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EdWorkingPaper No. 24-1076

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VERSION: November 2024

Suggested citation: Coffey, Stephanie, and Christopher Cleveland. (2024). IncreasED: How Court Rulings Impact Special Education Identification. (EdWorkingPaper: 24 -1076). Retrieved from Annenberg Institute at Brown University: https://doi.org/10.26300/jcq4-c790

IncreasED: How Court Rulings Impact Special Education Identification

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November 2024

Abstract

Healthcare services outside of school impact the likelihood of receiving a school-based special education classification and services. This paper employs difference-in-differences to examine the impacts of expanded Medicaid coverage for mental and behavioral healthcare brought by the *Rosie D.* lawsuit in 2009. Using Massachusetts administrative data on public school students, *Rosie D.* caused a 0.3 percentage point (2.1 percent) increase in emotional disorder (ED) identification among low-income grades 9-12 students. Students with ED were more likely to be Black or multiracial after *Rosie D*. Students were also more likely to have experienced suspension or chronic absenteeism before identification *after Rosie D*. Finally, grades K-8 students identified with ED were educated in less inclusive settings after *Rosie D.*

Keywords: special education, difference-in-difference, policy

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Acknowledgments: We thank the Massachusetts Department of Elementary and Secondary Education for their ongoing technical assistance and for providing data. We would also like to thank Amy Ellen Schwartz, Gary Engelhardt, Maria Zhu, Ying Shi, and the Syracuse University Education and Social Policy Workshop seminar participants for their valued feedback.

1. Introduction

Expanded health insurance has the potential to provide direct effects on health outcomes but also spillover effects into other social outcomes, such as in education (Card & Shore-Sheppard, 2004; Currie et al., 2008; Gruber & Currie, 1995; Howell & Kenney, 2012; Mata, 2012). For students with disabilities, in particular, increased healthcare coverage and use of disability-related healthcare may result in better identification and management of their conditions. However, little is known about how healthcare interacts with special education services to shape students' experiences receiving special education services.

This study leverages variation in health insurance coverage generated by the *Rosie D. vs. Patrick* suit (hereafter, *Rosie D.*) to study impacts on Emotional Disturbance (ED) prevalence and academic and behavioral outcomes for students with an ED. This class-action suit led to the restructuring of the children's Medicaid mental health system in Massachusetts in 2009 and expanded coverage for treating ED. This disability classification encompasses a variety of psychiatric and behavioral disorders. We leverage detailed, student-level data on the universe of Massachusetts public school students in academic years (AY) 2006-2013.

Our paper has four primary findings. First, the *Rosie D.* reform increased ED classification by about 0.3 percentage points (2.1 percent) among Medicaid-eligible, low-income students in 9^{th}-12^{th} grade relative to ineligible, not low-income, students. Second, we find evidence of changes in the racial/ethnic composition of identified students. Medicaid-eligible students with an ED in grades K-8 (9-12) were 3.8 (4.5) percentage points less likely to be white after the reforms. Third, we find evidence that students identified with an ED post-*Rosie D.* had worse behavioral outcomes in the year before special education identification. Specifically, students in grades K-8 were 8.9 percentage points more likely to have received an out-of-school suspension, and students in grades 9-12 were 9.9 percentage points more likely to have been chronically

absent. Fourth, Medicaid-eligible students with an ED in grades K-8 were 3.1 percentage points less likely to be fully included (spending less than 21% of their school day outside of a general education setting) post-reform. These changes may be due to changes in the demographic composition of identified students or because the reforms impacted the signals that lead to special education referral; however, we cannot distinguish between these two potential channels.

This paper contributes to two interdisciplinary literatures. The first literature is regarding the impacts of expanded health insurance coverage on student outcomes. Identifying the effects of healthcare insurance coverage is challenging because it is linked to student outcomes through various observed and unobserved factors, such as parental employment and income. Existing literature using the Medicaid and State Children's Health Insurance Program (SCHIP) expansions of the 1980s and 1990s as a source of variation has found evidence that the expansions improved academic outcomes in the short and long run (Cohodes et al., 2016; Qureshi & Gangopadhyaya, 2021; Schanzenbach & Levine, 2009; Yeung et al., 2010). Schanzenbach and Levine (2009) found that increased Medicaid eligibility at birth improved reading test scores but not math, while Qureshi and Gangopadhyaya (2021) showed that Medicaid expansion reduced the probability that a student was below the expected grade level for their age but had no effect on attendance. Yeung et al. (2010) examined the impact of SCHIP expansions on attendance. They found that the attendance rate increased between 0.17 and 0.39 percentage points for each one-percentage point increase in SCHIP participation. Finally, Cohodes et al. (2016) and Groves (2019) examined longer-run outcomes and found evidence that expanded Medicaid decreased the high school dropout rate and increased college attainment.

The impact of insurance coverage on the academic success of students with disabilities is further complicated by the fact that the full complement of disability-related healthcare received

is determined by the interaction between private services covered under the child's health insurance plan and special education services provided at school. To the best of our knowledge, only two recent studies have estimated the impact of a disability-specific health insurance policy on student outcomes. Acton et al. (2021) used administrative data on Michigan public school students and a triple differences strategy to examine the impact of a Michigan insurance mandate requiring private health insurance plans to cover the treatment of autism spectrum disorders (ASD). They proxied for private insurance coverage using student free-or-reduced-price lunch ineligibility. They showed that the private provision of disability-related healthcare decreased the use of ASD specialized teaching consultants and shifted students to more inclusive education settings. Similarly, Coffey (2024) estimated the academic and behavioral impacts of an ASD insurance mandate in Massachusetts and found that students with ASD were more likely to be educated in a fully inclusive setting and less likely to receive an out-of-school suspension after the reform. Our study is also related to Curran et al. (2021), who used student-fixed effects to examine the impact of special education on students identified with ED and found that academic outcomes improved after special education services were removed. Our study contributes to this literature in two main ways. First, we analyze an insurance change that occurred more recently than the Medicaid expansions used by previous authors. Second, while other studies referenced have focused on autism prevalence and services, our paper is the first to estimate the impact of insurance coverage on disability-related healthcare on students with ED, a particularly vulnerable group of students.

The second literature we contribute concerns disability identification patterns for different student groups. Unconditionally, minority students, and Black students in particular, are identified with disabilities at higher rates than white students. U.S. Department of Education

policy treats disproportionality in special education identification as evidence of bias, requiring school districts with high levels of disproportionality to take corrective action (Talbott et al., 2011). The use of relative standards in special education referral and identification combined with the concentration of minoritized students in low-achieving schools may lead to the under-identification of minoritized students. Racial and cultural biases may also lead to minoritized students being inappropriately classified (Talbott et al., 2011). Neither Qureshi and Gangopadhyaya (2021), Acton et al. (2021), nor Coffey (2024) show increases in disability identification overall nor for specific student groups related to the healthcare policies they study.

Many studies have pointed toward Black students and students in poverty being more likely to be identified for special education, attributed to issues such as low birth weight, lead exposure, and other contextual factors related to living in poverty (Shores et al., 2020; Elder et al., 2021). However, some research indicates that Black and Hispanic students are overidentified in schools with relatively small shares of students from minoritized backgrounds and under-identified in schools with large shares (Hibel et al., 2010; Morgan et al., 2017; Fish, 2019; Elder et al., 2021). This research has also highlighted nuances in which types of disabilities are more common for White versus minority students in these school contexts, suggesting White students are more likely to be identified with "higher-status" disabilities such as speech impairment. In contrast, minoritized students are more likely to be identified with "low-status" disabilities, such as intellectual disability (Fish, 2019). For ED in particular, a study from Wisconsin noted that African American and Native American students were two to three times more likely to be labeled emotionally disturbed (Bal et al., 2017).

In the causal literature, Ballis and Heath (2021a) document the responsiveness of Texas school districts to a required reduction in identification rates that led to sharp reductions in

special education enrollment. Similarly, Ballis and Heath (2021b) show that a Texas policy focused on reducing identification disproportionality gaps between Black and White students led to reductions in special education identification for Black students. Other prior research has documented disparate patterns of identification for special education. A substantial disparity in identification also exists between boys and girls, interpreted as an overrepresentation of boys by some and an underrepresentation of girls by others. Approximately 18% of boys in public schools received special education services in 2019-20, compared to 10% of girls. This discrepancy is generally attributed to the greater prevalence of disruptive behaviors, which lead to referral among boys (Wehmeyer & Schwartz, 2001). Overall, the extent to which different student groups are over or underrepresented in special education remains debatable. Our paper contributes to this literature by providing evidence on the composition of students identified with ED and how state healthcare policy may affect special education classification among different groups of students.

The remainder of the paper is structured as follows: Section 2 provides background on special education and context on the Massachusetts public school system and the *Rosie D.* suit. In Section 3, we describe the Massachusetts data that we use in this analysis. Section 4 provides an overview of the empirical strategy. Section 5 contains our analysis of ED incidence, while Section 6 contains an analysis of academic outcomes in the year prior to receiving a classification of ED. Lastly, Section 7 discusses and concludes.

2. Background

2.1 Special Education

Since the passage of the landmark Individuals with Disabilities Education Act (IDEA) in 1975, children aged 3-21 with disabilities have been guaranteed the right to a free appropriate

public education. Today, approximately 6.5 million students aged 6-21 receive special education services, representing 9.7% of the nation's public school enrollment (OSERS, 2023). Among students with disabilities, 5.2% (or 346,000 students in AY 2020-21) are classified as having an emotional disturbance, defined as (IDEA, 2004):

> "…a condition exhibiting one or more of the following characteristics over a long period of time and to a marked degree that adversely affects a child's educational performance: (A) An inability to learn that cannot be explained by intellectual, sensory, or health factors, (B) An inability to build or maintain satisfactory interpersonal relationships with teachers and peers, (C) Inappropriate types of behavior or feelings under normal circumstances, (D) A general pervasive mood of unhappiness or depression, or (E) A tendency to develop physical symptoms or fears associated with personal or school problems."

