# The Persistence of Parent-led Dental Healthcare Habits into Adulthood

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**Abstract**

This study investigates whether preventive healthcare habits formed under parental influence during adolescence persist into adulthood. Using data from the National Longitudinal Study of Adolescent to Adult Health (Add Health), the analysis estimates the effect of receiving dental examinations in adolescence on adulthood dental exams using a selection-on-observables framework. In contrast to health behaviors analyzed in prior intergenerational transmission studies, dental exams are preventive, non-urgent, and largely independent of genetic or addictive influences. Results show a strong and persistent effect of adolescent dental exams on adult dental exam behavior that is robust across OLS, propensity score matching, and LASSO-based variable selection.

## 1 Introduction

Understanding the intergenerational transmission of health status has been a central question in health economics. Prior research has presented evidence of a strong correlation between parents' and children's health status, including birth weight, weight, height, BMI, and chronic conditions (Currie and Moretti, 2007; Coneus and Spiess, 2012; Thompson, 2014). These studies show that socioeconomic factors exacerbate the inheritance of health

and demonstrate that disparities in early-life environments contribute to the perpetuation of health inequalities across generations. Although previous research has documented how childhood environments influence health outcomes, it remains unclear whether intergenerational health transmission also occurs through the formation of persistent healthcare habits shaped by parents.

During childhood and adolescence, individuals' healthcare decisions are largely shaped by their parents. These early experiences may affect not only immediate health outcomes but also the development of long-term healthcare habits. This paper focuses on the behavioral channel of intergenerational transmission, extending prior work that has emphasized genetic or socioeconomic factors. It tests the hypothesis that parental decisions during adolescence contribute to the formation of persistent healthcare routines. To examine this, the study estimates the effect of receiving dental examinations in adolescence on the likelihood of obtaining dental exams in adulthood.

Dental examinations during adolescence are used as a proxy for parental influence on preventive healthcare behavior. This measure has several advantages. First, dental exams capture preventive care that is largely independent of genetic or addictive influences. Unlike health outcomes such as weight or BMI, which reflect both biological and environmental inheritance, receiving a dental exam is a behavioral choice unlikely to be genetically determined. Most prior studies on intergenerational health behavior focus on smoking, drinking, or drug use, where passive exposure and addiction make it difficult to disentangle habit formation from non-behavioral transmission. Second, dental exams are not mandated by schools or programs, so the decision to obtain one reflects family or individual initiative rather than institutional requirements. Third, dental exams represent non-urgent preventive behavior rather than responses to poor health or acute medical needs. Finally, they provide a credible measure of parents' decisions. Parental and child dental visits are strongly correlated (Isong et al., 2010), and because adolescents in the sample remain financially dependent, non-urgent healthcare decisions are typically made by parents.

This study uses data from the National Longitudinal Study of Adolescent to Adult Health (Add Health), which contains detailed information on socioeconomic and family conditions in both adolescence and adulthood. Since the dental exams are not exogenously assigned to adolescents, this study adopts a selection-on-observables identification strategy. Following Oster (2019), I consider whether the estimated relationship between adolescent and adult healthcare behavior remains stable as additional meaningful observed controls are introduced. This study also implements propensity score matching to reduce reliance on functional form assumptions and LASSO-based variable selection to address model selection in a high-dimensional setting.

The findings show that individuals who received dental exams during adolescence are significantly more likely to do so again in adulthood. This relationship remains robust after adjusting for a comprehensive set of adolescent and adult characteristics. Specifically, adolescent dental exams are associated with a 5.7 percentage point (10.1 percent) increase in the probability of receiving an exam in Wave IV (ages 24–32), and a 3.4 percentage point (5.4 percent) increase in Wave V (ages 33–43). Although the effect size declines with age, the association remains statistically significant and substantively meaningful. This attenuation is expected given the two-decade gap between early exposure and adult behavior. Considering that 63 percent of the estimation sample received dental exams in Wave V, a 3.4 percentage point increase represents a notable and persistent association with early-life preventive care that extends beyond early adulthood into mid-adulthood.

Multiple channels may contribute to the association between adolescent and adult dental examination behavior. This study aims to identify the habitual transmission pathway by distinguishing behavioral persistence from other mechanisms, two of which are particularly relevant in this context. The first is transmission through socioeconomic status. Greater parental investment in childhood increases the likelihood of higher income, education, and insurance coverage in adulthood, which in turn increases access to dental care. To isolate this channel, the analysis controls for detailed socioeconomic characteristics measured in

adulthood. The second is transmission through forward-looking or health-oriented family preferences, which may jointly influence parental and child preventive care decisions. To separate this pathway, the models include parental and family background variables. By conditioning on these controls, the estimated coefficient is interpreted as capturing behavioral persistence most plausibly attributable to habit formation.

This study makes several contributions to the literature. First, it extends existing work on the intergenerational transmission of health by focusing on behavioral pathways. While prior studies have emphasized genetic traits, neighborhood conditions, and maternal disadvantage during the prenatal period (Currie and Moretti, 2007; Aizer and Currie, 2014), the role of health habit formation has received less attention. Because poor healthcare habits contribute to adverse long-term outcomes, identifying how parents shape these behaviors is essential for understanding the persistence of health inequality. This study provides evidence consistent with the idea that health habit formation is one behavioral mechanism through which intergenerational transmission occurs.

Second, this study contributes to the literature on health habit formation by providing evidence on longer-run behavioral persistence. Recent studies have shown that well-designed interventions, such as incentives or monitoring, can lead to durable behavioral changes. For example, Hussam et al. (2022) documents that handwashing behavior persisted up to 13 months after the end of an incentive-based intervention. Similarly, Jones et al. (2024) finds that financial incentives for health screening increased uptake for at least two years. While these studies provide valuable evidence of habit formation, their time horizons remain relatively short. By contrast, this study uses longitudinal data that track individuals from adolescence through adulthood, allowing for an assessment of whether health behaviors formed under parental influence persist over a much longer period. This complements the experimental literature by extending the analysis of habit formation in adolescence to adult behavior choice.

Third, this study focuses on preventive and non-addictive health behavior. Much of

the existing literature on intergenerational health habits has examined behaviors such as smoking and alcohol use, where it is difficult to disentangle habit formation from addiction, passive exposure, or shared genetic traits. For example, Schmidt and Tauchmann (2011) presents a positive association between parental and adult drinking behavior, and Loureiro et al. (2010) estimates a causal effect of parental smoking using instrumental variables. Brown and van der Pol (2014) further emphasizes that both shared genetics and shared environments contribute to the persistence of smoking. While these studies demonstrate intergenerational correlations in health behavior, they face challenges in isolating the role of parental attitude. In contrast, dental examinations are preventive, non-addictive, and unlikely to be driven by inherited traits. The present analysis provides a cleaner setting for examining how parental behavior shapes long-term health habits.

Finally, this study highlights parental influence as a distinct mechanism in shaping long-term engagement with the healthcare system. Although recent research has begun to examine social spillovers in healthcare consumption, including the influence of peers and household members, the specific role of parents in forming early healthcare habits has received limited attention (Hodor, 2021). This study addresses that gap by examining whether preventive care behavior encouraged by parents during adolescence predicts continued healthcare engagement in adulthood.

Promoting sustained engagement with healthcare remains a central policy concern. Although many interventions aim to foster lifelong health habits, their success has often been limited, partly due to an incomplete understanding of how such behaviors are formed and maintained. This study shows that healthcare behavior is not shaped solely by current incentives or adult circumstances but is also influenced by parental decisions during adolescence. A clearer understanding of these behavioral pathways can inform more effective policy strategies to improve long-term healthcare engagement.

# 2 Data

The data set used in this paper is the National Longitudinal Study of Adolescent to Adult Health (Add Health), a nationally representative panel that follows a cohort of U.S. adolescents in grades 7–12 during the 1994–1995 school year into adulthood (through 2016–2018). Add Health provides extensive information on individual healthcare behavior and outcomes, socioeconomic conditions, healthcare access, and family background, making it well-suited for studying the long-term effects of early-life healthcare behavior.

Table 1 summarizes the key analytical variables drawn from each Add Health wave used in this study. The primary independent variable, adolescent dental exam, is constructed from Waves I and II. The main outcome variables, adulthood dental exams, are taken from Waves IV and V. This study incorporates data from the Parent (1995) Survey, administered in Wave I to the parent or guardian residing with the adolescent. The preferred parent survey respondent was the biological mother; however, in her absence, other caregivers, such as stepmothers, grandmothers, or fathers, were also eligible. Table 2 displays the distribution of respondent relationships. In alignment with the survey guidance, 88.3 percent of the parent respondents were biological mothers. I restrict the analytic sample to 4,724 adolescents with reports from female relatives. The female relatives include biological mothers, stepmothers, grandmothers, and other female relatives, highlighted in bold in Table 2. Throughout the analysis, the female guardians who reported the parent survey are referred to simply as "mother".

Table 1: Add Health Structure

| Wave | Survey Year | Age Range | Key Variables |
|---|---|---|---|
| Wave I | 1994–1995 | Grades 7–12 | Dental exam; demographic, household, and parental characteristics |
| Wave II | 1996 | Grades 8–12 | Dental exam |
| Wave IV | 2008–2009 | Age 24–32 | Dental exam; individual and household characteristics |
| Wave V | 2016–2018 | Age 33–43 | Dental exam; individual and household characteristics |

Table 2: Reported Relationship to Adolescent in Parent (1995) Survey

| Parent Survey Respondent's Relationship with Adolescent | Count | Percent (%) |
|---|---|---|
| **Biological mother** | **5,033** | **88.33** |
| **Stepmother** | **114** | **2.00** |
| **Adoptive mother** | **75** | **1.32** |
| **Foster mother** | **22** | **0.39** |
| **Grandmother** | **107** | **1.88** |
| **Aunt** | **49** | **0.86** |
| **Other female relative** | **25** | **0.44** |
| Other female non-relative | 19 | 0.33 |
| Biological father | 233 | 4.09 |
| Stepfather | 7 | 0.12 |
| Adoptive father | 8 | 0.14 |
| Grandfather | 1 | 0.02 |
| Uncle | 1 | 0.02 |
| Other male relative | 2 | 0.04 |
| Other male non-relative | 2 | 0.04 |
| Observations | 5,698 | 100.00 |
| **With Mother or Female Relative** | **5,425** | **95.21** |

*Notes.* The analytic sample includes respondents whose reported caregiver was a female caregiver highlighted in bold.

