

**Partnership for a Drug Free New Jersey Study on The Effect of Suspicionless Random Drug Testing in
New Jersey Middle Schools**

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Abstract: A cohort panel design is used to measure the effectiveness of a school-wide, opt-in suspicionless random drug and alcohol testing program in New Jersey. Students at the school are compared with students in comparable schools, as well as with students who recently arrived in the school, and students who are not part of the testing program. The results indicate that the program has a significant effect reducing the perceived peer use of alcohol and the safety of that use. However, there were no significant effects on the use of illegal drugs – though the baseline levels of such use are very low – and the effects do not seem to spread outside of the students actually tested.

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Since the Supreme Court's decisions in *Vernonia School 47J v Acton* (1995), schools have been permitted to subject all students to random urinalysis drug testing. The Court found that the schools had a strong case for testing of student athletes on health and safety grounds, but schools around the country began testing students involved voluntarily in non-athletic extra-curricular activities as well. Such policies were upheld by the Court in 2002, in *Board of Education of Independent School District Number 92 of Pottawatomie County v Earls*. In *Earls*, the Court again upheld the suspicionless testing policies as being reasonable searches under the 4th Amendment. Since then, testing programs within schools have expanded dramatically, with some schools now testing all students on an opt-in voluntary basis. As of 2003, about 1 in 6 high schools had such programs (Ringwalt et al 2008).

However, attempts to measure the effectiveness of these testing programs on students' drug use have shown mixed results. Goldberg, et al, (2003) finds some evidence for deterrent effects in a program that tested athletes (a small, but non-significant difference in reported use of drugs), but also finds that drug testing programs tend to worsen some mediating factors, most notably the belief that drugs were part of social norms. Yamaguchi, Johnston and O'Malley (2003a, 2003b) compared student-level data from schools that reported having drug testing programs and those that did not, finding no difference in the rates of admitted drug use. The large size of their study means that it has been taken as strong evidence for the ineffectiveness of drug testing regimes, but the cross-sectional nature of their data means that it is vulnerable to selection effects. Schools are not randomly assigned to drug testing regimes, so if schools facing drug problems are more likely to adopt such measures, the absence of differences would be an indicator of a successful program. As the authors admit, only a panel design or a natural experiment can provide definitive results. Moreover, their sample of schools contained only a small number of schools with random drug testing programs, making it difficult for them to sort out any conditional effects within these schools.

Additionally, as Shek (2010) points out, drug testing regimes are rarely adopted in isolation. Schools that begin testing students for drugs almost certainly engage in other anti-drug practices as well, and these policies may serve to confound the effects of the drug testing programs on student outcomes. Further confusion about the effectiveness of programs could come from the sites that have been used for research: Botvin et al (2001) argue that research at middle-class predominantly white schools may be less likely to show results, and find that interventions that have had little effect at such schools has a large impact on students at an inner-city school.

Drawing from psychological research (i.e. Botvin and Wills 1985; Botvin et al 1990; Graham et al 1990), Hansen (1992) finds that social influence strategies seem to have the largest effects on reported drug use in schools. This makes sense, given that the largest predictor of drug use is association with peers who use drugs (Brook et al 1990; Newcomb and Bentler 1988)

Research into the effectiveness of suspicionless random drug testing of all students has been hampered by the relatively small number of schools carrying out such programs, but also by the lack of panel data, which makes it difficult to track effects on individual students, or cohorts of students, over time. The

present study makes use of a cohort panel study to test the effectiveness of a random drug testing program on middle school students in New Jersey. While court rulings suggest that such programs are lawful (Gorman 2004), especially as they test purely on an opt-in basis, it is clear whether they are effective enough to be desirable: this is the question we hope to answer here.

Procedures

Data was collected from multiple schools in suburban New Jersey. While geographically distant, these schools were demographically very similar: all were approximately 72 percent white, with median incomes slightly above the New Jersey average, and almost identical proportions of students receiving free or reduced lunch.¹ Data was collected from both middle schools (6th through 8th grades) and the high schools linked to those middle schools. At all schools, the procedure was the same. With consent of the school administration and district school boards, students and their parents were asked to opt-in to a survey of drug and alcohol use and attitudes. Parents were asked to fill out a consent form, and care was taken to ensure that no student was allowed to take the survey without parent's consent; students who did not opt-in were engaged in an outside activity to minimize social pressure to participate. Before taking the survey, students were given the opportunity to opt out of participation, even if their parents had allowed it, ensuring multiple layers of consent.

