and direction of the relationship between variables. At the same time, the box plots illustrate how prevalence distributions differ across air quality categories and identify states in high, mid, and low-level air quality reports that may warrant further investigation.

This combination of correlation tests and regression models will provide both descriptive and analytical evidence. The correlations will show how the variables relate to one another in simple terms. The regression will test the direction and strength of these relationships after adjusting for demographic risk factors. The interaction term will show whether the effect of air quality on child health is statistically significant.

Results

Across the twenty states included in this study, ADHD and autism rates varied substantially over time in ways that did not consistently align with air quality differences. Some states with relatively clean air report higher diagnosis rates, while others with poorer air quality report lower rates. These patterns suggest that factors such as screening practices, access to evaluation services, and reporting systems play a significant role in determining the number of children who receive formal diagnoses. The descriptive trends suggest that air quality alone cannot fully account for cross-state differences in neurological outcomes.

Regression Results for ADHD

The ADHD model examines whether air quality predicts ADHD rates after controlling for maternal age and population size. Air quality shows no meaningful statistical relationship

with ADHD ($\beta = 5.53$, $p = 0.735$). Once demographic factors are accounted for, cleaner air does not reliably correspond with higher or lower prevalence of ADHD.

Maternal age, however, emerges as a strong and statistically significant predictor. States with a larger share of births to mothers aged 35 and older report lower ADHD rates ($\beta = -0.31$, $p = 0.003$). Population size also shows a small but significant negative effect ($\beta \approx 0.00$, $p = 0.037$), though the extent is minimal.

The year indicators reveal meaningful shifts in ADHD diagnosis patterns. The 2022 coefficient is large and significant ($\beta = 28.20$, $p < 0.001$), showing a substantial increase in ADHD diagnoses during that year. This suggests changes in diagnostic practices, awareness, or screening systems rather than environmental changes.

Regression Results for Autism

The autism model shows a similar pattern. Air quality has no significant effect on autism prevalence ($\beta = 0.66$, $p = 0.912$). Maternal age is not a significant predictor in this model, and population size shows only a weak, non-significant positive trend.

Year effects, however, matter considerably. Autism prevalence increases modestly in 2018 and 2020 but rises sharply in 2022 ($\beta = 10.53$, $p < 0.001$). This mirrors national trends, suggesting that shifts in diagnostic criteria, reporting practices, and access to screening are driving the increases, rather than changes in environmental exposure.

Spearman Test Results

Spearman's rho shows no strong monotonic relationships between air quality and Autism or ADHD rates. The only strong correlation is a negative association between maternal age (35+) and ADHD, showing older maternal populations tend to have lower ADHD rates. These results highlight that demographic differences and state-level reporting systems may explain more variation in diagnoses than environmental quality scores

Summary of Findings

Altogether, the results suggest that air quality does not significantly predict rates of ADHD or autism once demographic factors are taken into account. Instead, year-to-year changes and demographic characteristics, especially maternal age in the ADHD model, explain a greater portion of the variation across states. The significant increases in 2022 for both disorders suggest broader shifts in awareness, screening, and reporting that are not directly related to environmental conditions. While air quality remains an essential environmental factor theoretically, it is not the primary driver of state-level diagnosis patterns in this dataset. (Figures will be displayed in the appendix.)

Discussion and Research Implications

The regression results reveal the complexity of linking environmental quality to neurological outcomes in children. Air quality does not significantly predict rates of ADHD or autism once demographic factors are taken into account, which does not support my original hypothesis. Several factors may explain this null result. First, state-level air quality measures may be too aggregated to capture the localized exposure that matters for child development. Children's actual exposure depends on neighborhood conditions, proximity to traffic, and indoor air quality factors that state averages cannot capture. Second, diagnostic trends appear to

overwhelm any environmental signal. The sharp increases in 2022 suggest that changes in screening practices, insurance coverage, and public awareness drive reported prevalence far more than environmental conditions during this period.

While I could not directly measure political capacity, the patterns suggest its importance. States vary considerably in how they identify and report neurodevelopmental conditions, likely reflecting differences in administrative infrastructure, healthcare access, and diagnostic resources. This variation in reporting capacity could obscure genuine environmental effects if states with better air quality also have more robust diagnostic systems.

For policymakers in California, these findings carry important implications. Clean-air policy remains essential for protecting child health, and measuring its impact on neurological outcomes requires looking beyond diagnosis rates alone. Investments in air quality improvement must be paired with efforts to standardize diagnostic practices, expand access to evaluation services, and improve data collection systems. Additionally, the state should focus on county- or air district-level enforcement practices and policy implementation to further enhance the quality of air. Disparities within California suggest that statewide policies alone are insufficient; regional enforcement capacity determines whether clean-air laws translate into actual health benefits. Without these complementary investments in both environmental protection and diagnostic infrastructure, determining the effectiveness of policy interventions remains challenging.