The restriction of the sample to respondents for whom a mother figure answers the parent survey questions is motivated by the way in which parent information is collected in the Add Health. The respondent to the parent survey answers detailed questions about their own characteristics and household characteristics at the time of the survey. Less detailed and reliable information about other parental figures, both residential and non-residential, can be obtained from adolescents' own reports in the main survey. This sample restriction allows the more detailed parent survey responses to be interpreted as maternal characteristics and less detailed paternal characteristics to be filled in from the adolescents' reports.

Respondents were asked in each wave whether they had received a dental exam from a dentist or hygienist within the past year. I construct a binary treatment indicator, adolescent dental exam, based on dental exam responses from Waves I and II. Adolescents who reported

receiving a dental exam in both Wave I and Wave II are classified as the treated group. If the adolescent answered the dental exam question in only one of these two waves, they are classified as treated if they received an exam in that wave. Table 3 shows the joint distribution of responses across the two waves. 2,885 of the 4,722 adolescents in cells highlighted in bold are coded as treated with adolescent dental exams. While the number of respondents who did not respond is very low in Wave I, approximately 22 percent of respondents did not answer the dental exam question in Wave II. As a robustness check, I construct an alternative treatment variable based only on Wave I.

Table 3: Wave I and Wave II Adolescent Dental exams

| | Dental Exam in Wave II | | | |
|---|---|---|---|---|
| Dental Exam in Wave I | No | Yes | Missing | Total |
| No | 696 | 414 | 356 | 1,466 |
| | (47.48%) | (28.24%) | (24.28%) | |
| | 65.23% | 15.92% | 33.78% | 31.05% |
| Yes | 365 | **2,183** | **698** | 3,246 |
| | (11.24%) | **(67.25%)** | **(21.50%)** | |
| | 34.21% | **83.93%** | **66.22%** | 68.74% |
| Missing | 6 | **4** | 0 | 10 |
| | (60.00%) | **(40.00%)** | (0.00%) | |
| | 0.56% | **0.15%** | 0.00% | 0.21% |
| Total | 1,067 | 2,601 | 1,054 | 4,722 |
| | (22.60%) | (55.08%) | (22.32%) | |

*Notes.* Bolded cells represent respondents who reported a dental exam in all waves where they provided a valid response. These individuals are classified as treated with adolescent dental exams.

Taking advantage of the detailed information in Add Health, this study includes a comprehensive set of controls for individual, family, and socioeconomic characteristics. To avoid sample loss, missing values for all variables other than dental exams are coded as a separate category rather than dropped. The control variables are grouped into five categories: demographic, concurrent adulthood, Wave I household, Wave I maternal, and Wave I paternal characteristics. These sets are added sequentially in the regression analysis to assess the

stability of the estimated effects to progressively richer controls. This section defines the variables in each category and reports their sources. Table 4 summarizes these control sets, including the number of categories or intervals for each variable.

Demographic characteristics include gender, age, age$^2$, and race, all based on adolescent self-reports. Concurrent adulthood characteristics capture socioeconomic factors that may confound the relationship between adolescent dental exams and adult dental care behavior. These include educational attainment, source of health insurance, personal earnings, and household income, all measured in the corresponding adulthood wave. Personal and household incomes are categorical variables in Add Health, except for Wave IV personal earnings, which are reported continuously and recoded into the same categorical format as in Wave V for consistency. These demographic and concurrent adulthood characteristics constitute the baseline controls.

Wave I household and maternal characteristics are added to capture family background. Household characteristics are primarily reported by the mother and include household income, the number of siblings, the adolescent's health insurance coverage, and whether the family experienced difficulty accessing medical care. The local area of the household is recorded by the interviewer during the home visit. Insurance coverage is categorized as fully insured, partially insured, or not insured over the past 12 months. Maternal characteristics are based on the mother's own responses and include her education, employment status, ability to pay bills, receipt of public assistance, marital status, and smoking behavior.

Finally, paternal characteristics are reported by the adolescent and include the father's education, occupation type, employment status, and smoking behavior. These variables refer first to resident fathers, defined as father figures living in the same household regardless of biological relation. If no father figure resides in the household, information on the non-resident biological father is used instead.

In addition to these main control sets, interaction terms are also included. Wave I household income is interacted with key variables, including race, Wave I insurance coverage,

and Wave I maternal education. These interactions are incorporated after the baseline specification with Wave I household and maternal characteristics. Table 4 lists the variables included in each control set.

Table 4: Control Variable List

| Control sets | Variables |
|---|---|
| **Demographic** | Gender (Dummy)<br>Age<br>Race (6 categories) |
| **Concurrent Adulthood** | Education (6 levels)<br>Insurance type (15 types)<br>Personal earnings (13 intervals)<br>Household income (13 intervals) |
| **Wave I Household** | Household income (13 intervals)<br>Number of siblings (4 categories)<br>Insurance coverage (4 categories)<br>Hardship in medical access (5 categories)<br>Local area (5 categories)<br>Household Income × Race<br>Household Income × Insurance Coverage |
| **Wave I Maternal** | Education (6 levels)<br>Full-time employed (Dummy)<br>Difficulty paying bills (Dummy)<br>Public assistance (Dummy)<br>Marital status (6 categories)<br>Smoking (Dummy)<br>Household Income × Maternal Education |
| **Wave I Paternal** | Education (6 levels)<br>Occupation (18 categories)<br>Paid job (Dummy)<br>Smoking (Dummy) |

*Notes.* There is an 'unknown' category for those variables with missing observations. Detailed categories and levels are reported in Tables A1 and A2.

The primary outcome of interest is whether the adult respondent received a dental exam within the past year, measured separately in Wave IV (ages 24–32) and Wave V (ages 33–43). Of the 4,722 respondents in the analytic sample, 4,326 participated in Wave IV and 3,581

participated in Wave V; among the latter, 27 did not answer the dental-exam question. Table 5 reports descriptive statistics for these two samples. Mean outcomes are presented separately for respondents who received adolescent dental exams (treated) and those who did not (control). The top row indicates that 61.1 percent of treated respondents reported a dental exam in Wave IV, compared with 48.7 percent among the control group.

Table 5 also presents selected adulthood characteristics, while the complete summary statistics for all control variables appear in Table A1. In both adulthood survey waves, respondents who received adolescent dental exams tend to have higher income and education levels. The treated groups are less likely to fall into low-income or low-education categories than the control groups, and these differences are statistically significant. Treated respondents are also more likely to have employer-based insurance and less likely to be uninsured.

Table 5: Selected Summary Statistics of Adulthood Characteristics by Adolescent Dental Exam

| Variables | Wave IV (Age 24–32) | | | Wave V (Age 33–43) | | |
|---|---|---|---|---|---|---|
| | Yes | No | Diff. | Yes | No | Diff. |
| **Adulthood Dental Exam** | | | | | | |
| Adulthood Dental Exam | 0.611 | 0.486 | 0.124*** | 0.673 | 0.559 | 0.114*** |
| **Household Income** | | | | | | |
| Less than $5,000 | 0.019 | 0.036 | -0.017*** | 0.126 | 0.143 | -0.017 |
| $5,000–$9,999 | 0.018 | 0.032 | -0.014*** | 0.017 | 0.018 | -0.000 |
| $10,000–$14,999 | 0.026 | 0.045 | -0.019*** | 0.008 | 0.024 | -0.015*** |
| $15,000–$19,999 | 0.024 | 0.044 | -0.019*** | 0.010 | 0.021 | -0.011*** |
| $20,000–$24,999 | 0.039 | 0.057 | -0.018*** | 0.017 | 0.025 | -0.008 |
| $25,000–$29,999 | 0.047 | 0.062 | -0.015** | 0.023 | 0.032 | -0.009 |
| **Insurance Type** | | | | | | |
| No Insurance | 0.184 | 0.244 | -0.060*** | 0.065 | 0.122 | -0.058*** |
| By Work | 0.532 | 0.467 | 0.065*** | 0.525 | 0.475 | 0.049*** |

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| Variables | Wave IV (Age 24–32) | | | Wave V (Age 33–43) | | |
|---|---|---|---|---|---|---|
| | Yes | No | Diff. | Yes | No | Diff. |
| By Partner's Plan | 0.121 | 0.106 | 0.015 | 0.194 | 0.143 | 0.052*** |
| Private Plan | 0.045 | 0.025 | 0.019*** | 0.038 | 0.023 | 0.015** |
| Medicaid | 0.057 | 0.100 | -0.043*** | 0.074 | 0.123 | -0.049*** |
| **Education Level** | | | | | | |
| Less than High School | 0.049 | 0.122 | -0.073*** | 0.029 | 0.072 | -0.042*** |
| High School / GED | 0.122 | 0.226 | -0.104*** | 0.116 | 0.211 | -0.095*** |
| Observations | 2,626 | 1,700 | | 2,256 | 1,298 | |

*Notes.* * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. Means are reported. Diff. column reports differences between treated and control groups, and an asterisk indicates the $p$-value from a $t$-test of differences. Standard deviations are reported in parentheses for continuous variables. Observations restricted to individuals whose Parent (1995) survey was answered by a mother figure and who responded to the adult dental exam question. Wave IV covers age 24–32 (N = 4,326), Wave V covers age 33–43 (N = 3,554).