Before the survey was administered, researchers explained the nature of the survey, as well as the procedures used to maintain response anonymity. All responses were collected via Scantron-type test forms, with no identifying information included on the forms. After the response sheets were scanned, the forms themselves were securely destroyed.

One of the middle schools studied – referred to here as the treatment school – makes use of random opt-in drug testing of all students, in addition to standard programs of suspicion-based testing and random testing of students in athletic and other extra-curricular activities. Parents may opt their children in to the random drug testing program at the start of the year, and about 70 percent of students at the middle school and 85 percent of students at the high school are part of the program.² On a regular basis over the course of the semester, a random group of students enrolled in the program are asked to submit biological samples, which are retrieved and tested for alcohol and drug use in accordance with state and federal guidelines. In general, about 1/3rd of the students enrolled in the random drug testing program are actually called for testing over the course of the school year. This means that in some school years, random suspicionless drug testing is conducted on more than 300 students.

In a normal year, none of these students test positive for drugs or alcohol; no information was available on the number of students tested as part of the suspicion-based or extra-curricular activities testing who tested positive for drugs or alcohol. While no information about the outcomes of particular drug tests is made available to students, aggregate data is made public annually, and whether students pass or fail the drug test can be easily inferred by other students (students are called to the office for testing). This

¹ Exact figures are excluded here, in order to preserve the confidentiality of the schools involved.

² Figures fluctuate on a year-to-year basis; these figures represent averages over the 7 years of the study.

program of random, opt-in drug testing of all students continues at the high school level, in parallel with standard suspicion-based and extra-curricular testing. The other schools – referred to as the control schools – in which data was collected only do drug testing on the basis of extra-curricular activities or suspicion. In terms of testing regimes, these schools are broadly representative of American public school districts: as of 2005, 93 percent of US public school districts reported testing student-athletes for drugs, 65 percent tested students in all extra-curricular activities, and 28 percent tested students not engaged in extra-curricular activities or involved in disciplinary processes (Ringwalt et al 2008).

In all of the schools studied, data collection commenced in the 2006-2007 school year, and was carried out annually (generally in October) until the 2012-2013 school year. Because of privacy concerns, we did not collect individual names, but the repeated cross-sectional nature of the data, along with the high level of opt-in to the survey (averaging across years, the sample included 70 percent of all students in a cohort, with a minimum of 56 percent, a maximum of 80 percent, and a standard deviation of 3.2) allows us to draw conclusions about individual cohorts of students as they move through time. For instance, our dataset includes students who were in 6th grade in 2006, and has data on these students annually through their senior year of high school. This ensures that we are able to control for cohort effects, generational effects and aging effects simultaneously in the analysis.

The survey itself consisted of 25 multiple choice questions designed to assess attitudes towards drug and alcohol use, perceived repercussions from use, family communication about drug and alcohol use, and perceptions of use among peer and aspirational groups. Because of the challenges involved with asking questions easily understood by students, the survey was revised dramatically after cognitive testing in a separate middle school focus group³. At the schools with the suspicionless random drug-testing program, students were also asked about their perceptions of the program, knowledge of the program, and participation in it. After the survey was administered, students were given both a guided and a responsive de-briefing as a group to ensure that their questions were fully answered. In most cases, students were also given the opportunity to ask questions of the researcher after the session, in case they had additional questions that they did not wish to air publicly. To control for acquiescence effects, response measures on most questions were rotated between survey administrations.