Limitations and Research Extensions

This study has several limitations. First, a temporal mismatch exists between birth cohorts and disorder prevalence: children diagnosed during the study period were born years earlier, whereas the maternal age data reflect births from 2016 to 2022. Future research should

align maternal age data with the birth years of diagnosed cohorts. Second, I was unable to directly measure political capacity due to its complexity and time constraints. Developing systematic measures of enforcement strength, such as agency budgets or regulatory comprehensiveness, would help test whether policy capacity moderates the impact of air quality improvements on health outcomes. Third, additional control variables, such as income, healthcare access, and screening availability, should be included to isolate environmental effects. Future research should be expanded to all fifty states, include more temporal data points, and examine how administrative infrastructure influences diagnosis patterns across similar environmental conditions.

Conclusion

This study examined whether differences in air quality help explain variation in autism and ADHD prevalence across twenty states from 2016 to 2022. The results indicate that air quality is not a significant predictor of either condition when demographic factors are considered. Instead, maternal age, population characteristics, and year-to-year changes in diagnosis drive the observed variation in outcomes. The sharp increases in 2022 reflect broader national shifts in screening, awareness, and reporting, rather than environmental causes.

These findings do not diminish the importance of clean-air policy. They reveal that diagnosis rates reflect both environmental conditions and the strength of state diagnostic systems. States vary widely in their capacity to identify and report neurological conditions, which can obscure genuine environmental effects. For California, addressing regional disparities requires more than strong legislation, but it demands county-level enforcement and measurable goals per air district. Only by strengthening both environmental protection and health

infrastructure can policymakers ensure that cleaner air translates into measurable benefits for children across all communities, thereby improving California's public health outcomes.

References

American Lung Association. (2023). *Breathing in danger: How health-harming air pollution threatens children and families*. American Lung Association.

American Lung Association. (2024). *State of the Air 2024* reports.

<https://www.lung.org/research/sota>

California Air Resources Board. (2025, July 25). *Cap-and-Invest dollars improving air quality in California's most polluted communities*. Office of Governor Gavin Newsom.

<https://www.gov.ca.gov/2025/07/25/new-report-shows-cap-and-invest-dollars-are-improving-air-quality-in-californias-most-polluted-communities/>

Centers for Disease Control and Prevention. (2023). *ADHD, autism, and developmental disability prevalence data*. <https://www.cdc.gov>

Martin, J. A., Hamilton, B. E., Osterman, M. J. K., Driscoll, A. K., & Drake, P. (2018). *Births: Final data for 2016* (National Vital Statistics Reports, 67(1)). National Center for Health Statistics.

Martin, J. A., Hamilton, B. E., Osterman, M. J. K., & Driscoll, A. K. (2019). *Births: Final data for 2018* (National Vital Statistics Reports, 68[13]). National Center for Health Statistics, Centers for Disease Control and Prevention.

Martin, J. A., Hamilton, B. E., Osterman, M. J. K., & Driscoll, A. K. (2021). *Births: Final data for 2020* (National Vital Statistics Reports, 68[13]). National Center for Health Statistics, Centers for Disease Control and Prevention.

- Martin, J. A., Hamilton, B. E., Osterman, M. J. K., & Driscoll, A. K. (2023). *Births: Final data for 2022* (National Vital Statistics Reports, 68[13]). National Center for Health Statistics, Centers for Disease Control and Prevention.
- Morello-Frosch, R., Zuk, M., Jerrett, M., Shamasunder, B., & Kyle, A. (2011). Understanding the cumulative impacts of inequalities in environmental health: Implications for policy. *Health Affairs*, 30(5), 879–887. <https://doi.org/10.1377/hlthaff.2011.0153>
- National Survey of Children's Health. (n.d.). *NSCH state-level data for autism, ADHD, and ADD*. <https://www.nschdata.org>
- Payne-Sturges, D. C., Marty, M., Perera, F., Miller, M. D., Swanson, M., Corey, G., Matheson, J., & Glen, G. (2008). Vulnerability and the air pollution-health link: A review of the science and implications for public health policy. *Environmental Health Perspectives*, 116(10), 1351–1358. <https://doi.org/10.1289/ehp.11447>
- Ross, K. R., Chmiel, J. F., & Ferkol, T. W. (2012). The impact of the Clean Air Act on pediatric respiratory health. *Annals of the American Thoracic Society*, 9(4), 304–309. <https://doi.org/10.1513/pats.201201-002MS>
- The Transmitter. (2023). *Global increases in autism, ADHD, OCD, and Tourette syndrome from 2000 to 2011*. <https://www.thetransmitter.org>
- U.S. Census Bureau. (2024). *State population totals and components of change*. <https://www.census.gov>