Table 6 reports summary statistics of Wave I characteristics for the Wave IV sample used in the first two columns of Table 5, again separated by adolescent dental exam status. The full summary statistics for all control variables appear in Table A2. The racial composition differs substantially between the two groups: 71.1 percent of treated adolescents are White, compared with 55.9 percent among the untreated. This suggests that access to preventive dental care during adolescence may be unequally distributed across racial groups. Treated adolescents also tend to come from higher-income households, have continuous insurance coverage, and live in families reporting fewer barriers to accessing medical care. Moreover, they are more likely to have mothers and fathers with higher education levels and less likely to have parents who smoke.

Table 6: Selected Summary Statistics by Adolescent Dental Exam

| Variables | Adolescent Dental Exam | | |
|---|---|---|---|
| | Yes | No | Diff. |
| **Demographic Characteristics:** | | | |
| Female | 0.556 | 0.526 | 0.030** |
| Birth year | 1979.174 | 1978.995 | 0.179*** |
| Race | | | |
| White | 0.711 | 0.559 | 0.152*** |
| Black | 0.179 | 0.295 | -0.116*** |
| **Wave I Household Characteristics:** | | | |
| Household Income | $55,702 | $36,677 | $19,025*** |
| | (57,995) | (40,108) | |
| Insurance Coverage | | | |
| Always | 0.883 | 0.716 | 0.167*** |
| With Discontinuity | 0.054 | 0.086 | -0.032*** |
| None | 0.059 | 0.187 | -0.128*** |
| Hardship in Medical Access | | | |
| Very Hard | 0.035 | 0.093 | -0.058*** |
| **Wave I Maternal Characteristics:** | | | |
| Education Level | | | |
| Less than High School | 0.104 | 0.198 | -0.094*** |
| High School/GED | 0.286 | 0.314 | -0.027* |
| Marital Status | | | |
| Single | 0.042 | 0.081 | -0.039*** |
| Married | 0.758 | 0.645 | 0.113*** |
| Smoking | | | |
| No | 0.743 | 0.637 | 0.106*** |
| Yes | 0.241 | 0.348 | -0.106*** |
| Unknown | 0.016 | 0.015 | 0.001 |

*(continued on next page)*

| Variables | Adolescent Dental Exam | | |
|---|---|---|---|
| | Yes | No | Diff. |
| **Wave I Paternal Characteristics:** | | | |
| Education Level | | | |
| Less than High School | 0.099 | 0.196 | -0.097*** |
| High School/GED | 0.303 | 0.353 | -0.050*** |
| Occupation | | | |
| None | 0.019 | 0.036 | -0.016*** |
| Professional 1 | 0.064 | 0.019 | 0.046*** |
| Professional 2 | 0.050 | 0.033 | 0.017*** |
| No Dad | 0.239 | 0.368 | -0.129*** |
| Smoking | | | |
| No | 0.474 | 0.408 | 0.066*** |
| Yes | 0.520 | 0.589 | -0.069*** |
| Observations | 2,626 | 1,700 | |

*Notes.* * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. Means are reported. Diff. column reports differences between treated and control groups, and an asterisk indicates the $p$-value from a $t$-test of differences. Standard deviations are reported in parentheses for continuous variables. The sample is restricted to 4,326 individuals whose Parent (1995) survey was answered by a mother figure, and with Wave IV outcomes.

# 3 Empirical Strategy

To estimate the intergenerational transmission of healthcare behavior, this study estimates the effect of receiving dental exams during adolescence on dental exams in adulthood.

The baseline estimations, estimated separately for Waves IV and V, are specified as:

$$D_i^{adult} = \alpha + \beta D_i^{adol} + \gamma X_i^{adol} + \delta X_i^{adult} + \psi_b + \varepsilon_i \quad (1)$$

In this equation, $D_i^{adult}$ is an indicator for whether individual $i$ received a dental exam within the past year. The variable $D_i^{adol}$ is an indicator equal to one if the respondent was treated with adolescent dental exams in Waves I and II. The vector $X_i^{adol}$ includes the demographic, household, and parental characteristics measured during adolescence, listed in Table 6. As detailed in Table 6, the adolescent controls are organized into four categories: demographic, Wave I household, Wave I maternal, and Wave I paternal characteristics. Age and age squared are included to account for non-linear life-cycle effects. In addition, interaction terms between Wave I household income and race, Wave I household income and adolescent insurance coverage, and Wave I household income and maternal education are included. The vector $X_i^{adult}$ contains the concurrent adult characteristics listed in Table 5. Birth year fixed effects, $\psi_b$, are included to control for cohort-level influences.

This study also estimates treatment effects using Propensity Score Matching (PSM) to approximate causal inference while allowing for greater flexibility in functional form than linear regression models. The average treatment effect on the treated (ATT) is estimated as:

$$(2) \qquad \tau^{PSM} = E_{P(X)|D^{adol}=1}\left[E[Y(1)|D^{adol}=1, P(X)] - E[Y(0)|D^{adol}=0, P(X)]\right]$$

In this expression, $\tau^{PSM}$ represents the average treatment effect on the treated (ATT) and the average treatment effect on the untreated (ATU) for individuals who received dental exams during adolescence. The treatment indicator $D^{adol}$ denotes adolescent dental exam status, and $Y$ is the potential outcome in adulthood. The covariate vector $X$ includes the same set of adolescent and adult characteristics as $X^{adol}$ and $X^{adult}$ used in the baseline regression model. Birth year fixed effects are included to control for cohort-level differences.

The identification assumption is that conditional on these observed characteristics, potential outcomes are independent of treatment status. This study benefits from a rich set of

baseline covariates measured during adolescence, including Wave I demographic, household, and detailed parental characteristics, which improves the plausibility of the selection-on-observables assumption. This strategy reduces reliance on functional form assumptions and improves comparability by restricting estimation to regions of common support. Balance diagnostics and overlap checks are used to assess the quality of matching and the plausibility of the identifying assumptions.

# 4 Results

## 4.1 Main analysis

Table 7 reports the estimated effect of adolescent dental exam on adulthood dental exam behavior separately for Waves IV and V surveys. Column 1 includes only birth year fixed effects, demographics, and adulthood characteristics. In the second column, Wave I household and maternal characteristics are added, and finally, paternal characteristics are added in the third column. In all specifications, an adolescent dental exam is positively and significantly associated with the likelihood of receiving a dental exam in adulthood. [1]

In Panel 1, which analyzes the Wave IV dental exam, the estimated effect is approximately 5.7 to 6.0 percentage points, depending on the control set. With the most comprehensive control set, individuals treated with adolescent dental exams are 5.7 percentage points more likely to receive dental exams in early adulthood. The inclusion of paternal characteristics slightly reduces the magnitude. Still, the association remains highly robust and statistically significant.

In Panel 2, for the Wave V dental exam, the magnitude of the effect declines to ap-

[1] Interaction terms are included in columns 2 and 3 of Table 7 to control for heterogeneity in adolescent conditions. The included interactions are between household income and race, household income and adolescent insurance, and household income and maternal education. When excluding the household income-race and household income–insurance interactions, the estimated coefficient on adolescent dental exams becomes smaller. This suggests that richly controlling for subgroups in adolescent socioeconomic status helps isolate the treatment effect.

proximately 3 percentage points but remains statistically significant across all specifications. This attenuation is consistent with the possibility that behavioral persistence weakens with age and increasing independence from adolescent conditions. As the average of dental exam receiving is 63 percent, the 3.4 percentage points increase corresponds to a relative increase of approximately 5.4 percent. While modest in size, the result suggests a lasting association between early preventive behavior and later-life healthcare engagement.

Table 7: Effect of Adolescent Dental Exam on Adult Dental Exam

| | Adulthood Dental Exam | | |
|---|---|---|---|
| | (1) | (2) | (3) |
| *Panel 1. Outcome = Dental Exam at Wave IV (Age 24–32)* | | | |
| Adolescent Dental Exam | 0.060*** | 0.060*** | 0.057*** |
| | (0.016) | (0.016) | (0.017) |
| Birth Year FE | Yes | Yes | Yes |
| Demographic Characteristics | Yes | Yes | Yes |
| Wave IV Characteristics | Yes | Yes | Yes |
| Wave I Household Characteristics | | Yes | Yes |
| Wave I Maternal Characteristics | | Yes | Yes |
| Wave I Paternal Characteristics | | | Yes |
| Mean of Outcome | 0.562 | 0.562 | 0.562 |
| $R^2$ | 0.120 | 0.164 | 0.170 |
| Observations | 4326 | 4326 | 4326 |
| *Panel 2. Outcome = Dental Exam at Wave V (Age 33–43)* | | | |
| Adolescent Dental Exam | 0.030* | 0.033* | 0.034* |
| | (0.017) | (0.018) | (0.018) |
| Birth Year FE | Yes | Yes | Yes |
| Demographic Characteristics | Yes | Yes | Yes |
| Wave V Characteristics | Yes | Yes | Yes |
| Wave I Household Characteristics | | Yes | Yes |
| Wave I Maternal Characteristics | | Yes | Yes |
| Wave I Paternal Characteristics | | | Yes |
| Mean of Outcome | 0.632 | 0.632 | 0.632 |
| $R^2$ | 0.162 | 0.203 | 0.208 |
| Observations | 3554 | 3554 | 3554 |

*Notes.* * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. Robust standard errors are reported in parentheses. All estimates are based on equation (1). The control sets labeled Demographic, Wave I Household, Wave I Maternal, and Wave I Paternal Characteristics include the variables listed in the corresponding panels of Table 6. For Wave IV and Wave V Characteristics, the models control for adulthood characteristics listed in Table 5, specific to each survey wave.