Data and Measures

Overall, the dataset consists of responses from 3,526 students across all schools in the sample. Participants were 71 percent white, and 17 percent reported that they had been tested for drugs or alcohol at some point. Because of the difficulty in obtaining SES measures from children – students generally do not know their parent’s income – we used a measure based on the number of homes that the student had lived in during their life. Census data tells us that residential mobility is highly correlated with parent’s SES, and is a measure that students are able to report with some degree of accuracy. By this measure, 34 percent of students at both schools reported having lived at the same home all their

³ For instance, younger students in the focus group often reported that they did not know what “Caucasian/White” meant as a racial category, whether sips of sacramental wine in religious services counted as drinking alcohol, and thought that an “eight ball” might refer to a fortune-telling toy. In all cases, the questions were re-worked until they were clear to the focus group.

lives, 37 percent reported living in two homes, and 14 percent in three. The remaining 15 percent had lived in 4 or more homes.

For comparative purposes, we divided the sample into three groups. The first is students attending one of the control schools, and therefore not exposed to the random drug testing program (n=1,010). The second is students attending the treatment school, and having done so since 7th grade (the start of the program), or at least three years. These students are considered to have long-term exposure to the random drug-testing program: so, an 8th grader would be considered to have long-term exposure provided he or she attended 7th grade in the treatment school, but a 12th grader could be considered to have long-term exposure provided that he or she had attended since at least 10th grade (n=1,955). The third group consists of students in the treatment school at the time of data collection, but without long-term exposure to the program (n=561). This separation allows us to separate out immediate effects of the drug testing program from effects that may be due to a culture engendered by the drug testing program. For instance, a cultural effect could be inferred from an outcome in which students who recently entered the treatment school were similar to students from the control school, *ceteris paribus*, but became more similar to students from the treatment school the longer they were in the treatment school. Comparing long-term students at the treatment school to recent arrivals also allows us to control for potential confounds that may arise from comparing students at different schools.

To assess the impact of the random drug-testing program, we constructed five outcomes. The first is the amount of reported discussion with parents about drug and alcohol use. This was assessed using a survey item asking students to describe their interaction with their parents about drugs and alcohol,⁴ a measure that was recoded into three categories: regular discussions about drugs and alcohol (49 percent), one discussion about drugs and alcohol (17%), or no discussion (35 percent).

The second and third outcomes deal with the use of alcohol. The first of these is reported alcohol use. Students were asked to report if they had drunk alcohol – not including that used for religious services – and if so, when they had done so⁵. Studies of deception in children (Polak and Harris 1999; Vrij 2008;

⁴ Exact question wording: Sometimes, parents discuss drugs and alcohol with their kids in one big “talk”; other parents discuss drugs and alcohol with their kids more often. What comes closest to describing how much you and your parents have talked about drugs and alcohol?

We had the “talk,” but no other conversations, about drugs and alcohol (17%)
We had the “talk,” and other regular conversations about drugs and alcohol (27%)
We have regular conversations about drugs and alcohol (22%)
I know what they think, so there’s been no need to talk about drugs and alcohol (24%)
We haven’t talked about drugs and alcohol, so I’m not sure what they think (11%)

⁵ When was the last time that you, personally, drank alcohol (not including sacramental wine for religious purposes)?

I’ve never drunk alcohol (76%)
I’ve had alcohol sometime this week (3%)
I had alcohol sometime last weekend (3%)

Salekin and Kubak 2008) indicate that when children lie about behavior, they prefer to do so in non-specific ways, in order to reduce the odds that they will be caught lying. Our cognitive testing group showed the same tendencies, saying that if they were to lie about use, they would claim to have used alcohol or drugs in the fairly distant past. As such, we use a graded measure of admitted alcohol use, with the highest scores given to students who said that they had consumed alcohol in the past week (6 percent), and lower scores given to students who claimed to have consumed alcohol sometime in the past (11 percent). The lower scores on the vague claims reflect both the greater likelihood of deception as well as the general measure of recent alcohol use found in most of the research in this area.

In addition to admitted alcohol use, a measure was also constructed of aspirational alcohol use. This measure is designed to reflect the degree to which students feel that alcohol use is socially acceptable or even desirable, and is comprised of three equally weighted questions. The questions ask about perceived usage among peers and the perceived health effects of alcohol use,⁶ and were combined such that higher scores indicate a greater perception of perceived peer use and lower perception of danger arising from use (the combined score runs from 0 to 1, with a mean of .26, median of .19, and standard deviation of .24).

I had alcohol sometime in the past month, but not in the last week (6%)

I had alcohol sometime last summer, or before (11%)

⁶ If you had to guess, about how many of the people in this class right now drank alcohol last weekend?