Appendix

Figure 1. Regression Slopes for All States

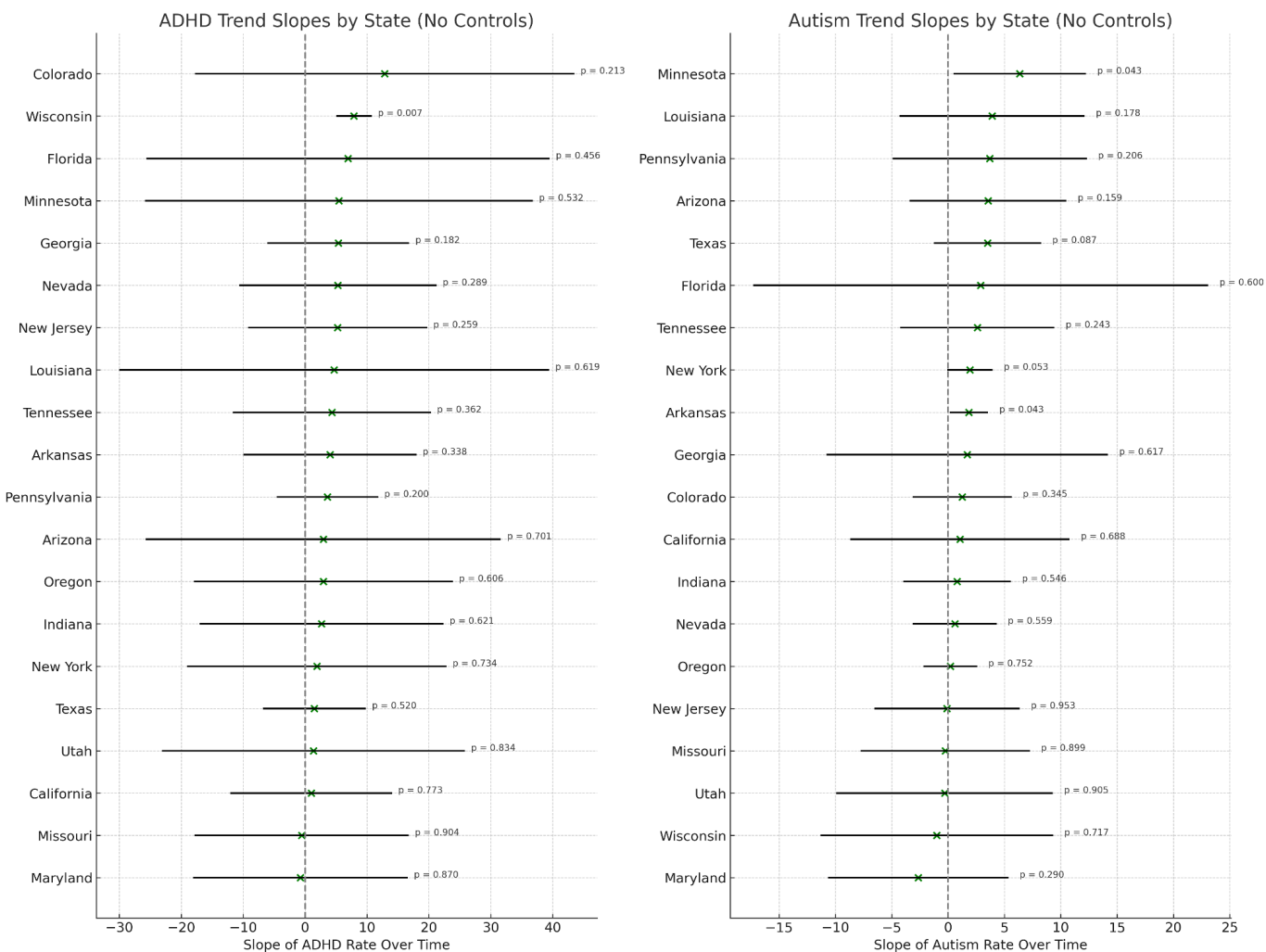




Figure 2. Neurological rates across air quality levels, 2016–2022.