The major challenge in this analysis is the potential for omitted variable bias arising from unobserved confounding. Leveraging a rich set of control variables, this study shows that the estimated coefficients remain relatively stable as additional control sets are gradually included in the baseline models. While Oster (2019) argues that coefficient stability alone does not guarantee the absence of omitted variable bias, examining changes in R-squared values provides further insight into the robustness of the findings.

At the end of Table 7, the R-squared values are reported for each wave. In both Waves IV and V, R-squared values increase across columns as additional controls are added. Notably, the change in the coefficient estimates between Columns 2 and 3 is subtle, suggesting that the inclusion of Wave I paternal characteristics has little additional influence on the estimated relationship. The increase in R-squared values is of a similar scale to the modest changes in the coefficients. This pattern suggests that the selection on unobserved factors may be similar to, or smaller than, the selection on observed characteristics included in the analysis. Consequently, the results are less likely to be driven entirely by omitted variable bias.

## 4.2 Propensity Score Matching

To assess robustness and reduce reliance on linear functional form assumptions, propensity score matching (PSM) is employed. The treatment group is defined as those who reported receiving a dental exam during adolescence. Propensity scores are estimated using a logit model, and due to perfect prediction, the sample size is smaller than in the main analysis.

Radius matching with replacement is used with a caliper of 0.001 to ensure high-quality matches while maintaining flexibility. Common support is enforced by dropping treated observations whose propensity scores fall outside the support range of the control group. For Wave IV, 34 treated observations are off-support, and for Wave V, 40 are excluded. These numbers reflect observations dropped solely because they fell outside the common support range defined by the maximum and minimum propensity scores of the control group. When the caliper restriction is further imposed (e.g., 0.001, 0.005), additional treated units may

Figure 1: Propensity Score Distribution for Wave 4

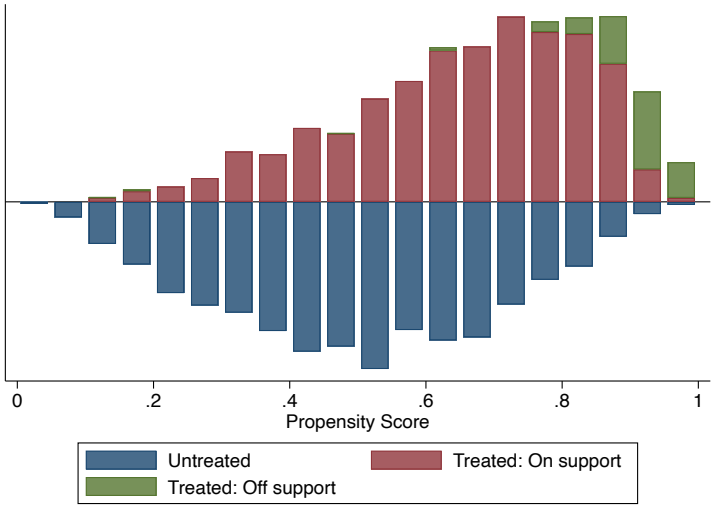
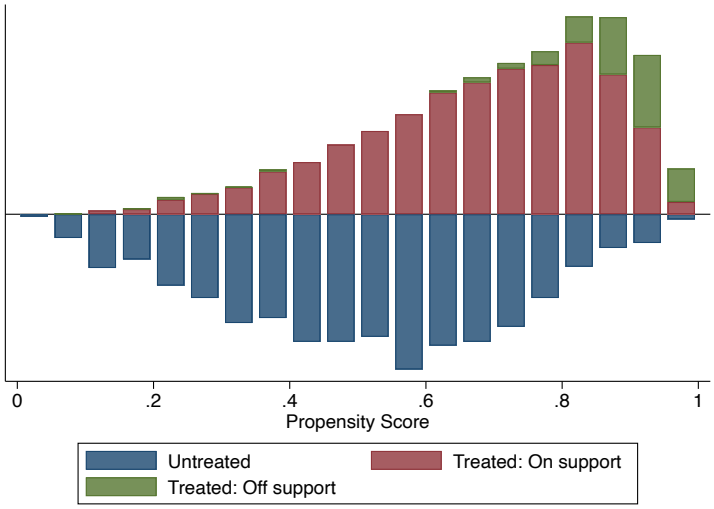



Figure 2: Propensity Score Distribution for Wave 5




*Notes.* The common support area for PSM with a radius of 0.001 and the full set of controls. 34 out of 4,269 and 40 out of 3,489 are off-support by dropping the treated based on the minimum and maximum of controls for Waves 4 and 5, respectively.

be unmatched due to a lack of sufficiently close controls, leading to further reductions in the matched sample sizes as reported in Table 8. Therefore, the total number of matched observations in each specification reflects both common support trimming and caliper-based exclusion. Figures 1 and 2 illustrate the distribution of propensity scores by treatment status. Substantial overlap between the treated and control distributions indicates that the common support condition is satisfied, supporting the credibility of the matching procedure.

This study examines the behavioral pathways underlying preventive healthcare habits, where both receiving and not receiving a dental examination during adolescence may influence long-term healthcare behaviors. This motivates consideration of both groups, as either receiving or not receiving early dental exams may lead to persistent habits. Beyond this contextual motivation, the econometric distinction between the average treatment effect on the treated (ATT) and on the untreated (ATU) is analytically meaningful. Unlike OLS, which assumes homogeneous treatment effects, PSM allows for heterogeneity across conditioning subpopulations. ATT estimates the effect among those who actually received adolescent dental exams, while ATU captures the effect among those who did not. Because these groups differ in observed characteristics, such as parental characteristics and access to medical care, the treatment may affect them differently. Estimating both ATT and ATU allows the analysis to capture these differences, rather than imposing a uniform effect across all individuals.

Table 8 presents the ATT and ATU estimates under different control sets. The control sets in the top panel, labeled "Without Paternal Controls", match on all variables used in column 2 of Table 7, including the interactions between household income and race, household income and adolescent insurance, and household income and maternal education. The bottom panel, labeled "With Paternal Controls", adds paternal characteristics to this set, corresponding to column 3 of Table 7.

Post-matching balance diagnostics confirm that covariate imbalance is substantially reduced. Most covariates exhibit standardized biases below 10 percent. Appendix B reports

the $p$-values from $t$-tests for covariate differences in the specifications in the panel with paternal controls in Table 8 for both Waves IV and V. In both cases, the $p$-values are statistically insignificant, indicating that the treated and control groups are balanced after matching. These results support the quality of the match.

Table 8: Effect of Adolescent Dental Exam on Adult Dental Exam

| Without Paternal Controls | ATT (S.E.) | Obs. | ATU (S.E.) | Obs. |
|---|---|---|---|---|
| *Panel 1. Outcome = Dental Exam in Wave IV (Age 24–32)* | | | | |
| Unmatched | 0.123 (0.015) | 4270 | 0.123 (0.015) | 4270 |
| Matched (Radius, caliper = 0.001) | 0.070 (0.021) | 3854 | 0.048 (0.020) | 3855 |
| *Panel 2. Outcome = Dental Exam in Wave V (Age 33–43)* | | | | |
| Unmatched | 0.114 (0.017) | 3490 | 0.114 (0.017) | 3490 |
| Matched (Radius, caliper = 0.001) | 0.041 (0.024) | 3072 | 0.038 (0.022) | 3074 |
| With Paternal Controls | ATT (S.E.) | Obs. | ATU (S.E.) | Obs. |
| *Panel 1. Outcome = Dental Exam in Wave IV (Age 24–32)* | | | | |
| Unmatched | 0.123 (0.015) | 4270 | 0.122 (0.015) | 4270 |
| Matched (Radius, caliper = 0.001) | 0.070 (0.022) | 3824 | 0.045 (0.020) | 3826 |
| *Panel 2. Outcome = Dental Exam in Wave V (Age 33–43)* | | | | |
| Unmatched | 0.114 (0.017) | 3490 | 0.114 (0.017) | 3490 |
| Matched (Radius, caliper = 0.001) | 0.062 (0.025) | 3029 | 0.024 (0.022) | 3035 |

*Notes:* ATT is the Average Treatment Effect on the Treated, while ATU is the Average Treatment Effect on the Untreated. The control set for the panel without paternal controls matches the covariates used in column 2 of Table 7, while the panel with paternal controls corresponds to the covariates in column 3 of Table 7. Standard errors are reported in parentheses. The sample size is smaller than in the main analysis due to perfect prediction and collinearity in the logit estimation of the propensity score. Observations for matched is the total number of matched samples.

For Wave IV outcomes, after matching, the ATT estimates range from 6.8 to 7.0 percentage points, consistent with the Table 7 OLS results. The corresponding ATU estimates are slightly smaller in magnitude. It suggests symmetric results for not receiving a dental exam in adolescence. For Wave V, the ATT remains statistically significant at 3.6 percentage points without paternal controls, aligning with the Table 7 OLS analysis coefficient of 0.034. The ATU estimates for Wave V are also approximately 3 percentage points, consistent with the Table 7 OLS results. The ATT in the panel with paternal controls is slightly higher, showing a 6.1 percentage point increase in adult dental examinations.

To assess the sensitivity of the results to the choice of caliper and common support def-

inition, additional matching specifications are reported in Table 9. The control set used corresponds to the bottom panel of Table 8, which includes demographic, adult characteristics, Wave I household, maternal, and paternal characteristics. Alternative calipers (0.005 and 0.01) and trimming of the sample to the 5th to 95th percentile of the propensity score distribution yield consistent ATT estimates, generally within 1 to 2 percentage points of the baseline results. Although some matching specifications show slightly larger standard errors or modest reductions in covariate balance, the overall quality of the match remains high, and the pattern of positive and statistically significant treatment effects remains intact. These results suggest that the main findings are robust to choices of matching algorithm and common support definition.