Though cognitive impairment is not generally a feature of their conditions, students with an ED score roughly comparably in math and ELA with other students with disabilities, many of whom face significant cognitive impairments (Wagner et al., 2005).

Concerning academic and discipline outcomes, students with an ED face some of the steepest challenges of any disability group. Nationally, in AY 2019-2020, 2.3% of students with an ED received an expulsion or out-of-school suspension longer than 10 days, compared to .45% of students with disabilities generally. More troubling still, in the same year, 26.8% of students with an ED aged 14-21 who exited high school did so by dropping out, compared to 12.7% for students with disabilities generally (OSERS, 2023). Students with this disability classification may also exhibit disruptive behaviors that negatively affect classmates. While students with other types of disabilities are not generally detrimental to their classmates, each additional classmate with an ED reduces peer achievement by 6% and 3% standard deviations (sd) in math and ELA, respectively (Hanushek et al., 2002; Fletcher, 2010))

2.2 Massachusetts

Massachusetts provides an opportunity to study the intersection of healthcare expansion and special education. As of AY 2023-24, the Massachusetts public school system comprised approximately 400 districts, 1,800 schools, and 915,000 students. The state was an early leader in school accountability, implementing its statewide standards-based assessment, the Massachusetts Comprehensive Assessment System (MCAS), as part of a 1993 educational reform. Compared to their peers nationwide, Massachusetts students are more likely to be identified with disabilities. In 2020, at 18% of total enrollment, Massachusetts ranked third nationally by percentage of public-school students receiving special education services. Additionally, students with disabilities in Massachusetts consistently outperform students with disabilities in other states. On the 2019 National Assessment of Educational Progress, 42% (48%) of students with disabilities in Massachusetts achieved at or above the basic math (reading) level, ranking the state first by this measure.

2.3 The Rosie D. vs. Patrick Suit and Mechanisms

Rosie D. was a class-action lawsuit filed in 2001 by the Center for Public Representation for all Medicaid-eligible children with an ED in Massachusetts. The suit challenged the state's failure to provide medically necessary services as required under the federal Medicaid program and to inform parents and children that they were entitled to these covered services. Specifically, the plaintiffs argued that the lack of appropriate home-based services placed children with an ED at an increased risk of prolonged hospitalization and removal from their communities and local schools. As shown in Figure 1, the lawsuit and the implementation of the resulting reforms spanned nine years.[1]

In 2006, the federal court found the state had violated the requirements of the Early and Periodic Screening, Diagnosis, and Treatment (EPSDT) provision of the federal Medicaid Act.

As a result, children with an ED were "… forced to endure unnecessary confinement in residential facilities…". They experienced exacerbated symptoms, including "…failure at school, inability to relate positively to others, isolating depression and assaultive or other anti-social behavior" (*Rosie D. vs. Patrick*, 2007). In 2007, the case entered a final judgment that included a detailed remedial plan that restructured Massachusetts's Medicaid-funded mental health care system, including a strict implementation timeline.

The result expanded Medicaid coverage to include various mental and behavioral healthcare services. Changes related to the identification of mental health conditions included voluntary screenings by primary care physicians during annual Medicaid well-child visits and the requirement that children who were found to have a potential mental health condition be evaluated by a certified mental health professional using a standardized instrument called the Child and Adolescent's Needs and Strengths (CANS) questionnaire.

The resolution also mandated coverage for medically necessary, intensive home-based behavioral and mental health services, including the adoption of Intensive Care Coordination (ICC) as the method of service delivery. Under ICC, every child determined to have an ED was assigned a care manager who acted as a single point of accountability and contact for implementing home-based mental health services, convening and overseeing the treatment team, and working directly with the child and family. Other newly covered services included mobile crisis intervention, in which short-term emergency care is available 24/7 to treat a child in crisis without the need to go to a medical facility, in-home behavioral therapy, therapeutic mentoring, and crisis stabilization. (Center for Public Representation, 2008).[2]

The *Rosie D.* reforms were implemented incrementally. Voluntary mental health screening began in January 2008, while the requirement that children identified through

voluntary screening be evaluated using the CANS instrument began in November 2008. The provision of home-based mental health services was implemented beginning in July 2009 and completed on December 1, 2009 (Center for Public Representation, 2008).

The reforms implemented because of *Rosie D.* may have affected the screening for ED and the use of special education services by students with this disability classification. On the extensive margin, the reforms may have increased ED identification among Medicaid-eligible children due to increased/improved screening or to take advantage of newly covered services. On the intensive margin, the effects are ambiguous. Increased use of newly covered private services may help students better manage their symptoms, decreasing the need for more intensive special education services and allowing students with an ED to be educated in more inclusive environments. Advocates hoped that the reforms would allow students with an ED to remain in their schools and communities, decreasing hospitalizations and placements in residential programs. In this case, privately provided mental healthcare may crowd out special education. Alternatively, healthcare providers may serve as advocates to ensure that students with an ED receive the special education services they are entitled to, resulting in more intensive or less inclusive special education services and settings. In this case, privately provided mental healthcare may crowd in special education.

3. Data

3.1 Data Construction

We use longitudinal, student-level data from the Massachusetts Student Information Management System (SIMS) on kindergarten through 12th-grade students in Massachusetts public schools from 2006-2013. Data on students include race/ethnicity, gender, free or reduced-price lunch (FRPL) eligibility, English learner (EL) status, student with disability status, grade, and school/district identifiers.

The *Rosie D.* decision increased Medicaid coverage for a variety of mental and behavioral health services for children with an ED. Unfortunately, our data do not contain information on student health insurance plans. Our available measure of low-income status is FRPL eligibility, which identifies some, but not all, students whose family income level qualifies them for Medicaid. Students are eligible for free or reduced-price lunch if their family earns up to 130% or 185% of the federal poverty line, respectively. In comparison, Medicaid insurance coverage is available to children in Massachusetts from families earning up to 300% of the federal poverty line. As shown in Appendix Table A1, between 2008 and 2012, 82% of Massachusetts children eligible for free lunch and 58% of children eligible for reduced-price lunch had Medicaid health insurance, compared to 12% of children ineligible for free or reduced-price lunch. Because FRPL eligibility is a proxy for Medicaid insurance coverage, some misclassification of insurance status is inevitable. Students who are consistently FRPL-eligible are the most disadvantaged and are thus the most likely covered under Medicaid (Michelmore & Dynarski, 2017; Acton et al., 2021). Following existing literature, to minimize misclassification of insurance status, we define students as low-income if they are invariably observed as FRPL-eligible and high-income if they are never FRPL-eligible (Acton et al., 2021; Coffey, 2024). Students who are sometimes FRPL-eligible are excluded from the analysis.[3] Because we will misclassify the insurance status of some students, our estimates represent lower bounds for the effects of the *Rosie D.* reforms.

In our data, student with disability status is a binary indicator equal to one for students with an IEP on record in that year. Importantly for this analysis, the data contain specific disability classifications (intellectual, hard of hearing/deaf, communication, vision impairment/blind, emotional, physical, other health impairment, specific learning disability,

deaf/blind, multiple disabilities, ASD, neurological or developmental delay) for every student with a disability each year. We use this information to construct the indicator variable *ED*, which takes on a value of one for students currently enrolled in special education with a primary disability classification of emotional disturbance.

We examine several student outcomes, including math and ELA test scores on the Massachusetts Comprehensive Assessment System (MCAS), as well as measures of attendance and suspension. Per Massachusetts law, all students educated with public funds are required to participate in MCAS testing. A few students who cannot take the standard MCAS test even with accommodations may complete an alternative assessment consisting of a portfolio of student work submitted to the MADESE. Given the different natures of the standard MCAS and alternative assessment, our analysis of test scores focuses on students who took the standard exam.[4] We standardize MCAS scores with a mean of zero and a standard deviation of one for each grade year using the statewide mean and standard deviation. We consider the annual attendance rate (0-1) and construct an indicator for chronic absenteeism, which equals one for students absent at least 10 percent of days. For suspension, we use the number of days spent in out-of-school suspension and a binary indicator equal to one for students who received any out-of-school suspension as our two unique outcomes.

Special education setting is another key variable in our analysis, and it is only observed in students currently receiving special education services. Students with disabilities who are enrolled in a regular public school are categorized by the percentage of instructional time spent outside of a general education setting as "full inclusion" (less than 21%), "partial inclusion" (21-60%), or "substantially separate" (greater than 60%). Students may also be educated in public or

private separate day schools, residential schools, public residential institutional schools, or home/hospital-bound. We group these five settings under the umbrella term "separate school."

Table 1 shows baseline descriptive statistics for all students without disabilities, students with other disabilities (non-ED), and those with an ED in AY 2006-07, before the policy implementation. As shown in column 1, slightly more than half of public-school students without disabilities in MA are girls, and the majority (72%) are white, with smaller shares of Asian (6%), Hispanic (13%), Black (8%) and multiple races (2%). Students with other disabilities and those with an ED differ markedly from their peers without disabilities in several ways. First, girls are underrepresented among both students with other disabilities (36%) and those with an ED (28%). Students with other disabilities are disproportionately Black (10%), Hispanic (16%), and FRPL eligible (35%), as are students identified with ED (18%, 15%, and 46%, respectively).[5]

Outcomes for students with an ED lag those of their peers. The attendance rate for students with an ED is 88%, compared to 95% and 93% for students without disabilities and students with other disabilities, respectively. Students with an ED score worse than general education students on math and ELA tests, and slightly worse than students with other disabilities. On average, they score about 1 sd below the statewide mean in ELA and math, respectively, compared to students with other disabilities, who score .8 sd below the statewide mean, and students without disabilities who score .2 sd above the statewide mean.