No one (42%)

Just a couple of people (28%)

More than a couple, but less than half (14%)

More than half (9%)

Almost everyone (5%)

If you had to guess, what proportion of people your age drink alcohol at least once a month?

Almost no one (34%)

A few, but less than a quarter (29%)

More than a quarter, but less than half (17%)

More than half, but not everyone (12%)

Almost everyone (6%)

In terms of your health, how dangerous is drinking alcohol for people your age?

I don't know (20%)

It doesn't have any real health consequences (5%)

It is likely to have some mild health consequences, but they're not serious or too long-lasting (13%)

It is likely to have some serious health consequences, but they won't be long-lasting or fatal (19%)

It is likely to cause serious long-term damage, or even death (41%)

The fourth and fifth outcomes are reported and aspirational use of illegal drugs other than alcohol. Students in the cognitive testing groups reported multiple contradictory biases in how they would answer such questions. For instance, one subset of students said that they would not admit to using drugs, even if they had done so, for fear of punishment, even if the survey were anonymous. Another subset reported that while use of drugs was not socially desirable, knowledge about drugs and other forbidden topics was desirable, and claims of past use could be desirable as well. To overcome these over reporting, we used a discounted measure of reported past use (as with the reported alcohol use measure).⁷ In addition to this measure, however, we also used fact-based questions about the price of drugs in the area. Students were asked about the price of two products: an eightball (identified as a type of drug, to avoid confusion) and a dime bag of marijuana. These factual questions were designed such that the correct answer would be easily identifiable to anyone with even casual interaction with drugs, but would be difficult to guess. The “Don’t Know” option was also included as the first response option on these questions, to avoid having students guess an answer when they otherwise would not. For instance, the response options on the eightball question were less than \$20, \$20-\$50, \$50-\$100, and more than \$100. In reality, an eightball – 2 oz, or 1/8th of a pound of heroin or cocaine – costs \$250-\$400, so anyone who had been involved in the purchase of one would certainly know that it was more than \$100. However, our cognitive testing indicated that students who were guessing about the price would be likely to avoid guessing the extreme values of less than \$20 or more than \$100, figuring that the correct answer would be somewhere in the middle (a tendency that could be reinforced by school instruction on strategies for taking multiple-choice tests). As such, based on responses to these questions, we can divide students into three groups: those who have no reported exposure to drugs, nor claim any such exposure (83%), those who have no exposure, but want to pretend that they do (6%), those who seemingly have exposure to drugs (3%), and those that almost certainly do (1%). Students were included in the first category if they never claimed to use drugs, and did not attempt to answer the factual questions. They were included in the second category if they claimed to have used drugs, but were unable to answer the factual questions correctly. The third category includes students who were able to one of the factual questions correctly, and claim past of drug use. The last category includes students who were able to answer both factual questions correctly, regardless of their claims about past use. Some students provided incomplete answers to these questions, and were excluded from this analysis.

Aspirational drug use was assessed exactly as aspirational alcohol use was, through questions asking about perceived use among peers, and perceived danger. The question of perceived danger was asked

⁷ When was the last time that you, personally, used drugs other than alcohol (not including prescriptions drugs prescribed to you by a doctor)?

I’ve never used drugs (90%)

I’ve used drugs sometime this week (2%)

I used drugs sometime last weekend (1%)

I used drugs sometime in the past month, but not in the last week (2%)

I used drugs sometime last summer, or before (4%)

separately for marijuana and unprescribed prescription drugs.⁸ The questions were equally weighted and rescaled to a 0-1 scale (mean .18, median .12, standard deviation of .18).

Hypotheses

Based on past research on drug testing, we identified three ways in which the random drug testing program could be expected to student's beliefs about drugs and alcohol, and their behavior with regards to them.

The first set of hypotheses has to do with familial discussion. Some past research has indicated a correlation between family discussions of drugs and alcohol and a decreased propensity to use among children. However, these results could be driven by parents with stronger familial connections being

⁸If you had to guess, about how many of the people in this class right now used drugs other than alcohol last weekend?