Table 9: Sensitivity Check with Various Matching Methods

| | ATT (S.E.) | Obs. | ATU (S.E.) | Obs. |
|---|---|---|---|---|
| *Panel 1. Outcome = Dental Exam in Wave IV (Age 24–32)* | | | | |
| Radius = 0.001 | 0.070 (0.022) | 3824 | 0.045 (0.020) | 3826 |
| Radius = 0.001, Common Support = [5% - 95%] | 0.068 (0.022) | 3693 | 0.054 (0.020) | 3671 |
| Radius = 0.005 | 0.068 (0.022) | 4205 | 0.048 (0.019) | 4210 |
| Radius = 0.005, Common Support = [5% - 95%] | 0.080 (0.020) | 3874 | 0.064 (0.019) | 3869 |
| Radius = 0.01 | 0.065 (0.021) | 4217 | 0.047 (0.019) | 4230 |
| Radius = 0.01, Common Support = [5% - 95%] | 0.080 (0.020) | 3874 | 0.064 (0.019) | 3885 |
| Kernel = 0.001 | 0.073 (0.022) | 3824 | 0.048 (0.020) | 3824 |
| *Panel 2. Outcome = Dental Exam in Wave V (Age 33–43)* | | | | |
| Radius = 0.001 | 0.062 (0.025) | 3029 | 0.024 (0.022) | 3035 |
| Radius = 0.001, Common Support = [5% - 95%] | 0.061 (0.025) | 2902 | 0.022 (0.023) | 2892 |
| Radius = 0.005 | 0.052 (0.025) | 3412 | 0.036 (0.021) | 3423 |
| Radius = 0.005, Common Support = [5% - 95%] | 0.085 (0.024) | 3143 | 0.021 (0.021) | 3175 |
| Radius = 0.01 | 0.042 (0.024) | 3425 | 0.040 (0.021) | 3446 |
| Radius = 0.01, Common Support = [5% - 95%] | 0.079 (0.023) | 3152 | 0.023 (0.021) | 3175 |
| Kernel = 0.001 | 0.064 (0.025) | 3029 | 0.021 (0.023) | 3029 |

*Notes:* ATT is the Average Treatment Effect on the Treated using Radius matching, while ATU is the Average Treatment Effect on the Untreated. The control set matches the covariates used in the bottom panel of Table 8. Standard errors are reported in parentheses. Common support is imposed by dropping treatment observations where the propensity score is higher than the maximum or lower than the minimum of the controls. For common support 5% to 95%, the sample was manually trimmed based on propensity score distribution, and the sample was matched with the initially estimated propensity score. Observations are the total number of matched samples.

## 4.3 Exact Matching with PSM

In the main OLS analysis, adulthood characteristics were found to significantly influence dental examination behavior in adulthood. As shown in Table 5, individuals who received an adolescent dental exam were more likely to attain higher education and less likely to be uninsured in adulthood. To address potential bias arising from matching individuals who differ substantially in education or insurance status, this section applies exact matching on adulthood education level and insurance type in addition to propensity score matching.

Under this approach, individuals are first grouped into strata defined by identical education level, insurance type, or both. Within each stratum, kernel matching is performed using the propensity score, imposing a caliper of 0.001 and ensuring common support by keeping treated individuals with propensity scores overlapping with controls[2]. In the exact matching procedure, the insurance variable is recoded into three categories: no insurance, Medicaid and Indian Health Service, and all other types.

Table 10 presents results from exact matching on education, insurance, and both combined. The estimated ATTs for Wave IV dental exams range from 6.2 to 7.5 percentage points, closely aligning with those reported in Table 8. For Wave V, the ATT estimates become slightly larger than the radius matching results in Table 8 when comparisons are restricted to individuals within the same education and insurance strata. Notably, the ATU for both Wave V is substantially higher than the corresponding estimates in Tables 8 and 9.

To assess whether these differences are driven by sample size, the Kernel matching analysis in Table 8 is re-estimated using the matched sample sizes from the exact matching on both education and insurance, 1,987 for Wave IV and 1,496 for Wave V. The resulting estimates indicate that part of the increase in ATU may be attributable to the smaller sample size. This suggests that the higher ATU under exact matching reflects not only more stringent comparisons among individuals with similar adulthood characteristics but also the

[2]Since `psmatch2`, which implements radius matching, does not support exact matching, `kmatch` is used instead. As `kmatch` does not support radius matching, kernel matching is conducted. The results without exact matching are reported in Table 9.

Table 10: Estimated ATT Using Propensity-Score Kernel Matching with Exact Matching

| Exact Matching on: | ATT (S.E.) | ATU (S.E.) | Obs. |
|---|---|---|---|
| *Panel 1. Outcome = Dental Exam at Wave IV (Age 24–32)* | | | |
| Adulthood Education Level | 0.062 (0.024) | 0.050 (0.023) | 2657 |
| Adulthood Insurance type | 0.081 (0.023) | 0.071 (0.021) | 3252 |
| Adulthood Education & Insurance type | 0.072 (0.027) | 0.069 (0.026) | 1984 |
| Kernel without Exact Matching | 0.077 (0.025) | 0.081 (0.025) | 1980 |
| *Panel 2. Outcome = Dental Exam at Wave V (Age 33–43)* | | | |
| Adulthood Education Level | 0.055 (0.027) | 0.026 (0.026) | 1927 |
| Adulthood Insurance type | 0.065 (0.026) | 0.033 (0.025) | 2573 |
| Adulthood Education & Insurance type | 0.078 (0.030) | 0.041 (0.029) | 1495 |
| Kernel without Exact Matching | 0.073 (0.029) | 0.048 (0.029) | 1490 |

*Notes:* ATT is the Average Treatment Effect on the Treated, while ATU is the Average Treatment Effect on the Untreated. The control set corresponds to the covariates used in the bottom panel of Table 8. Standard errors are reported in parentheses. Kernel matching is implemented with a bandwidth of 0.001, and common support is enforced to ensure perfect overlap between treated and control observations. Reported observations reflect the total number of matched units and are symmetric for ATT and ATC. In the rows of "Kernel without exact matching", the samples are limited to the matched sample size of exact matching with both adulthood education and insurance.

influence of reduced sample size. Overall, the estimates fall within the range of the sensitivity checks reported in Table 9, except the Wave V ATU, which appears more sensitive to adult characteristics.

## 4.4 Lasso Model Selection

This study implements the least absolute shrinkage and selection operator (LASSO) for variable selection to address challenges posed by high-dimensional control sets. The specification in column 3 of Table 7 includes an extensive set of controls, leading to many possible models through different selections of variables and interaction terms. In previous analyses, interactions were included between household income and race, household income and adolescent insurance status, and household income and maternal education. These interactions were chosen based on theoretical considerations and joint significance tests.

The top panel of Table 11 reports results from post-double-selection LASSO (PDS-LASSO) regressions and propensity score matching (PSM) using the same set of controls

as in earlier analyses. Nonetheless, relying on a limited and potentially arbitrary choice of interaction terms may introduce bias. To address this concern, the bottom panel of Table 11 expands the analysis to include all possible interactions among control variables, with LASSO-based variable selection applied. Both regression and PSM analyses are conducted using the variables picked by the LASSO. For PSM, the radius matching algorithm is implemented with a caliper of 0.001 and the common support condition enforced, consistent with the approach described in Section 4.2.

Table 11: PDS-Lasso Selected Controls

| | Adulthood Dental Exam at Wave IV | | Adulthood Dental Exam at Wave V | |
|---|---|---|---|---|
| *Panel 1. With Interactions in the Main Analysis* | OLS | PSM ATT | OLS | PSM ATT |
| Adolescent Dental Exam | 0.073*** | 0.083*** | 0.039** | 0.041* |
| | (0.016) | (0.020) | (0.017) | (0.022) |
| Observations | 4326 | 4101 | 3554 | 3431 |
| *Panel 2. All Possible Interactions* | | | | |
| Adolescent Dental Exam | 0.077*** | 0.083*** | 0.040** | 0.032 |
| | (0.016) | (0.020) | (0.017) | (0.022) |
| Observations | 4326 | 4178 | 3554 | 3344 |

*Notes.* * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.
The birth year fixed effect is partialled out. Observations for PSM are the total number of matched observations.

The PDS-LASSO regression produces results closely aligned with those from the main OLS analysis. The estimated effect of adolescent dental exams on adulthood dental exams ranges from a 7.3 to 7.7 percentage point increase in usage at Wave IV. The magnitude of the effect is slightly higher when variables are selected via LASSO from the initial control set, and even larger when LASSO selects variables from models including all possible interactions. A similar pattern is observed at Wave V.

The ATT estimates derived from PSM with the Lasso selected variables also exhibit a similar tendency compared to the PSM results based on the initial control sets. In particular, for Wave IV, the ATT estimates are very close to those reported in Table 8. While the results

for Wave V show some variation, they remain within the range of ATT estimates reported in the sensitivity analysis in Table 9.

# 5 Conclusion

This study investigates whether exposure to parent-led preventive healthcare during adolescence leads to the formation of persistent healthcare habits in adulthood. Using the dental exam as a proxy, the analysis estimates the effect of receiving a regular dental exam in adolescence on adulthood dental exams based on selection-on-observables. Dental exams are advantageous for studying behavioral transmission because they are largely independent of genetic or addictive factors and reflect the influence of parents' decisions on preventive care rather than responses to bad health conditions. With rich controls, the estimations aim to isolate the habitual pathways from other pathways, such as socio-economics or forward-looking preferences within families.