Turning to specific disability classifications, the majority (43%) of students with other disabilities are classified with a specific learning disability. In contrast, 18% have a speech or language impairment, and 6% have another health impairment. The remaining disability classifications combined make up 24%. Compared to students with other disabilities, those with an ED are educated in less inclusive settings. Only 30% of students with an ED are fully

included, compared to 56% of students with other disabilities, and roughly 26% of students with an ED spend more than 60% of their day outside of a general education setting, compared to 13% of students with other disabilities. Finally, students with an ED are more likely to be enrolled in a separate school than students with other disabilities (3% vs 4%).

3.2 Analytic Samples

Our analysis uses four primary analytic samples. When examining changes in the incidence of ED and the demographic characteristics of identified students, we use a sample of all students (with and without disabilities) in grades K-12 in AY 2006-2013. This full student sample consists of roughly 5.3 million observations of 1.5 million unique students. In the remaining analyses, we focus on a sample of students currently enrolled in special education, within which students with other disability classifications serve as a comparison group for students with an ED. When examining changes in the pre-identification academic outcomes of students with an ED, our sample exists of students in their first year of disability identification in AY 2007-2013 (for whom we observe outcomes in the year prior to identification). Attendance and suspension outcomes are observed in all grades K-12, yielding a sample of roughly 60,000 observations. The math and ELA MCAS tests are administered to students in grades 3-8 and 10 only, yielding a smaller sample of roughly 25,000 students. Finally, when estimating changes to special education setting, we use a sample of roughly 845,000 observations of 280,000 students currently enrolled in special education in grades K-12 in AY 2006-13. As noted, all samples exclude students sometimes observed as FRPL-eligible.

4. Research Methods

4.1 Impact on ED Incidence Estimation Strategy

Rosie D. may have increased ED identification among students likely to be covered under Medicaid due to increased/improved screening or access to newly covered services. We investigate this by estimating a difference-in-differences (DD) model using the entire sample of students in grades K-12 enrolled in MA public schools between AY 2006-13. Specifically, we estimate the following regression:

$$ED_{it} = \beta_0 + \beta_1 LowInc_i + \beta_2 LowInc_i \cdot Post_t + \gamma X_{it} + \delta_g + \eta_s + \lambda_t + \varepsilon_{igst} \quad (1)$$

In this model (1), ED_{it} is an indicator equal to one for students currently classified with an ED, and $Post_t$ takes on a value of one beginning in 2009. The indicator $LowInc_i$ equals to one for students who are always observed as eligible for free or reduced-price lunch. We control for student demographic characteristics (EL status, race/ethnicity, gender) via the vector $\boldsymbol{X}$ and include grade (δ_g), school (η_s), and year fixed effects (λ_t). In (1) the DD coefficient β_2 captures the extent to which ED incidence among low-income relative to high-income students changed after *Rosie D.* The identifying assumption is that ED identification trends among high-income students are a valid counterfactual for ED identification trends among low-income students.

4.2 Heterogeneity of ED Identification

The existing disparities in disability identification rates by race and gender suggest that the effect of *Rosie D.* on ED identification may also differ along these dimensions. To investigate whether *Rosie D.* impacted the demographic composition of students identified with ED, we estimate the following triple difference (DDD) regression:

$$Y_{it} = \beta_0 + \beta_1 LowInc_i + \beta_2 ED_{it} + \beta_3 LowInc_i \cdot ED_{it} + \beta_4 LowInc_i \cdot Post_t + \beta_5 ED_{it} \cdot Post_t + \beta_6 LowInc_i \cdot ED_{it} \cdot Post_t + \gamma X_{it} + \delta_g + \eta_s + \lambda_t + \varepsilon_{igst} \quad (2)$$

In this model (2), the DDD coefficient β_6 captures the extent to which a demographic characteristic between ED and non-ED-identified students and between low-income relative to

high-income students changed after Rosie D. This model allows us to understand how *Rosie D.* contributed to a change in the makeup of ED-identified students. The assumption required for the a causal interpretation of our DDD estimates is that there was no contemporaneous shock affecting the relative outcomes of low-income students with an ED in the same year as policy implementation.

We also examine whether and how the pre-identification academic and behavioral outcomes of students who are identified with ED change after *Rosie D.,* either due to changes in the demographic composition of identified students or because the policy led to changes in the academic and behavioral "signals" that lead a student to be referred for disability evaluation. We estimate a version of (2) in which the dependent variable is replaced by academic or behavioral outcomes in the year prior to disability identification. Here, the sample consists of students with disabilities in grades K-12 in their first year of disability classification in AY 2007-2013.

Lastly, mental and behavioral healthcare services newly covered under *Rosie D.* may have crowded out or in special education services at school. As our data do not contain information about specific special education services, we use the special education setting as a proxy for the intensity of services received. Using a sample of all students with disabilities in AY 2006-2013, we estimate a version of (2) in which the dependent variable is replaced by an indicator variable for the student's special education setting.

5. Results

5.1 Impact on ED Identification

We first explore whether the *Rosie D.* reforms increased ED identification among children likely eligible for Medicaid. The DD estimates from (1) in column 1 of Table 2 indicate that this did not occur for grades K-8. The 95% confidence interval of the estimate is [-.0003, .0020],

allowing us to rule out all but very modest impacts on the incidence of ED among younger students. In contrast, we find that the incidence of ED among low-income students in grades 9-12 increased by .4 percentage points (roughly 2.8% of the sample mean) after policy implementation. The remaining columns in Table 2 show DD estimates for changes in the incidence of other disabilities after policy implementation. *Rosie D.* is unlikely to have impacted the incidence of non-ED disabilities directly. However, in the analysis that follows, we use students with other disabilities as a comparison group for those with an ED. Changes in the incidence of other disabilities could affect the composition of the comparison group, complicating the interpretation of our DD estimates. Column 2 shows that *Rosie D.* is associated with a 1.4 percentage point decrease in non-ED disabilities among low-income K-8 students and a .3 percentage point increase among low-income 9-12 students. The remaining columns show estimates for the three most common non-ED disability classifications. Among low-income grade K-8 students, we find that *Rosie D.* is associated with a decrease in specific learning disabilities (SLD) and an increase in other health impairments. Among low-income grade 9-12 students, we estimate increases in SLD, communication, and other health-related impairments.

Following Acton et al. (2021), we show estimates that include a linear time trend interacted with low-income status in panels B and D of Table 2. Including the trend reduces the magnitudes of the estimated coefficients for non-ED disabilities such that only the estimate for SLD among K-8 students remains statistically significant. This suggests that the estimates are driven by secular trends in disability identification rates over time rather than *Rosie D.* itself. To account for these changes, Appendix Tables A3 and A4 show that our main results are robust to include a linear time trend. In contrast to the other disability classifications, *Rosie D.* increased

ED among grade 9-12 students by .3 percentage points (2.1 percent of the sample mean) after accounting for these trends.

5.2 Heterogeneity of ED Identification

We now show how *Rosie D.* impacted the types of students who receive a classification of emotional disturbance. Table 3 shows DDD estimates of the effect on *Rosie D.* of the demographic characteristics of students identified with ED. While we do not estimate an increase in the incidence of ED among low-income students in grades K-8 after the reform, we find evidence of a change in the racial/ethnic composition of identified students. Specifically, we find that low-income students with an ED were 3.8 pp less likely to be white and 1.1 pp more likely to be multi-racial after policy implementation. A similar pattern emerges among grade 9-12 students. ED identified students in 9-12th grade were 4.5 pp less likely to be white and 2.3 and .9 pp more likely to be Black and multi-racial, respectively, after policy implementation.[6] The finding that low-income students with an ED were less likely to be white after *Rosie D.* is interesting, as minority students are disproportionately likely to receive a disability classification of ED. One possible explanation is that the policy increased awareness of ED among healthcare providers or school personnel, who may have sought to expand mental and behavioral healthcare services among groups of students who had previously been determined to require these services.

Table 4 presents DDD estimates exploring changes in identified students' pre-disability identification academic and behavioral outcomes. Here, the dependent variables are test scores, attendance, and suspension, all in the year before a student is first classified as having a disability. The sample consists of students in their first year of disability classification, and students with other types of disabilities serve as a comparison group for those with an ED. Among K-8 students, we find that newly identified low-income students with an ED were suspended for .22 more days and were 8.9 pp more likely to have received any out-of-school

suspension in the year before disability classification in the post-policy period. Among students in grades 9 –12, we estimate a 9.9 pp increase in the probability of being chronically absent in the year before disability classification. In contrast, we find no evidence of a change in the pre-classification test scores of either K-8 or 9-12 students.[7] These estimates suggest that *Rosie D.* may have led to students with more significant behavioral challenges being classified with an ED, either because the policy impacted the behavioral "signals," which may result in a child being referred for evaluation, or due to the changes in demographic characteristics of identified students.