- No one (53%)
- Just a couple of people (29%)
- More than a couple, but less than half (11%)
- More than half (4%)
- Almost everyone (2%)

If you had to guess, what proportion of people your age use drugs other than alcohol at least once a month?

- Almost no one (47%)
- A few, but less than a quarter (30%)
- More than a quarter, but less than half (14%)
- More than half, but not everyone (5%)
- Almost everyone (3%)

In terms of your health, how dangerous is using marijuana for people your age?

- I don't know (20%)
- It doesn't have any real health consequences (6%)
- It is likely to have some mild health consequences, but they're not serious or too long-lasting (7%)
- It is likely to have some serious health consequences, but they won't be long-lasting or fatal (14%)
- It is likely to cause serious long-term damage, or even death (51%)

How dangerous is using prescription drugs not prescribed to you for people your age?

- I don't know (26%)
- It doesn't have any real health consequences (4%)
- It is likely to have some mild health consequences, but they're not serious or too long-lasting (10%)
- It is likely to have some serious health consequences, but they won't be long-lasting or fatal (22%)
- It is likely to cause serious long-term damage, or even death (36%)

more likely to talk with their children about drugs and alcohol, making stronger, more supportive family connections the real driver of the relationship. However, if more conversation is a driver of decreased use or aspirational use, the presence of the random drug testing program could lead to positive outcomes just by spurring families into conversation about whether or not to participate in the program.

H1: Students in the treatment school should report more family conversation about drugs and alcohol.

H2: Students who report more family conversation about drugs and alcohol will be less likely to use, or aspire to use, drugs and alcohol.

The second set of hypotheses deals with informational and peer pressure effects. The most reported finding in the causes of drug use among children and adolescents is the presence of actual or perceived drug use in peer groups. Because the results of the random drug testing program are made public on an annual basis, and students can presumably infer something about the outcome of the tests during the year, students in the treatment school have more information about the prevalence of drug and alcohol use in their school than students at the control schools. To the extent that this additional information leads students at the treatment school to revise down their beliefs about the frequency of drug and alcohol use among their peers, it may lead to less use and aspirational use. However, we would expect this effect to take root only as students remain in the program, and are exposed to the information, for some time.

H3: Students in the treatment school will have lower perceptions of peer use of alcohol and drugs than students in the control schools.

H4: Students with decreased perceptions of drug and alcohol use among peers will be less likely to use, or aspire to use, drugs and alcohol.

The final set of hypothesis arises from the increased likelihood of being caught for using drugs and alcohol in the treatment school. At the control school, students may be able to avoid being tested for drugs and alcohol by staying out of athletic and extra-curricular activities, reducing the perceived risk of such activities. At the treatment school, however, students wishing to avoid drug testing must also stay out of the random drug test program. So, students enrolled – perhaps against their will – in the drug testing program may be less likely to use drugs and alcohol (though not less likely to aspire to do so) than students not enrolled in the program. Put another way, enrollment in the drug testing program will make it less likely that students who see drug and alcohol use as desirable will actually engage in it.

H5: For a given degree of aspirational use, students in the treatment school who are enrolled in the drug testing program will show lower levels of drug and alcohol use than those in the treatment school not enrolled in the program.

Analysis

First, we analyze the effect of being in the treatment school on the likelihood of talking with parents about drugs and alcohol. While it may have been expected that the presence of the random drug testing program would lead to increased conversations about drugs and alcohol, this does not seem to be the

case. At all grade levels, students at the control school had higher rates of talking with their parents, both at any point, or regularly.

Additionally, looking only at the treatment school, there is no significant difference in rates of talking with parents between students who do, and do not, report being part of the random drug testing program. Sixty-five percent of students who have opted-in to the program report having any talk with their parents about drugs and alcohol, compared with 62 percent of those who have not opted in ($t=1.47$, $p=.07$, one-tailed). The difference is even smaller for reporting regular conversations: 48 percent in the opt-in group versus 46 percent of those not opting in ($t=-.74$, $p=.23$, one-tailed).