Results from OLS, propensity score matching, and LASSO-based estimation consistently show that adolescents who received dental exams are significantly more likely to continue this behavior in adulthood, even after accounting for extensive adolescent and adult socioeconomic controls. The magnitude of the effect decreases modestly with age but remains statistically and substantively meaningful over two decades. This persistence suggests that preventive healthcare habits, once formed under parental influence, tend to be carried forward as individuals age and gain independence.

These findings indicate that intergenerational transmission of health is not limited to biological or socioeconomic channels but also occurs through behavioral mechanisms shaped by parental influence. Policies aimed at promoting early engagement with preventive care may therefore yield long-term benefits if they foster durable habits during adolescence. Encouraging parental participation and awareness in adolescent healthcare could enhance the effectiveness of such interventions. Future research could extend this analysis to other pre-

ventive behaviors or investigate how changes in family structures and healthcare access shape the persistence of health habits across generations.

# A Summary Statistics

Table A1: Summary Statistics of Adulthood Characteristics by Adolescent Dental Exam

| Variables | Wave IV (Age 24–32) | | | Wave V (Age 33–43) | | |
|---|---|---|---|---|---|---|
| | Yes | No | Diff. | Yes | No | Diff. |
| **Adulthood Dental Exam** | | | | | | |
| Adulthood Dental Exam | 0.611 | 0.486 | 0.124*** | 0.673 | 0.559 | 0.114*** |
| **Personal Earnings** | | | | | | |
| Less than $5,000 | 0.106 | 0.134 | -0.028*** | 0.098 | 0.117 | -0.020* |
| $5,000–$9,999 | 0.046 | 0.071 | -0.025*** | 0.038 | 0.045 | -0.007 |
| $10,000–$14,999 | 0.056 | 0.075 | -0.019** | 0.031 | 0.049 | -0.018*** |
| $15,000–$19,999 | 0.050 | 0.069 | -0.019*** | 0.031 | 0.046 | -0.015** |
| $20,000–$24,999 | 0.076 | 0.088 | -0.012 | 0.047 | 0.060 | -0.014* |
| $25,000–$29,999 | 0.088 | 0.096 | -0.009 | 0.051 | 0.059 | -0.008 |
| $30,000–$39,999 | 0.171 | 0.167 | 0.004 | 0.094 | 0.126 | -0.032*** |
| $40,000–$49,999 | 0.131 | 0.105 | 0.027*** | 0.114 | 0.138 | -0.024** |
| $50,000–$74,999 | 0.156 | 0.087 | 0.069*** | 0.200 | 0.185 | 0.015 |
| $75,000–$99,999 | 0.042 | 0.022 | 0.020*** | 0.113 | 0.082 | 0.031*** |
| $100,000–$149,999 | 0.020 | 0.011 | 0.009** | 0.101 | 0.052 | 0.049*** |
| $150,000–$199,999 | 0.015 | 0.005 | 0.010*** | 0.066 | 0.024 | 0.043*** |
| $200,000 or more | 0.042 | 0.069 | -0.028*** | 0.016 | 0.017 | -0.001 |
| **Household Income** | | | | | | |
| Less than $5,000 | 0.019 | 0.036 | -0.017*** | 0.126 | 0.143 | -0.017 |
| $5,000–$9,999 | 0.018 | 0.032 | -0.014*** | 0.017 | 0.018 | -0.000 |
| $10,000–$14,999 | 0.026 | 0.045 | -0.019*** | 0.008 | 0.024 | -0.015*** |
| $15,000–$19,999 | 0.024 | 0.044 | -0.019*** | 0.010 | 0.021 | -0.011*** |
| $20,000–$24,999 | 0.039 | 0.057 | -0.018*** | 0.017 | 0.025 | -0.008 |
| $25,000–$29,999 | 0.047 | 0.062 | -0.015** | 0.023 | 0.032 | -0.009 |
| $30,000–$39,999 | 0.090 | 0.111 | -0.021** | 0.041 | 0.070 | -0.029*** |

*(continued on next page)*

| Variables | Wave IV (Age 24–32) | | | Wave V (Age 33–43) | | |
|---|---|---|---|---|---|---|
| | Yes | No | Diff. | Yes | No | Diff. |
| $40,000–$49,999 | 0.115 | 0.108 | 0.007 | 0.048 | 0.080 | -0.032*** |
| $50,000–$74,999 | 0.234 | 0.212 | 0.022* | 0.137 | 0.158 | -0.021* |
| $75,000–$99,999 | 0.152 | 0.119 | 0.033*** | 0.145 | 0.131 | 0.014 |
| $100,000–$149,999 | 0.119 | 0.055 | 0.064*** | 0.182 | 0.134 | 0.048*** |
| $150,000–$199,999 | 0.057 | 0.033 | 0.024*** | 0.184 | 0.072 | 0.111*** |
| $200,000 or more | 0.061 | 0.087 | -0.027*** | 0.062 | 0.092 | -0.030*** |
| **Insurance Type** | | | | | | |
| No Insurance | 0.184 | 0.244 | -0.060*** | 0.065 | 0.122 | -0.058*** |
| By Work | 0.532 | 0.467 | 0.065*** | 0.525 | 0.475 | 0.049*** |
| By Union | 0.011 | 0.008 | 0.003 | 0.010 | 0.016 | -0.006 |
| By School | 0.018 | 0.009 | 0.009** | – | – | – |
| By Parent's Plan | 0.008 | 0.011 | -0.003 | – | – | – |
| By Partner's Plan | 0.121 | 0.106 | 0.015 | 0.194 | 0.143 | 0.052*** |
| Duty Military | 0.015 | 0.015 | -0.000 | 0.003 | 0.003 | -0.000 |
| Private Plan | 0.045 | 0.025 | 0.019*** | 0.038 | 0.023 | 0.015** |
| Medicaid | 0.057 | 0.100 | -0.043*** | 0.074 | 0.123 | -0.049*** |
| Indian Health Service | 0.001 | 0.006 | -0.005*** | 0.002 | 0.004 | -0.002 |
| Marketplace Plan | – | – | – | 0.033 | 0.023 | 0.010* |
| Medicare | – | – | – | 0.023 | 0.027 | -0.004 |
| Veterans Affairs | – | – | – | 0.008 | 0.008 | 0.000 |
| Military Health Plan | – | – | – | 0.015 | 0.015 | -0.000 |
| Unknown Type | 0.008 | 0.009 | -0.001 | 0.011 | 0.018 | -0.007* |
| **Education Level** | | | | | | |
| Less than High School | 0.049 | 0.122 | -0.073*** | 0.029 | 0.072 | -0.042*** |
| High School / GED | 0.122 | 0.226 | -0.104*** | 0.116 | 0.211 | -0.095*** |
| Some Post-secondary | 0.417 | 0.444 | -0.027* | 0.361 | 0.441 | -0.081*** |
| College / University | 0.248 | 0.128 | 0.119*** | 0.245 | 0.151 | 0.094*** |
| Beyond College / University | 0.165 | 0.079 | 0.086*** | 0.248 | 0.125 | 0.123*** |

*(continued on next page)*

| Variables | Wave IV (Age 24–32) | | | Wave V (Age 33–43) | | |
|---|---|---|---|---|---|---|
| | Yes | No | Diff. | Yes | No | Diff. |
| Unknown | 0.000 | 0.001 | -0.001 | 0.001 | 0.000 | 0.001 |
| Observations | 2,626 | 1,700 | | 2,256 | 1,298 | |

*Notes.* $^{*}$ $p < 0.10$, $^{**}$ $p < 0.05$, $^{***}$ $p < 0.01$. Means are reported. Diff. column reports differences between treated and control groups, and an asterisk indicates the $p$-value from a $t$-test of differences. Standard deviations are reported in parentheses for continuous variables. Observations restricted to individuals whose Parent (1995) survey was answered by a mother figure and who responded to the adult dental exam question. Wave IV covers age 24–32 (N = 4,326), Wave V covers age 33–43 (N = 3,554).

Table A2: Summary Statistics by Adolescent Dental Exam

| Variables | Adolescent Dental Exam | | |
|---|---|---|---|
| | Yes | No | Diff. |
| **Demographic Characteristics:** | | | |
| Female | 0.556 | 0.526 | 0.030** |
| Age at Wave I | 15.273 | 15.432 | -0.158*** |
| | (1.715) | (1.774) | |
| Birth year | 1979.174 | 1978.995 | 0.179*** |
| Race | | | |
| White | 0.711 | 0.559 | 0.152*** |
| Black | 0.179 | 0.295 | -0.116*** |
| Native American | 0.026 | 0.046 | -0.020*** |
| Asian | 0.032 | 0.025 | 0.007 |
| Others | 0.050 | 0.070 | -0.020*** |
| Unknown | 0.001 | 0.004 | -0.002* |
| **Wave I Household Characteristics:** | | | |
| Household Income | $55,702 | $36,677 | $19,025*** |