5.3 Changes in Special Education Setting

Lastly, we investigate potential changes in special education settings following the *Rosie D.* reforms. Table 5 shows DDD estimates using a sample of all students enrolled in special education in grades K-12 in AY 2006-2013. Here, the dependent variables are a series of dummies representing four education settings (full inclusion, partial inclusion, substantially separate, and separate school). We estimate that students with an ED in grades K-8 were 3.1 percentage points less likely to be fully included after the reforms. While the remaining coefficients are positive in sign, they are not statistically significant at conventional levels. Among grades 9-12 students, the coefficient for substantially separate is positive. In contrast, partial inclusions and separate school coefficients are negative, but none are statistically significant at conventional levels.[8] The finding of a move towards less inclusive settings is interesting as both Acton et al. (2021) and Coffey (2024) find that insurance coverage for private ASD treatment led to fewer ASD specialized services and more inclusive settings in school. However, given that we see evidence of changes in ED identification after the implementation of *Rosie D,* the decrease in full inclusion may arise due to changes in the composition of identified

students and not because of the newly covered services. While advocates hoped that the mental and behavioral health services covered under *Rosie D.* would help students with an ED remain in their schools and communities, we find no evidence that placements in separate schools decreased after the reforms. The 95% confidence intervals for separate schools are [-.008, .022] and [-.012, .031] for students in grades K-8 and 9-12, respectively, ruling out large decreases in separate school placement following policy implementation.

6. Discussion and Conclusion

This paper builds on existing literature that investigates the impact of health insurance on student outcomes. Several authors used the Medicaid and SCHIP expansions of the 1980s and 1990s as a source of variation and found that expanded public health insurance increased reading test scores, decreased the probability of being below grade for age in the short run, and increased educational attainment long-term (Cohodes et al., 2016; Qureshi & Gangopadhyaya, 2021; Schanzenbach & Levine, 2009; Groves, 2019). To our knowledge, two papers investigated how the private provision of disability-related health services interacted with special education to determine academic outcomes for students with disabilities. Acton et al. (2021) showed that a Michigan mandate requiring private insurers to cover the treatment of ASD had no impact on the incidence of ASD or the test scores of diagnosed students. However, they found that the mandate decreased placement in cognitive impairment programs, decreased assignment of specialized teacher consultants, and increased placements in general education. They noted that their findings were consistent either with a decreased need for in-school services or with privately provided services crowding out special education services. Coffey (2024) examined the academic and behavioral impacts of a similar policy in Massachusetts and found that private

insurance for autism treatment enabled students with ASD to be educated in more inclusive settings and decreased the probability that they received an out-of-school suspension.

Our paper also contributes to the literature on special education classification. Our findings reveal significant changes in special education classification for ED among Medicaid-eligible students in grades 9-12. They were 0.3 percentage points (2.1 percent) more likely to receive special education services with a primary disability classification of ED after the reforms. While we find no evidence of an increase in the overall incidence of ED among younger students, we find that *Rosie D.* affected the racial/ethnic composition of identified students. Specifically, low-income students with an ED in grades K-8 were 3.8 percentage points less likely to be white and 1.1 percentage points more likely to be multi-racial after the reforms. Similarly, students in grades 9-12 were 4.5 percentage points less likely to be white, .9 percentage points more likely to be multi-racial, and 2.3 percentage points more likely to be Black in the post-policy period. These findings connect to previous evidence that highlights multiple dynamics at play when considering trends in identification across different socioeconomic groups (Hibel et al., 2010; Morgan et al., 2017; Elder et al., 2020; Elder et al., 2021).

We also find some evidence that behavioral outcomes in the year preceding ED classification were worse for students identified after the reform. Students in grades K-8 were suspended for roughly l.22 additional days and were 8.9 percentage points more likely to have received any out-of-school suspension in the year prior to ED classification. In comparison, students in grades 9-12 saw a decrease in attendance rate of 2.6 percentage points and were 9.9 percentage points more likely to have been chronically absent. Lastly, we find that students in grades K-8 were 3.1 percentage points less likely to be educated in a fully included setting after *Rosie D.* However, these changes may be attributable to changes in the demographic composition of identified

students, rather than the increased mental and behavioral health screening or services newly covered under the policy. While advocates hoped that *Rosie D.* would allow students with an ED to remain in their schools and communities, we find no evidence of a decrease in the likelihood that a student was educated in a separate school following the reform.

For policymakers, this study has two main implications. First, court rulings and health insurance policies can have spillover effects on the education system that require preparation to implement. Second, the change in the composition of students with EDs and their placement settings might prompt additional consideration of how to structure support for them, especially when the diagnoses occur more frequently in high schools, which tend to be larger educational environments with variability in the prevalence of available counseling staff such as counselors, social workers, and psychologists.

The following caveats temper these conclusions. First, the data do not contain information on the type of health insurance plan under which a student is covered (Medicaid vs. private). While free or reduced-price lunch eligibility is a good proxy of Medicaid insurance coverage for students, it does not perfectly capture Medicaid insurance participation. Second, we do not observe the specific mental health or special education services students receive. We cannot directly investigate whether privately provided services may crowd out or crowd in those provided at school.

Overall, this study provides new insights into the intersections of legal proceedings and health policy with special education identification. We focus on a more recent change in health insurance coverage, distinct from the Medicaid expansions studied by previous authors. Our research delves into the impact of changes in disability-related health insurance on students with ED, a group that has been understudied and is particularly vulnerable. We extend prior studies by

exploring how a state health insurance policy, which explicitly increased childhood disability screening, influenced the incidence of ED classification and the receipt of associated special education services within schools.

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Tables & Figures

Table 1. Descriptive statistics, MA public school students AY 2006-07

	No Disability	Non-ED Disability	ED
	(1)	(2)	(3)
Demographics			
Female	.514	.351	.284
Asian	.058	.030	.019
Hispanic	.128	.157	.149
Black	.079	.100	.182
White	.719	.699	.634
Multiple Races (non-Hispanic)	.016	.015	.015
Foreign Born	.028	.010	.005
FRPL	.289	.352	.460
ELL	.059	.053	.031
Academic Outcomes			
Attendance	.947	.933	.881
Math Z-score	.177	-.803	-1.036
ELA Z-score	.189	-.849	-1.012
Days Suspended	.104	.184	.622
Disabilities			
ED	--	--	1
Communication	--	.183	--
SLD	--	.433	--
Health	--	.064	--
Other	--	.320	--
Education Setting			
Full Inclusion	--	.558	.281
Partial Inclusion	--	.233	.131
Substantially Separate	--	.127	.257
Separate School	--	.037	.327
N-students	1,115,547	198,292	21,076

Table 1 Notes: FRPL and ELL denote students eligible for free or reduced-price lunch and English language learner services, respectively. Math and ELA Z-scores are standardized for each grade statewide, with a mean of zero and a standard deviation of one.

Figure 1. Event Study Estimates – ED Identification Rates

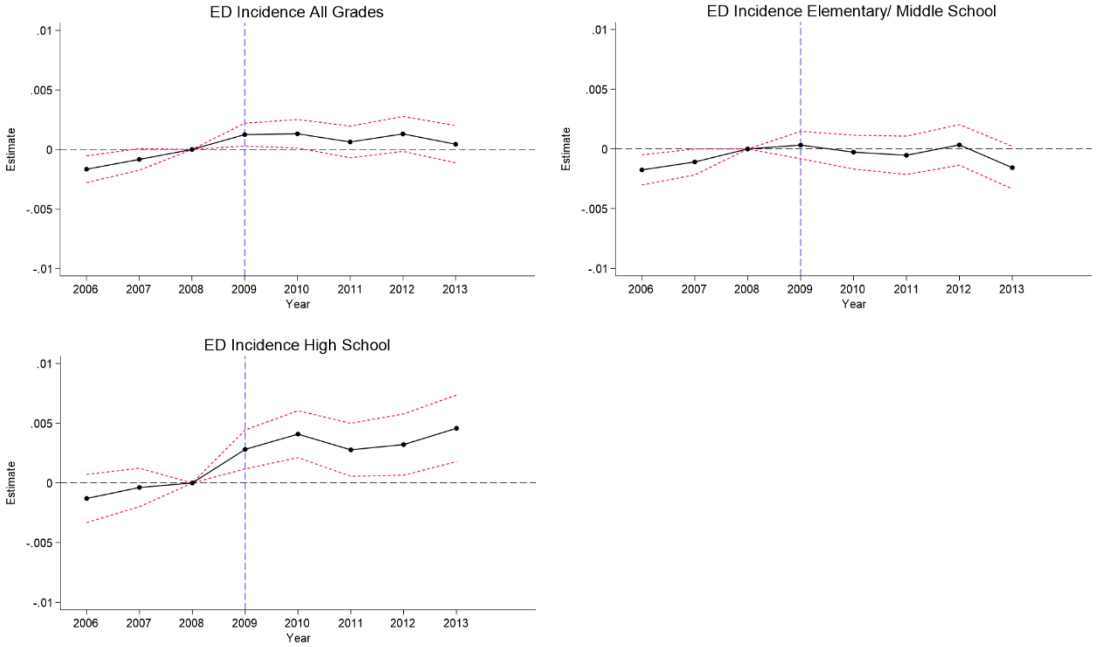

Figure 1 Notes: Event study estimates of Rosie D's impact on ED identification rates. Model (1) $Post_t$*$LowInc_i$ is replaced with low-income status interacted with a series of year dummies. The sample is all students in grades K-12, K-8, or 9-12 in AY 2006-2013. The year 2008 is omitted. Regressions control for race/ethnicity, gender, and EL status and include grade, school, and year fixed effects. Pink dashed lines represent 95% confidence intervals calculated from standard errors clustered at the school level.