Table One: Comparison of Percent talking with parents, by grade and group

	Grade		
	6	7	8
Regular Talk % - Control Group	0.57	0.61	0.63
Regular Talk % - Treatment Group	0.43	0.43	0.44
<i>T of Difference</i>	-3.05	-4.74	-2.96
<i>P-Value (1 tailed)</i>	0.999	1.000	0.998
Any Talk % - Control Group	0.74	0.74	0.72
Any Talk % - Treatment Group	0.64	0.62	0.62
<i>T of Difference</i>	-2.45	-3.51	-1.69
<i>P-Value (1 tailed)</i>	0.993	1.000	0.953

However, these results could be driven by some unmeasured differences between the treatment and control groups, or those students who do and do not choose to opt in. While the matching of the treatment and control schools should minimize this possibility, we can control for such potential confounds through regression analysis. In the regression, we control for the race, mobility, the interaction of race and mobility, whether the student at the treatment school opted in to the random drug testing program, and whether the individual had been tested for drugs, for whatever reason, in the past. All variables were coded as 0-1 dummy variables, save mobility, which was coded 1-5, reflecting the number of residences the student had lived in. The excluded outcome category is having regular talks with parents.

The regression model confirms the results of the t-tests. Residential mobility drives up the likelihood of not having a conversation with parents among non-white students, and white students are more likely to not have had a conversation with parents about drugs and alcohol, but the effect of the control school remains. Students at the control school, all else equal, are 25 points more likely to have had some sort of conversation with their parents about drugs or alcohol.

Moreover, it appears that talking with parents has a strong effect on both the use of drugs and alcohol and the perceived desirability of drug and alcohol use. Relative to students who have no discussions with their parents, students who have regular discussions with their parents about drugs and alcohol are

significantly lower on the use and aspiration scales for both drugs and alcohol. A single talk also has an effect relative to no talk, but only on use, not on the aspirational use scale.

Table Two: Regression Model for talking with parents

	Coef	Std. Err.	Z	P> z
<i>Effect on Likelihood of No Talk</i>				
White	0.683	0.299	2.28	0.02
Mobility	0.205	0.098	2.11	0.04
White x Mobility	-0.384	0.122	-3.15	0.00
Control School?	-1.625	0.645	-2.52	0.01
Opt-in	-0.228	0.155	-1.48	0.14
Tested in past?	0.081	0.142	0.57	0.57
Constant	-0.421	0.278	-1.52	0.13
<i>Effect on Likelihood of One Talk</i>				
White	0.623	0.386	1.61	0.11
Mobility	0.174	0.127	1.37	0.17
White x Mobility	-0.224	0.153	-1.46	0.14
Control School?	-0.527	0.587	-0.9	0.37
Opt-in	0.028	0.199	0.14	0.89
Tested in past?	-0.202	0.183	-1.11	0.27
Constant	-1.373	0.367	-3.74	0.00

The next set of hypotheses deal with potential informational effects arising from the random drug testing program. In the control school, or any school without a random drug testing program, students have no way of knowing what the actual rate of drug and alcohol use among their peers is: this may lead them to overestimate usage, and feel greater peer pressure to use, or be more likely to feel that there is a social norm of use. These views are measured by the aspirational alcohol and drug constructs, which include items about peer use as well as on the perceived danger of use.