*(continued on next page)*

| Variables | Adolescent Dental Exam | | |
|---|---|---|---|
| | Yes | No | Diff. |
| | (57,995) | (40,108) | |
| Less than $5,000 | 0.019 | 0.022 | -0.002 |
| $5,000–$9,999 | 0.026 | 0.074 | -0.049*** |
| $10,000–$14,999 | 0.038 | 0.082 | -0.044*** |
| $15,000–$19,999 | 0.035 | 0.072 | -0.036*** |
| $20,000–$24,999 | 0.055 | 0.094 | -0.039*** |
| $25,000–$29,999 | 0.045 | 0.065 | -0.019*** |
| $30,000–$39,999 | 0.118 | 0.131 | -0.013 |
| $40,000–$49,999 | 0.117 | 0.115 | 0.002 |
| $50,000–$74,999 | 0.246 | 0.142 | 0.104*** |
| $75,000–$99,999 | 0.094 | 0.041 | 0.053*** |
| $100,000–$149,999 | 0.051 | 0.019 | 0.032*** |
| $150,000–$199,999 | 0.032 | 0.005 | 0.026*** |
| $200,000 or more | 0.125 | 0.139 | -0.015 |
| Number of Siblings | 1.312 | 1.469 | -0.157 |
| | (1.091) | (1.255) | |
| 0 | 0.215 | 0.225 | -0.010 |
| 1 | 0.430 | 0.355 | 0.075*** |
| 2 | 0.240 | 0.252 | -0.011 |
| 3 or more | 0.114 | 0.168 | -0.053*** |
| Insurance Coverage | | | |
| Always | 0.883 | 0.716 | 0.167*** |
| With Discontinuity | 0.054 | 0.086 | -0.032*** |
| None | 0.059 | 0.187 | -0.128*** |
| Unknown | 0.004 | 0.011 | -0.006** |
| Hardship in Medical Access | | | |
| Very Easy | 0.714 | 0.529 | 0.185*** |
| Somewhat Easy | 0.178 | 0.251 | -0.073*** |

*(continued on next page)*

| Variables | Adolescent Dental Exam | | |
|---|---|---|---|
| | Yes | No | Diff. |
| Somewhat Hard | 0.056 | 0.111 | -0.055*** |
| Very Hard | 0.035 | 0.093 | -0.058*** |
| Unknown | 0.016 | 0.015 | 0.001 |
| Local Area | | | |
| Rural | 0.290 | 0.286 | 0.004 |
| Suburban | 0.398 | 0.325 | 0.073*** |
| Urban/Commercial | 0.299 | 0.376 | -0.078*** |
| Other | 0.007 | 0.006 | 0.000 |
| Unknown | 0.007 | 0.006 | 0.001 |
| **Wave I Maternal Characteristics:** | | | |
| Education Level | | | |
| Less than High School | 0.104 | 0.198 | -0.094*** |
| High School/GED | 0.286 | 0.314 | -0.027* |
| Some Post-secondary | 0.288 | 0.292 | -0.004 |
| College/University | 0.165 | 0.118 | 0.047*** |
| Beyond College/University | 0.138 | 0.059 | 0.079*** |
| Unknown | 0.018 | 0.020 | -0.002 |
| Full-time Employed | | | |
| No | 0.403 | 0.424 | -0.021 |
| Yes | 0.571 | 0.545 | 0.026* |
| Unknown | 0.026 | 0.031 | -0.005 |
| Difficulty Paying Bills | | | |
| No | 0.131 | 0.218 | -0.087*** |
| Yes | 0.831 | 0.742 | 0.088*** |
| Unknown | 0.039 | 0.040 | -0.001 |
| Public Assistance | | | |
| No | 0.922 | 0.861 | 0.061*** |
| Yes | 0.059 | 0.116 | -0.057*** |

*(continued on next page)*

| Variables | Adolescent Dental Exam | | |
|---|---|---|---|
| | Yes | No | Diff. |
| Unknown | 0.019 | 0.022 | -0.003 |
| Marital Status | | | |
| Single | 0.042 | 0.081 | -0.039*** |
| Married | 0.758 | 0.645 | 0.113*** |
| Widowed | 0.026 | 0.036 | -0.011** |
| Divorced | 0.123 | 0.158 | -0.035*** |
| Separated | 0.036 | 0.065 | -0.029*** |
| Unknown | 0.016 | 0.015 | 0.001 |
| Smoking | | | |
| No | 0.743 | 0.637 | 0.106*** |
| Yes | 0.241 | 0.348 | -0.106*** |
| Unknown | 0.016 | 0.015 | 0.001 |
| **Wave I Paternal Characteristics:** | | | |
| Education Level | | | |
| Less than High School | 0.099 | 0.196 | -0.097*** |
| High School/GED | 0.303 | 0.353 | -0.050*** |
| Some Post-secondary | 0.166 | 0.134 | 0.032*** |
| College/University grad | 0.222 | 0.131 | 0.091*** |
| Beyond college/University | 0.133 | 0.050 | 0.083*** |
| No Dad | 0.055 | 0.103 | -0.048*** |
| Unknown | 0.022 | 0.033 | -0.011** |
| Occupation | | | |
| None | 0.019 | 0.036 | -0.016*** |
| Professional 1 | 0.064 | 0.019 | 0.046*** |
| Professional 2 | 0.050 | 0.033 | 0.017*** |
| Manager | 0.112 | 0.042 | 0.069*** |
| Technical Specialist | 0.058 | 0.030 | 0.028*** |
| Office Worker | 0.017 | 0.013 | 0.004 |

*(continued on next page)*

| Variables | Adolescent Dental Exam | | |
|---|---|---|---|
| | Yes | No | Diff. |
| Sales Worker | 0.037 | 0.026 | 0.010* |
| Services Worker | 0.007 | 0.013 | -0.006* |
| Craftsperson | 0.026 | 0.028 | -0.002 |
| Construction Worker | 0.058 | 0.069 | -0.011 |
| Mechanic | 0.068 | 0.068 | -0.000 |
| Factory Worker | 0.077 | 0.076 | 0.001 |
| Transportation Driver | 0.026 | 0.035 | -0.008 |
| Military | 0.024 | 0.024 | 0.000 |
| Farm or Fishery | 0.014 | 0.014 | 0.001 |
| Other | 0.098 | 0.099 | -0.001 |
| No Dad | 0.239 | 0.368 | -0.129*** |
| Unknown | 0.003 | 0.006 | -0.003 |
| Paid Job | 0.725 | 0.575 | 0.150*** |
| Smoking | | | |
| No | 0.474 | 0.408 | 0.066*** |
| Yes | 0.520 | 0.589 | -0.069*** |
| Unknown | 0.006 | 0.004 | 0.003 |
| Observations | 2,626 | 1,699 | |

*Notes.* * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. Means are reported. Diff. column reports differences between treated and control groups, and an asterisk indicates the $p$-value from a $t$-test of differences. Standard deviations are reported in parentheses for continuous variables. The sample is restricted to 4,325 individuals whose Parent (1995) survey was answered by a mother figure, and with Wave IV outcomes.

# B PSM Balancing Test

Table A3: Covariate Balance Diagnostics after Radius Matching

| | $p$-values of $t$-test After Radius Matching | | | |
|---|---|---|---|---|
| | Wave IV | | Wave V | |
| Variable | Unmatched | Matched | Unmatched | Matched |
| Female | 0.049 | 0.738 | 0.153 | 0.721 |
| Race: Black | 0.000 | 0.188 | 0.000 | 0.952 |
| Race: Native American | 0.000 | 0.595 | 0.029 | 0.317 |
| Race: Asian | 0.119 | 0.037 | 0.785 | 0.642 |
| Race: Others | 0.002 | 0.862 | 0.000 | 0.509 |
| Age | 0.000 | 0.614 | 0.055 | 0.892 |
| Age Squared | 0.000 | 0.599 | 0.050 | 0.874 |
| Household Income Level 2 | 0.000 | 0.298 | 0.000 | 0.430 |
| Household Income Level 3 | 0.000 | 0.775 | 0.000 | 0.951 |
| Household Income Level 4 | 0.000 | 0.427 | 0.000 | 0.354 |
| Household Income Level 5 | 0.000 | 0.579 | 0.000 | 0.445 |
| Household Income Level 6 | 0.012 | 0.562 | 0.012 | 0.163 |
| Household Income Level 7 | 0.223 | 0.617 | 0.285 | 0.723 |
| Household Income Level 8 | 0.875 | 0.703 | 0.857 | 0.223 |
| Household Income Level 9 | 0.000 | 0.592 | 0.000 | 0.829 |
| Household Income Level 10 | 0.000 | 0.779 | 0.000 | 0.331 |
| Household Income Level 11 | 0.000 | 0.518 | 0.000 | 0.570 |
| Household Income Level 12 | 0.000 | 0.175 | 0.000 | 0.088 |
| Household Income Level 13 | 0.151 | 0.733 | 0.129 | 0.585 |
| Number of Siblings: 2 | 0.000 | 0.077 | 0.000 | 0.415 |
| Number of Siblings: 3 | 0.488 | 0.302 | 0.274 | 0.502 |
| Number of Siblings: 4 or more | 0.000 | 0.081 | 0.000 | 0.909 |
| Insurance Coverage: With Discontinuity | 0.000 | 0.995 | 0.000 | 0.581 |
| Insurance Coverage: None | 0.000 | 0.994 | 0.000 | 0.608 |
| Insurance Coverage: Unknown | 0.032 | 0.866 | 0.057 | 0.328 |
| Hardship in Medical Access: Somewhat Easy | 0.000 | 0.872 | 0.000 | 0.076 |