Table 2. DD Estimates - Disability Incidence – Grades K-8 and 9-12

	ED	Non-ED	Comm.	SLD	Health
	(1)	(2)	(3)	(4)	(5)
A. Grades K-8					
Post*Low Inc	.001	-.014***	.000	-.007***	.002***
	(.001)	(.002)	.001	(.001)	(.000)
B. Grades K-8 With Linear Time Trend					
Post*Low Inc	.001	.003	-.001	.002*	.001
	(.001)	(.002)	(.001)	(.001)	(.001)
Sample Mean	.009	.151	.034	.056	.013
N-students	891,222	891,222	891,222	891,222	891,222
N-observations	3,497,065	3,497,065	3,497,065	3,497,065	3,497,065
C. Grades 9-12					
Post*Low Inc	.004***	.003***	.010***	.002***	.012***
	(.001)	(.001)	(.002)	(.001)	(.003)
D. Grades 9-12 With Linear Time Trend					
Post*Low Inc	.003***	.000	.003	.000	.003
	(.001)	(.001)	(.002)	(.001)	(.003)
Sample Mean	.139	.011	.076	.017	.020
N-students	682.907	682.907	682.907	682.907	682.907
N-observations	1,860,196	1,860,196	1,860,196	1,860,196	1,860,196

Table 2 Notes: Each column in each panel represents a separate regression for model (1) DD estimates for disability incidence. Panels A and B samples are grades K-8 in AY 2006-2013. Panels C and D samples are grades 9-12 in AY 2006-2013. All regressions control for race/ethnicity, poverty status, and EL status and include grade, school, and year fixed effects. Regressions in Panels B and D include a linear time trend interacting with low-income status. *p<0.10; **p<0.05; ***p<0.01.

Table 3. DDD Estimates – Demographics of ED Identified Students - Grades K-8 and 9-12

	Black	Hispanic	Asian	White	Mult.	Female
	(1)	(2)	(3)	(4)	(5)	(6)
A. Grades K-8						
Post*Low Inc*ED	.007	.010	.009	-.038***	.011**	.022
	(.010)	(.010)	(.005)	(.012)	(.005)	(.014)
Sample Mean	.086	.115	.059	.751	.021	.489
N-observations	3,497,065	3,497,065	3,497,065	3,497,065	3,497,065	3,497,065
B. Grades 9-12						
LowInc*ED*Post	.023***	.013	.001	-.045***	.009**	.015
	(.008)	(.010)	(.005)	(.013)	(.004)	(.014)
Sample Mean	.066	.107	.051	.761	.014	.492
N-observations	1,860,196	1,860,196	1,860,196	1,860,196	1,860,196	1,860,196

Table 3 Notes: Each column in each panel represents a separate regression for model (2) DDD estimates of the demographic characteristics of ED identified students. The sample in Panel A is students in grades K-8 AY 2006-2013. The sample in Panel B is students in grades 9-12 AY 2006-2013. Students who are sometimes observed as FRPL-eligible are excluded. All regressions include grade, school, and year fixed effects. *p<0.10; **p<0.05; ***p<0.01.

Table 4. DDD Estimates - Prior Year Outcomes for Students in the First Year of SWD Identification – Grades K-8 and 9-12

	Read (sd) (1)	Math (sd) (2)	Attend. Rate (3)	Chronic (4)	Days Susp. (5)	Ever Susp. (6)
A. Grades K-8						
LowInc*ED*Post	.046	.069	.000	-.020	.214*	.087***
	(.084)	(.084)	(.007)	(.031)	(.116)	(.028)
Sample Mean	-.736	-.770	.946	.127	.107	.045
N-observations	20,098	20,098	49,972	49,972	49,972	49,972
B. Grades 9-12						
LowInc*ED*Post	-.129	.221	-.026*	.100**	-.125	.067
	(.156)	(.137)	(.016)	(.048)	(.313)	(.052)
Sample Mean	-.429	-.545	.892	.327	.526	.179
N-observations	4,904	4,904	10,380	10,380	10,380	10,380

Table 4 Notes: Each column in each panel represents a separate regression for model (2) DDD estimates for prior year outcomes for students in the first year of SWD identification. The sample is students in their first year of SWD identification in grades K-8 in panel A and 9-12 in panel B in AY 2007-2013. Students who are sometimes observed as FRPL-eligible are excluded. All regressions control for race/ethnicity, gender, poverty status, and EL status and include grade, school, and year fixed effects.
*p<0.10; **p<0.05; ***p<0.01.

Table 5. DDD Estimates - Special Education Setting

	Full Inclusion	Part Inclusion	Subs. Separate	Separate School
	(1)	(2)	(3)	(4)
A. Grades K-8				
LowInc*ED*Post	-.031**	.006	.019	.006
	(.015)	(.011)	(.014)	(.007)
Sample Mean	.669	.184	.111	.036
N-students	164,138	164,138	164,138	164,138
N-observations	550,534	550,534	550,534	550,534
B. Grades 9-12				
LowInc*ED*Post	-.001	.012	-.022	.010
	(.014)	(.014)	(.014)	(.011)
Sample Mean	.555	.222	.124	.100
N-students	115,344	115,344	115,344	115,344
N-observations	294,567	294,567	294,567	294,567

Table 5 Notes: Each column in each panel represents a separate regression for model (2) DDD estimates for special education settings. The sample is students in special education in grades K-8 in panel A and grades 9-12 in panel B in AY 2006-2013. Students are considered low-income if they are always observed as FRPL-eligible and high-income if they are never observed as FRPL-eligible. Students who are sometimes observed as FRPL-eligible are excluded. All regressions control for race/ethnicity, gender, and EL status and include grade, school, and year fixed effects. *p<0.10; **p<0.05; ***p<0.01.

Appendix

Figure A1. Timeline of Rosie D. vs. Patrick Lawsuit and Reform Implementation

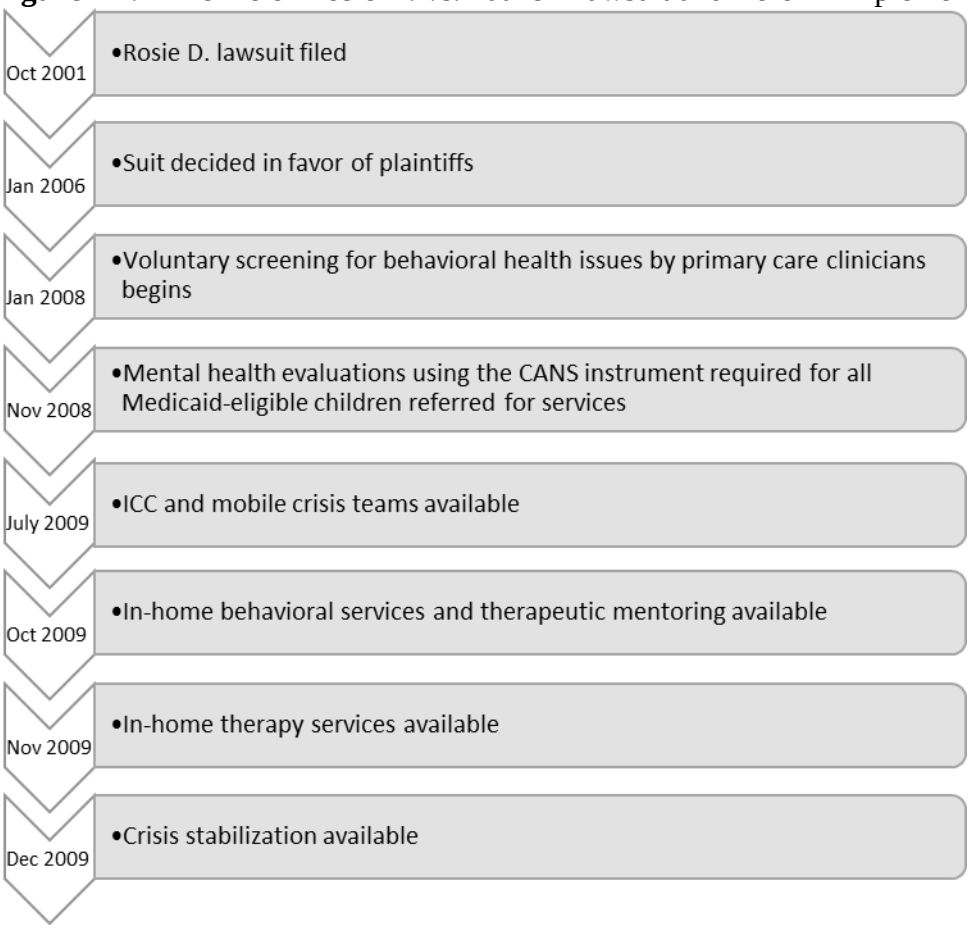

Figure A1 Notes: Provides the timeline for the Rosie D. vs Patrick lawsuit filing and implementation of behavioral and mental health services.

Table A1. Type of Insurance Coverage by FRPL Eligibility

FRPL Eligibility	Percent Insured	Percent Medicaid	Percent Private
	(1)	(2)	(3)
Free (<130% FPL)	96.89	82.00	24.03
Reduced Price (130-185% FPL)	97.22	58.04	53.13
Not Eligible	98.97	12.21	91.26

Table A2 Notes: Tabulations from the 2008-2012 American Community Survey among children in grades K-12 at Massachusetts public schools (N=65,255). Insurance counts may exceed 100%, as some individuals may have multiple insurance plans.