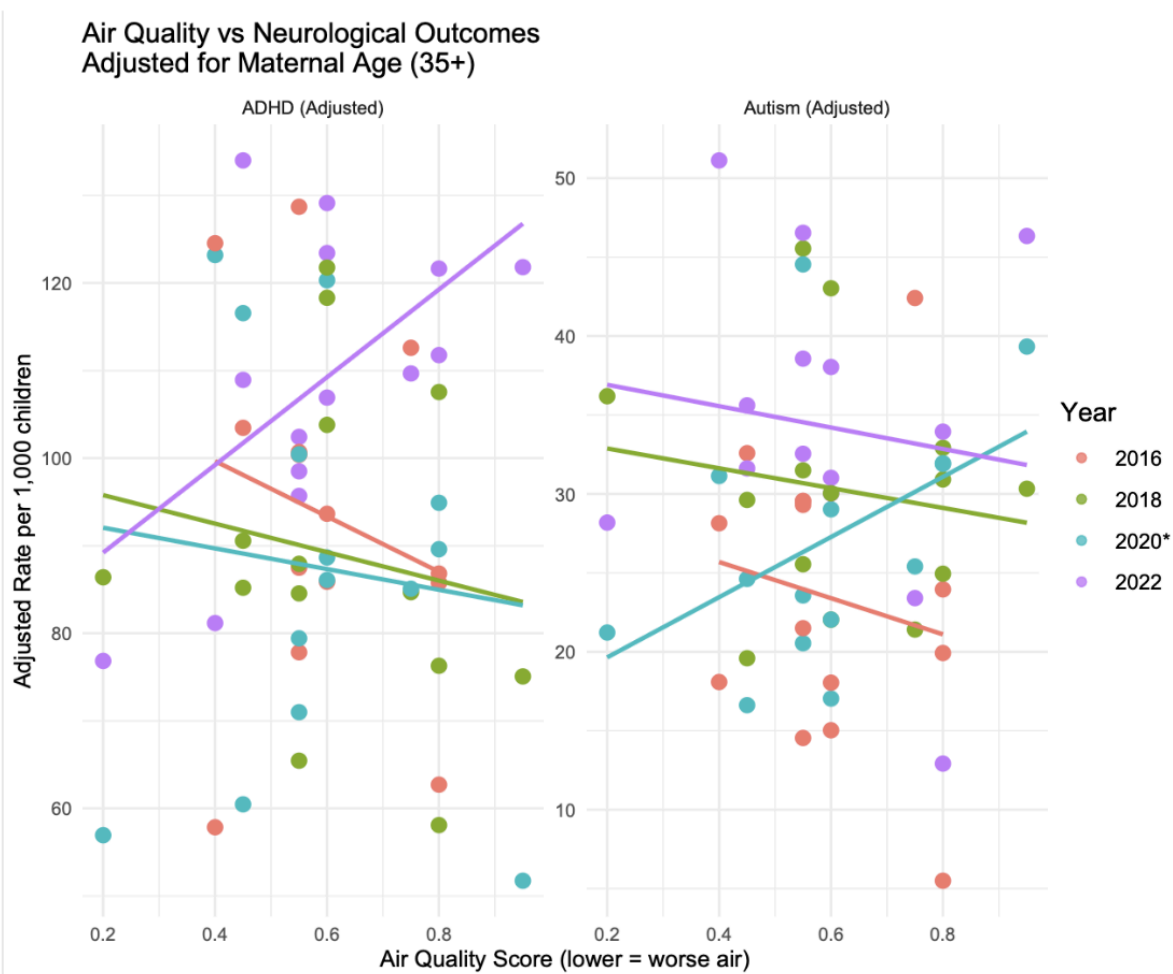


Figure 3. Air quality vs neurological outcomes, by year, controlling for maternal birth age

ADHD ~ Air Quality + Controls

Predictor	Coefficient	p value	Interpretation
Air Quality	5.53	0.735	No clear effect
Maternal Births 35+	-0.31	0.003	Strong negative link
Population	-0.0	0.037	Small negative effect
Year 2018	11.95	0.129	Mild increase only
Year 2020	-3.61	0.643	No meaningful change
Year 2022	28.2	0.0	Large increase noted

Autism ~ Air Quality + Controls

Predictor	Coefficient	p value	Interpretation
Air Quality	0.66	0.912	No clear effect
Maternal Births 35+	0.0	0.983	No relationship found
Population	0.0	0.392	Weak positive trend
Year 2018	3.65	0.209	Small increase only
Year 2020	3.39	0.24	Small increase only
Year 2022	10.53	0.0	Strong increase seen

Figure 4. Regression table