Continued on next page

| | $p$-values of $t$-test After Radius Matching | | | |
|---|---|---|---|---|
| | Wave IV | | Wave V | |
| Variable | Unmatched | Matched | Unmatched | Matched |
| Hardship in Medical Access: Somewhat Hard | 0.000 | 0.945 | 0.000 | 0.159 |
| Hardship in Medical Access: Very Hard | 0.000 | 0.617 | 0.000 | 0.507 |
| Hardship in Medical Access: Unknown | 0.799 | 0.832 | 0.870 | 0.933 |
| Local Area: Suburban | 0.000 | 0.789 | 0.000 | 0.388 |
| Local Area: Urban/Commercial | 0.000 | 0.997 | 0.000 | 0.490 |
| Local Area: Other | 0.891 | 0.750 | 0.609 | 0.317 |
| Local Area: Unknown | 0.634 | 0.165 | 0.637 | 0.586 |
| Difficulty Paying Bills: Yes | 0.000 | 0.603 | 0.000 | 0.411 |
| Difficulty Paying Bills: Unknown | 0.974 | 0.997 | 0.681 | 0.514 |
| Parental Education: Some College | 0.042 | 0.782 | 0.055 | 0.841 |
| Parental Education: Associate's Degree | 0.671 | 0.658 | 0.307 | 0.704 |
| Parental Education: Bachelor's Degree | 0.000 | 0.491 | 0.000 | 0.617 |
| Parental Education: Master's or Higher | 0.000 | 0.165 | 0.000 | 0.575 |
| Parental Education: Unknown | 0.956 | 0.545 | 0.709 | 0.131 |
| Parental Employment: Not Working | 0.096 | 0.687 | 0.042 | 0.222 |
| Parental Employment: Unknown | 0.343 | 0.550 | 0.800 | 0.691 |
| Public Assistance: Yes | 0.000 | 0.243 | 0.000 | 0.428 |
| Public Assistance: Unknown | 0.384 | 0.655 | 0.417 | 0.477 |
| Marital Status: Married | 0.000 | 0.434 | 0.000 | 0.409 |
| Marital Status: Widowed | 0.038 | 0.771 | 0.094 | 0.065 |
| Marital Status: Divorced | 0.003 | 0.573 | 0.001 | 0.486 |
| Marital Status: Separated | 0.000 | 0.937 | 0.001 | 0.951 |
| Marital Status: Unknown | 0.709 | 0.543 | 0.786 | 0.131 |
| Smoking: Yes | 0.000 | 0.636 | 0.000 | 0.444 |
| Smoking: Unknown | 0.874 | 0.630 | 0.929 | 0.507 |
| Current Personal Earnings Level 2 | 0.000 | 0.961 | 0.402 | 0.945 |
| Current Personal Earnings Level 3 | 0.014 | 0.600 | 0.007 | 0.745 |
| Current Personal Earnings Level 4 | 0.014 | 0.666 | 0.020 | 0.314 |

Continued on next page

| | $p$-values of $t$-test After Radius Matching | | | |
|---|---|---|---|---|
| | Wave IV | | Wave V | |
| Variable | Unmatched | Matched | Unmatched | Matched |
| Current Personal Earnings Level 5 | 0.237 | 0.264 | 0.075 | 0.882 |
| Current Personal Earnings Level 6 | 0.293 | 0.403 | 0.245 | 0.315 |
| Current Personal Earnings Level 7 | 0.731 | 0.964 | 0.007 | 0.537 |
| Current Personal Earnings Level 8 | 0.006 | 0.052 | 0.060 | 0.991 |
| Current Personal Earnings Level 9 | 0.000 | 0.218 | 0.362 | 0.512 |
| Current Personal Earnings Level 10 | 0.001 | 0.342 | 0.005 | 0.567 |
| Current Personal Earnings Level 11 | 0.010 | 0.895 | 0.000 | 0.719 |
| Current Personal Earnings Level 12 | 0.003 | 0.514 | 0.000 | 0.001 |
| Current Personal Earnings Level 13 | 0.000 | 0.742 | 0.530 | 0.277 |
| Current Household Income Level 2 | 0.002 | 0.299 | 0.942 | 0.397 |
| Current Household Income Level 3 | 0.001 | 0.949 | 0.000 | 0.716 |
| Current Household Income Level 4 | 0.000 | 0.572 | 0.016 | 0.593 |
| Current Household Income Level 5 | 0.008 | 0.987 | 0.091 | 0.326 |
| Current Household Income Level 6 | 0.029 | 0.868 | 0.111 | 0.230 |
| Current Household Income Level 7 | 0.049 | 0.501 | 0.000 | 0.703 |
| Current Household Income Level 8 | 0.522 | 0.362 | 0.000 | 0.723 |
| Current Household Income Level 9 | 0.107 | 0.492 | 0.100 | 0.091 |
| Current Household Income Level 10 | 0.002 | 0.397 | 0.255 | 0.735 |
| Current Household Income Level 11 | 0.000 | 0.463 | 0.000 | 0.163 |
| Current Household Income Level 12 | 0.000 | 0.955 | 0.000 | 0.016 |
| Current Household Income Level 13 | 0.001 | 0.404 | 0.001 | 0.150 |
| Current Insurance Type Level 2 | 0.000 | 0.355 | 0.125 | 0.326 |
| Current Insurance Type Level 3 | 0.273 | 0.931 | 0.000 | 0.143 |
| Current Insurance Type Level 4 | 0.030 | 0.268 | 0.826 | 0.824 |
| Current Insurance Type Level 5 | 0.129 | 0.422 | 0.016 | 0.232 |
| Current Insurance Type Level 6 | 0.320 | 0.426 | 0.107 | 0.055 |
| Current Insurance Type Level 7 | 0.810 | 0.166 | 0.000 | 0.607 |
| Current Insurance Type Level 8 | 0.002 | 0.427 | 0.431 | 0.823 |

Continued on next page

| | $p$-values of $t$-test After Radius Matching | | | |
|---|---|---|---|---|
| | Wave IV | | Wave V | |
| Variable | Unmatched | Matched | Unmatched | Matched |
| Current Insurance Type Level 9 | 0.000 | 0.647 | 0.917 | 0.718 |
| Current Insurance Type Level 10 | 0.005 | 0.672 | 0.923 | 0.031 |
| Current Insurance Type Level 11 | 0.709 | 0.871 | 0.239 | 0.662 |
| Current Insurance Type Level 12 | 0.000 | 0.473 | 0.087 | 0.949 |
| Current Insurance Type Level 13 | 0.089 | 0.970 | 0.000 | 0.316 |
| Current Education Level 2 | 0.000 | 0.473 | 0.000 | 0.533 |
| Current Education Level 3 | 0.089 | 0.970 | 0.000 | 0.635 |
| Current Education Level 4 | 0.000 | 0.477 | 0.000 | 0.923 |
| Current Education Level 5 | 0.000 | 0.242 | 0.000 | 0.987 |
| Father's Education Level 2 | 0.001 | 0.317 | 0.000 | 0.388 |
| Father's Education Level 3 | 0.004 | 0.543 | 0.055 | 0.785 |
| Father's Education Level 4 | 0.000 | 0.177 | 0.000 | 0.429 |
| Father's Education Level 5 | 0.000 | 0.411 | 0.000 | 0.957 |
| Father's Education Level 6 | 0.000 | 0.674 | 0.000 | 0.372 |
| Father's Education Level 7 | 0.064 | 0.663 | 0.057 | 0.414 |
| Father's Occupation Level 2 | 0.000 | 0.387 | 0.000 | 0.387 |
| Father's Occupation Level 3 | 0.010 | 0.559 | 0.038 | 0.372 |
| Father's Occupation Level 4 | 0.000 | 0.344 | 0.000 | 0.132 |
| Father's Occupation Level 5 | 0.000 | 0.445 | 0.001 | 0.249 |
| Father's Occupation Level 6 | 0.218 | 0.522 | 0.590 | 0.818 |
| Father's Occupation Level 7 | 0.063 | 0.938 | 0.512 | 0.903 |
| Father's Occupation Level 8 | 0.056 | 0.693 | 0.141 | 0.676 |
| Father's Occupation Level 9 | 0.676 | 0.223 | 0.934 | 0.886 |
| Father's Occupation Level 10 | 0.154 | 0.467 | 0.063 | 0.787 |
| Father's Occupation Level 11 | 0.877 | 0.277 | 0.864 | 0.386 |
| Father's Occupation Level 12 | 0.772 | 0.527 | 0.895 | 0.830 |
| Father's Occupation Level 13 | 0.135 | 0.445 | 0.095 | 0.445 |
| Father's Occupation Level 14 | 0.882 | 0.749 | 0.559 | 0.057 |

Continued on next page

| | $p$-values of $t$-test After Radius Matching | | | |
|---|---|---|---|---|
| | Wave IV | | Wave V | |
| Variable | Unmatched | Matched | Unmatched | Matched |
| Father's Occupation Level 15 | 0.894 | 0.543 | 0.991 | 0.493 |
| Father's Occupation Level 16 | 0.839 | 0.943 | 0.434 | 0.555 |
| Father's Occupation Level 17 | 0.000 | 0.545 | 0.000 | 0.572 |
| Father's Occupation Level 18 | 0.228 | 0.583 | 0.119 | 0.433 |
| Father Has Paid Job | 0.000 | 0.349 | 0.000 | 0.355 |
| Father Smokes: Yes | 0.000 | 0.774 | 0.000 | 0.989 |
| Father Smokes: Unknown | 0.319 | 0.771 | 0.260 | 0.804 |
| Birth Year: 1975 | 0.146 | 0.756 | 0.057 | 0.180 |
| Birth Year: 1976 | 0.007 | 0.183 | 0.049 | 0.814 |
| Birth Year: 1977 | 0.707 | 0.322 | 0.368 | 0.648 |
| Birth Year: 1978 | 0.001 | 0.623 | 0.005 | 0.090 |
| Birth Year: 1979 | 0.352 | 0.551 | 0.411 | 0.014 |
| Birth Year: 1980 | 0.191 | 0.326 | 0.998 | 0.438 |
| Birth Year: 1981 | 0.060 | 0.640 | 0.042 | 0.062 |
| Birth Year: 1982 | 0.340 | 0.314 | 0.421 | 0.382 |
| Birth Year: 1983 | 0.587 | 0.765 | . | . |

*Notes.* $p$-values are from $t$-tests comparing covariates between treated and control groups after radius matching. This table reports diagnostics for the Wave IV and Wave V samples, corresponding to models in Table 8. Interaction terms are excluded as all were insignificant.

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