Table A2. DDD Estimates - MCAS Alt taking

	Grades K-8		Grades 9-12	
	ELA Alt	Math Alt	ELA Alt	Math Alt
	(1)	(2)	(3)	(4)
A. No Linear Time Trend				
LowInc*ED*Post	-.004	-.003	-.001	-.002
	(.009)	(.009)	(.009)	(.009)
B. With Linear Time Trend				
LowInc*ED*Post	-.002	-.001	-.001	-.002
	(.007)	(.007)	(.009)	(.009)
Sample Mean	.070	.072	.060	.060
Observations	401,195	403,241	66,772	67,981

Table A1 Notes: Each column in each panel represents a separate regression for model (2) DDD estimates for MCAS Alt taking. The sample is all students enrolled in special education in grades K-8 in columns 1 and 2 and grades 9-12 in columns 3 and 4 in AY 2006-2013. Students who are sometimes observed as FRPL-eligible are excluded. All regressions control for race/ethnicity, gender, and low-income status and include grade, school, and year fixed effects. Regressions in Panel B include a linear time trend that interacts with low-income status. *p<0.10; **p<0.05; ***p<0.01

Figure A2. ED Incidence 2006 to 2018 by FRPL Status - Grades K-8 and 9-12

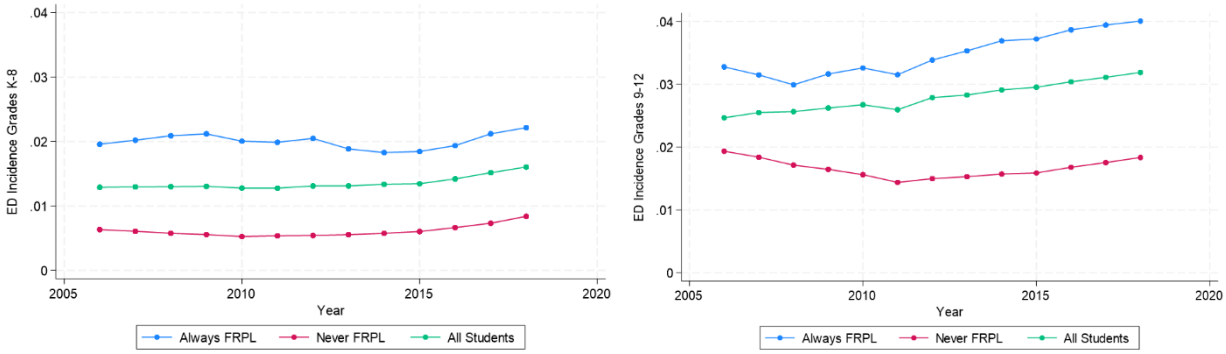

Figure A2 Notes: Massachusetts ED incidence (%) from 2006 to 2018 by FRPL status by grades K-8 and 9-12.

Figure A3. Event Study Estimates – Demographics of ED Identified Students - Grades K-8

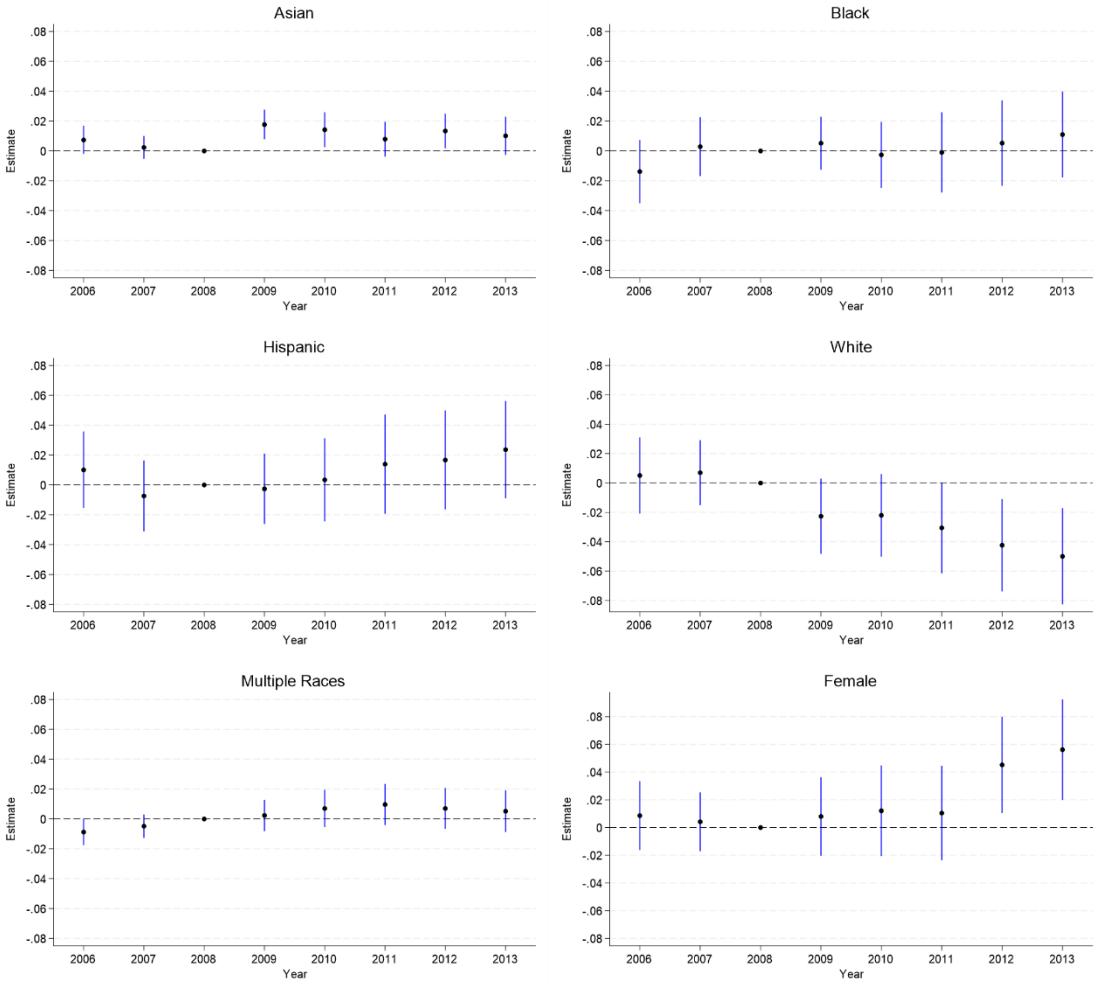

Figure A3 Notes: Event study estimates of Rosie D's impact on the demographic composition of students identified with ED. Model (2) is replaced with ED and low-income status interacted with a series of year dummies. The sample is all grades 9-12 AY 2006-2013 students. The year 2008 is omitted. All regressions include grade, year, and school-fixed effects. Blue bars represent 95% confidence intervals calculated from standard errors clustered at the school level.

Figure A4. Event Study Estimates – Demographics of ED Identified Students - Grades 9-12

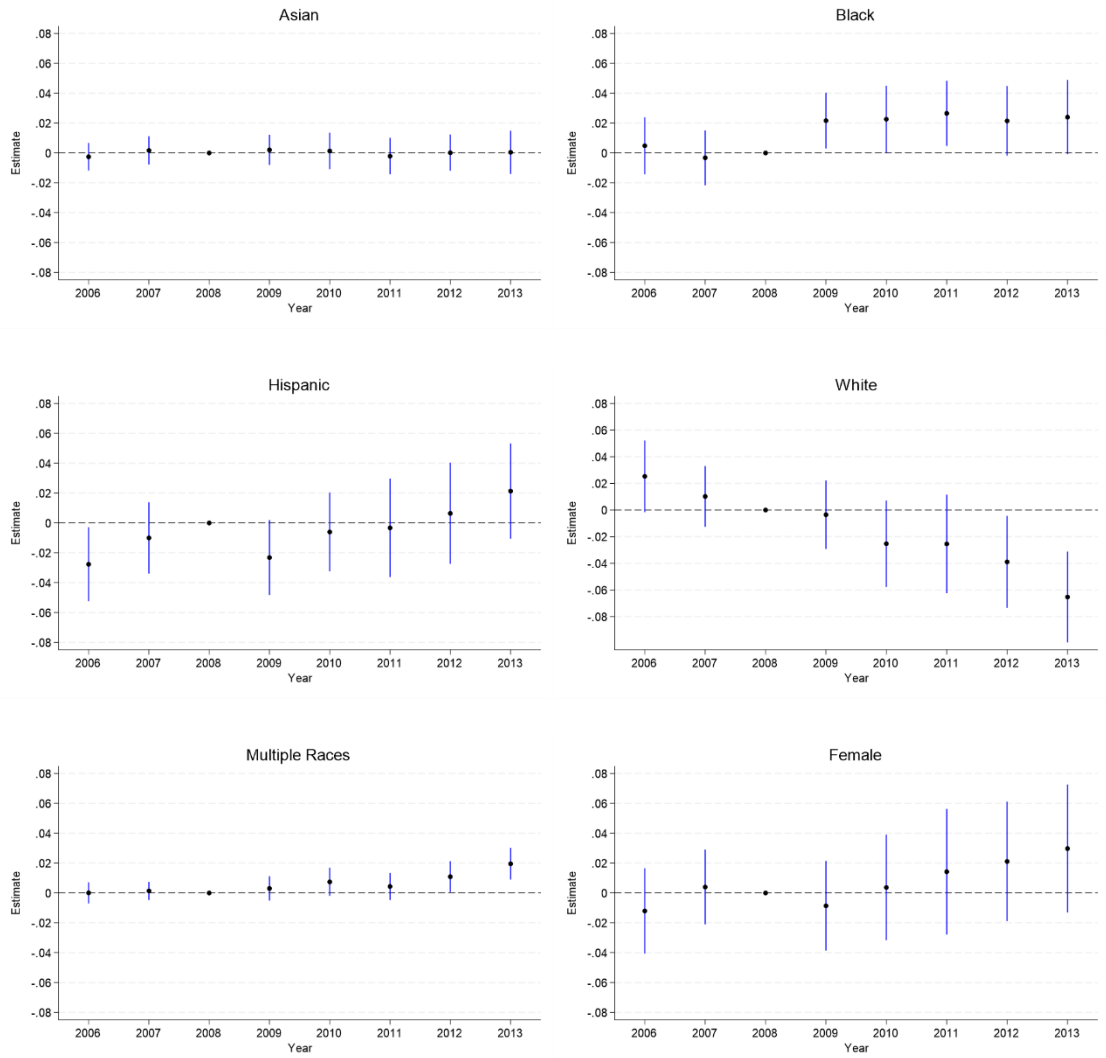

Figure A4 Notes: Event study estimates of Rosie D's impact on the demographic composition of students identified with ED. Model (2) is replaced with ED and low-income status interacted with a series of year dummies. The sample is all grades 9-12 AY 2006-2013 students. The year 2008 is omitted. All regressions include grade, year, and school-fixed effects. Blue bars represent 95% confidence intervals calculated from standard errors clustered at the school level.

Figure A5. Event Study Estimates - Prior Year Outcomes for Students in First Year of SWD Identification - Grades K-8

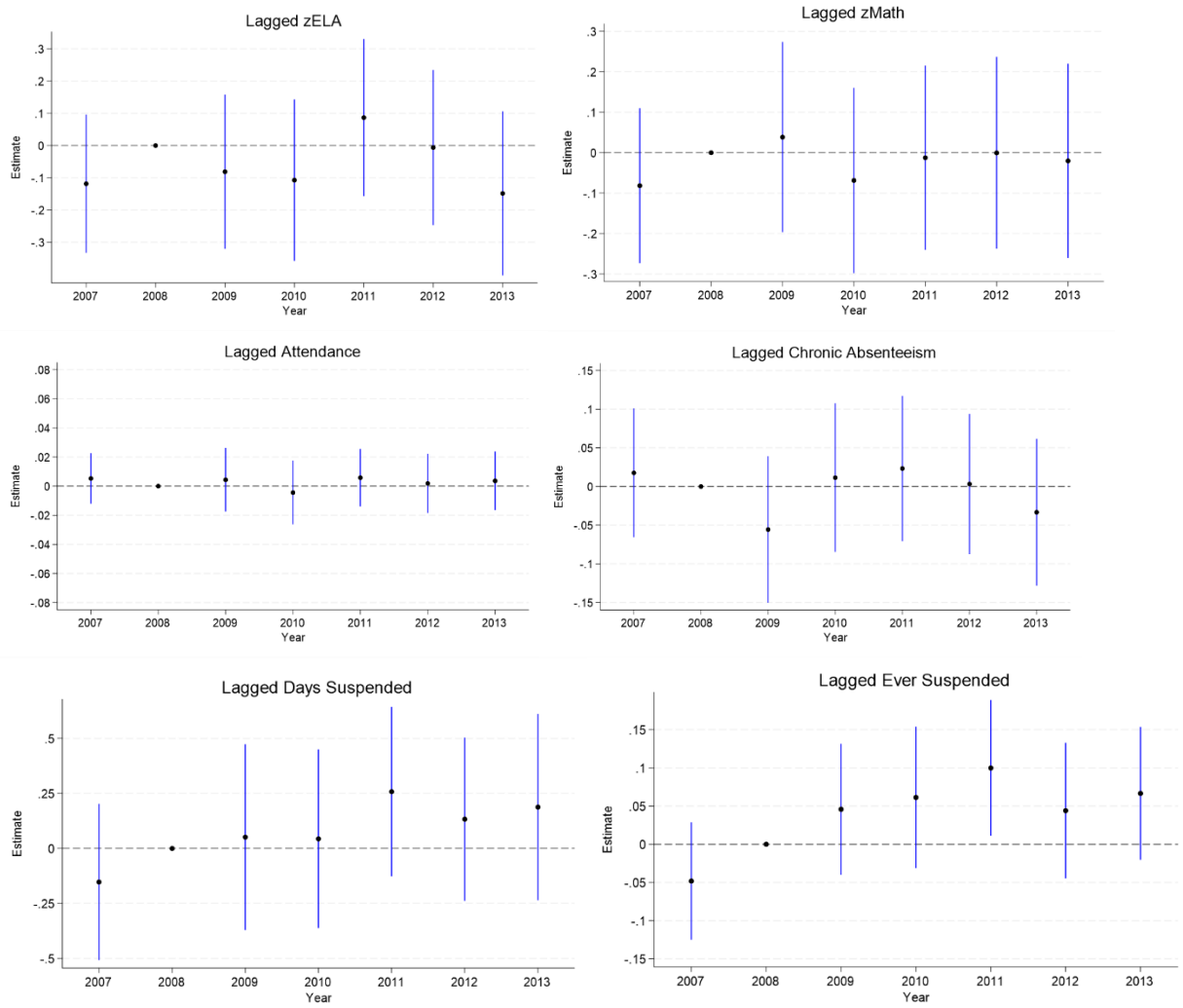

Figure A5 Notes: Event study estimates of Rosie D's impact on academic outcomes in the year prior to identification in grades K-8. Model (2) is replaced with ED and low-income status interacted with a series of year dummies. The sample is students enrolled in special education in AY 2006-2013. The year 2008 is omitted. All regressions control for gender, race/ethnicity, poverty, and EL status and include grade, school, and year fixed effects. Blue bars represent 95% confidence intervals calculated from standard errors clustered at the school level.

Figure A6. Event Study Estimates - Prior Year Outcomes for Students in First Year of SWD Identification - Grades 9-12

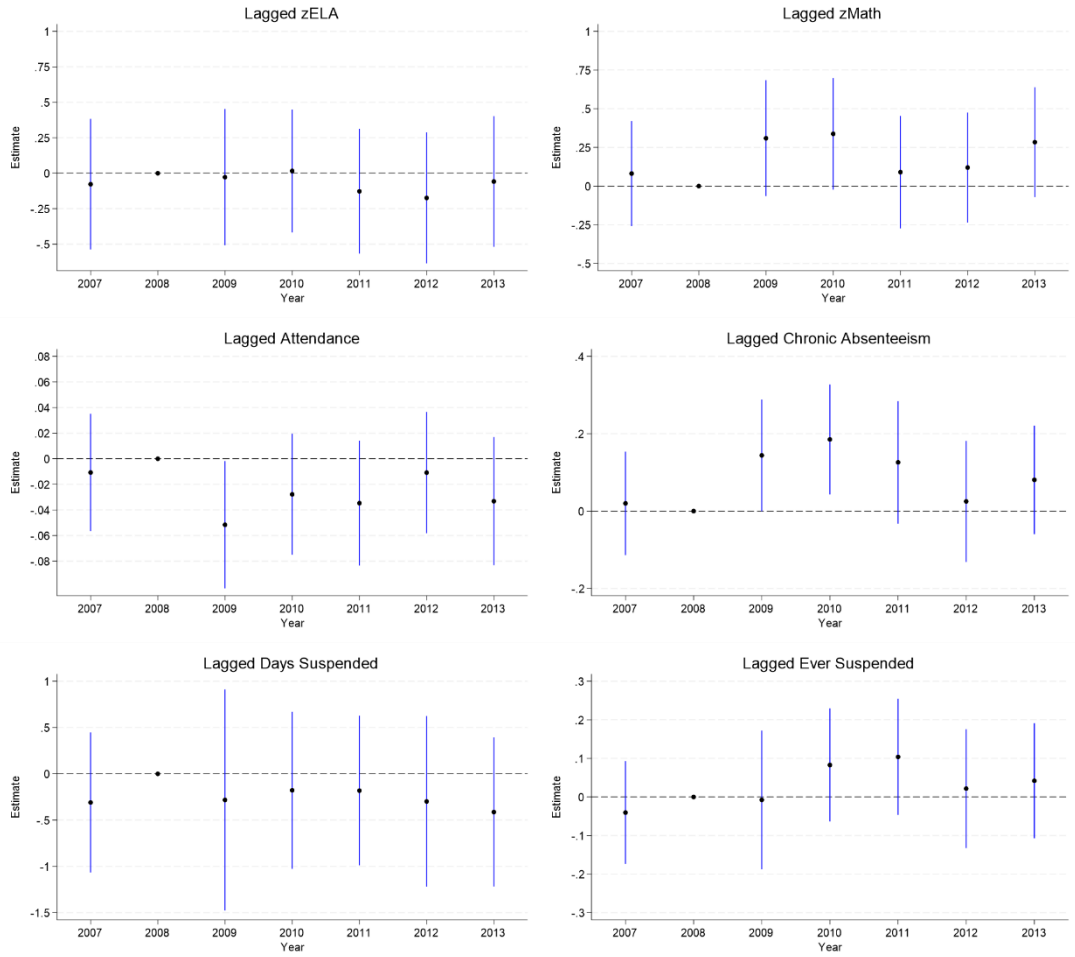

Figure A6 Notes: Event study estimates of Rosie D's impact on academic outcomes in the year prior to identification in grades 9-12. Model (2) is replaced with ED and low-income status interacted with a series of year dummies. The sample is students enrolled in special education in AY 2006-2013. The year 2008 is omitted. All regressions control for gender, race/ethnicity, poverty, and EL status and include grade, school, and year fixed effects. Blue bars represent 95% confidence intervals calculated from standard errors clustered at the school level.

Figure A7. Event Study Estimates - Special Education Setting – Grades K-8|

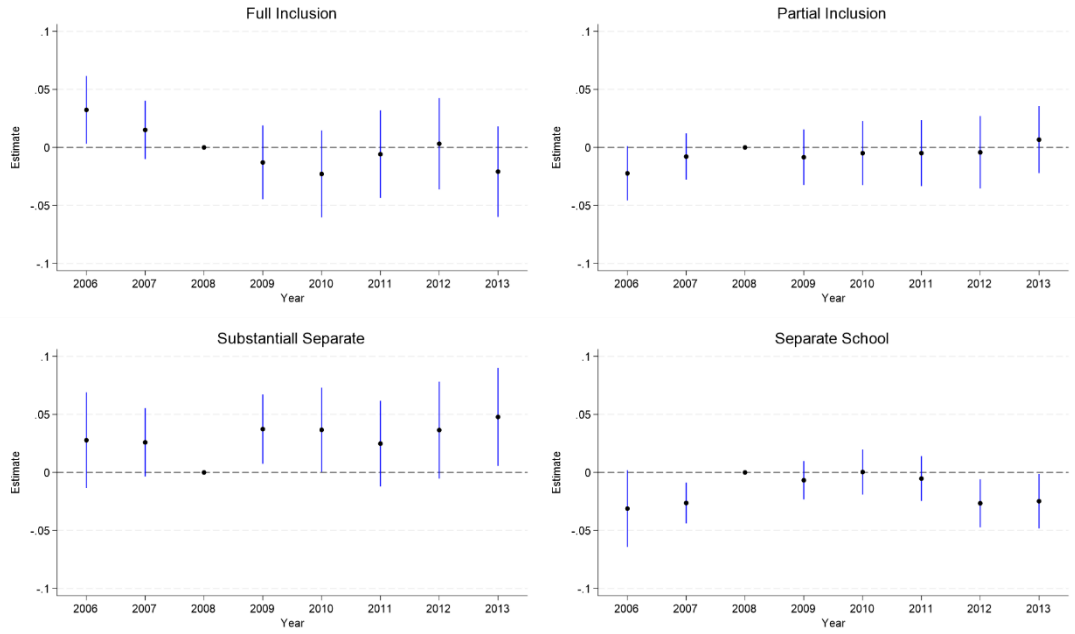

Figure A7 Notes: Event study estimates of Rosie D's impact on special education settings in grades K-8. Model (2) is replaced with ED and low-income status interacted with a series of year dummies. The sample consists of students currently enrolled in special education from AY 2006-2013. The year 2008 is omitted. All regressions control for gender, race/ethnicity, poverty, and EL status and include grade, school, and year fixed effects. Blue bars represent 95% confidence intervals calculated from standard errors clustered at the school level.

Figure A8. Event Study Estimates - Special Education Setting – Grade 9-12 Students

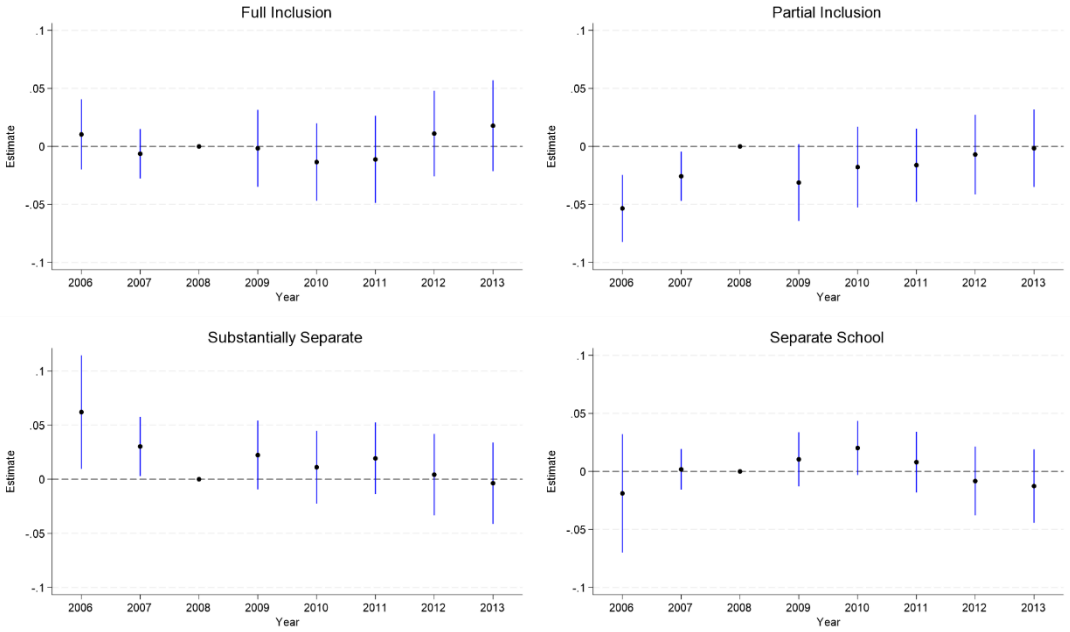

Figure A8 Notes: The event study estimates Rosie D.'s impact on special education settings in grades 9-12. Model (2) is replaced with ED and low-income status interacted with a series of year dummies. The sample consists of students currently enrolled in special education from AY 2006-2013. The year 2008 is omitted. All regressions control for gender, race/ethnicity, poverty, and EL status and include grade, school, and year fixed effects. Blue bars represent 95% confidence intervals calculated from standard errors clustered at the school level.

Table A3. DDD Estimates - Prior Year Outcomes for Students in First Year of SWD Identification with Linear Time Trend

	Read (sd) (1)	Math (sd) (2)	Attend. Rate (3)	Chronic (4)	Days Susp. (5)	Ever Susp. (6)
A. Grades K-8 With Linear Time Trend						
LowInc*ED*Post	.017	.035	.000	-.020	.221*	.089***
	(.035)	(.084)	(.007)	(.031)	(.116)	(.029)
Sample Mean	-.736	-.790	.947	.127	.107	.045
N-observations	20,098	20,502	49,972	49,972	50,018	50,018
B. Grades 9-12 With Linear Time Trend						
LowInc*ED*Post	-.034	.192	-.026*	.099**	-.111	.070
	(.163)	(.129)	(.016)	(.048)	(.311)	(.052)
Sample Mean	-.429	-.561	.892	.327	.528	.179
N-observations	4,904	5,039	10,380	10,380	10,390	10,390

Table A3 Notes: Each column in each panel represents a separate regression for model (2) DDD estimates for different prior year outcomes for students in their first year of disability identification in grades K-8 in panel A and grades 9-12 in panel B in AY 2007-2013. Students who are sometimes observed as FRPL-eligible are excluded. All regressions control for race/ethnicity, gender, poverty status, and EL status and include grade, school, and year fixed effects and a linear time trend interacted with low-income status. *p<0.10; **p<0.05; ***p<0.01.

Table A4. DDD Estimates - Special Education Setting with Linear Time Trend

	Full Inclusion	Part Inclusion	Subs. Separate	Separate School
	(1)	(2)	(3)	(4)
A. Grades K-8 with Linear Time Trend				
LowInc*ED*Post	-.031**	.006	.019	.006
	(.015)	(.011)	(.014)	(.008)
Sample Mean	.669	.184	.111	.036
N-students	164,138	164,138	164,138	164,138
N-observations	550,534	550,534	550,534	550,534
B. Grades 9-12 with Linear Time Trend				
LowInc*ED*Post	-.001	.012	-.022	.010
	(.014)	(.014)	(.014)	(.011)
Sample Mean	.555	.222	.124	.100
N-students	115,344	115,344	115,344	115,344
N-observations	294,567	294,567	294,567	294,567

Table A4 Notes: Each column in each panel represents a separate regression for model (2) DDD estimates for special education settings. The sample is students in special education in grades K-8 in panel A and grades 9-12 in panel B in AY 2006-2013. Each column in each panel represents a separate regression. Students are considered low-income if they are always observed as FRPL-eligible and high-income if they are never observed as FRPL-eligible. Students who are sometimes observed as FRPL-eligible are excluded. All regressions control for sex, race/ethnicity, and EL status, including grade, school, and year fixed effects and a linear time trend with low-income status. *p<0.10; **p<0.05; ***p<0.01.

Endnotes

[1] The Massachusetts healthcare reform law, An Act Providing Access to Affordable, Quality, Accountable Health Care, was also passed in 2006 and was implemented during this period.
[2] In contrast, coverage for mental and behavioral health services under private insurance plans was not mandated or standardized until after the period we study. As of July 1, 2019, all fully insured plans must cover the same behavioral health services.
[3] In Massachusetts, some children with disabilities may be eligible to enroll in Medicaid regardless of family income through the MassHealth CommonHealth program. While information about the take-up of CommonHealth by specific disability classification is not publicly available, as of 2018, only 4,800 children were enrolled in the program.
[4] Appendix Table A2 shows DDD estimates in which the dependent variable in (2) is replaced with a dummy variable indicating whether a student took the MCAS alternative assessment. We find no evidence that *Rosie D.* impacted the likelihood that students with an ED took the alternative assessment.
[5] Appendix Figure 2 provides an overview of ED rates by FRPL status during the study period 2006-2013.
[6] Event student estimates of Rosie D.'s effect on the demographic composition of students identified with an ED are shown in Appendix Figures A3 and A4.
[7] Event study estimates of changes in the prior year's academic and behavioral outcomes of newly SWD-identified students are shown in Appendix Figures A5 and A6.
[8] Event study estimates of changes in special education settings are shown in Appendix Figures A7 and A8.