Table Three: OLS Regression Model for effect of talking with parents

	Coef	Std. Err.	Z	P> z	Coef	Std. Err.	Z	P> z
<i>Effect on Aspirational Alcohol Use</i>					<i>Effect on Actual Alcohol Use</i>			
One Talk with Parents	-0.016	0.014	-1.2	0.25	-0.063	0.023	-2.8	0.01
Regular Talks	-0.026	0.011	-2.4	0.02	-0.034	0.017	-1.9	0.05
White	-0.018	0.023	-0.8	0.44	0.001	0.037	0.0	0.98
Mobility	0.014	0.007	1.9	0.06	0.026	0.012	2.2	0.03
White x Mobility	-0.009	0.009	-1.0	0.33	-0.002	0.015	-0.2	0.88
Control School?	-0.047	0.036	-1.3	0.20	-0.030	0.062	-0.5	0.62
Opt-in	-0.028	0.012	-2.3	0.02	-0.019	0.020	-1.0	0.34
Tested in past?	0.016	0.012	1.4	0.18	0.029	0.019	1.5	0.13
Grade 7	0.073	0.013	5.8	0.00	0.051	0.021	2.5	0.01
Grade 8	0.155	0.013	12.1	0.00	0.068	0.021	3.3	0.00
Constant	0.129	0.023	5.5	0.00	0.038	0.038	1.0	0.31
<i>Effect on Aspirational Drug Use</i>					<i>Effect on Actual Drug Use</i>			
One Talk with Parents	-0.019	0.012	-1.6	0.11	-0.016	0.008715	-1.8	0.07
Regular Talks	-0.019	0.009	-2.1	0.04	-0.013	0.006792	-1.9	0.06
White	-0.016	0.020	-0.8	0.42	0.003	0.014672	0.2	0.85
Mobility	0.013	0.006	2.0	0.04	0.015	0.004714	3.1	0.00
White x Mobility	-0.008	0.008	-1.0	0.30	-0.011	0.005832	-1.8	0.07
Control School?	-0.039	0.032	-1.2	0.22	-0.040	0.023309	-1.7	0.09
Opt-in	-0.021	0.010	-2.0	0.04	-0.020	0.007624	-2.6	0.01
Tested in past?	0.012	0.010	1.2	0.24	0.009	0.007394	1.2	0.21
Grade 7	0.024	0.011	2.2	0.03	0.010	0.007996	1.3	0.21
Grade 8	0.077	0.011	6.9	0.00	0.025	0.008105	3.1	0.00
Constant	0.116	0.020	5.8	0.00	0.023	0.014787	1.6	0.11

Table Four: Comparison of Aspirational Drug and Alcohol, by grade and group

	Grade		
	6	7	8
Aspirational Alcohol - Control Group	0.09	0.18	0.30
Aspirational Alcohol - Treatment Group	0.10	0.17	0.26
<i>T of Difference</i>	0.56	-0.30	-1.66
<i>P-Value (1 tailed)</i>	0.713	0.381	0.050
Aspirational Drug - Control Group	0.10	0.14	0.22
Aspirational Drug - Treatment Group	0.09	0.12	0.19
<i>T of Difference</i>	-0.99	-1.76	-1.51
<i>P-Value (1 tailed)</i>	0.161	0.039	0.067

While there is no significant difference between the treatment and control groups among 6th graders, the degree of perceived use and safety of use rises much more quickly among students in the control group than among those in the treatment group. The pattern is more pronounced in the alcohol based outcomes, but the same pattern exists in both.

Table Five: OLS Regression Analysis of Aspirational Drug and Alcohol

	Coef	Std. Err.	Z	P> z
<i>Effect on Aspirational Alcohol Use</i>				
White	-0.017	0.023	-0.76	0.45
Mobility	0.013	0.007	1.83	0.07
White x Mobility	-0.009	0.009	-0.95	0.34
Any Talk?	-0.017	0.014	-1.23	0.22
Regular Talks?	-0.027	0.011	-2.51	0.01
Opt-in	-0.032	0.024	-1.35	0.18
Control Group?	-0.046	0.036	-1.27	0.21
Grade 7?	0.090	0.026	3.43	0.00
Grade 8?	0.142	0.026	5.39	0.00
Opt-in x Grade 7	-0.005	0.030	-0.18	0.86
Opt-in x Grade 8	0.018	0.030	0.62	0.53
Tested?	0.101	0.040	2.53	0.01
Tested x Grade 7	-0.114	0.044	-2.60	0.01
Tested x Grade 8	-0.077	0.043	-1.79	0.07
Constant	0.128	0.028	4.50	0.00
<i>Effect on Aspirational Drug Use</i>				
White	-0.016	0.020	-0.80	0.43
Mobility	0.013	0.006	2.01	0.05
White x Mobility	-0.008	0.008	-1.04	0.30
Any Talk?	-0.020	0.012	-1.64	0.10
Regular Talks?	-0.019	0.009	-2.12	0.04
Opt-in	-0.025	0.021	-1.19	0.23
Control Group?	-0.040	0.032	-1.24	0.21
Grade 7?	0.028	0.023	1.22	0.22
Grade 8?	0.066	0.023	2.87	0.00
Opt-in x Grade 7	-0.002	0.026	-0.06	0.95
Opt-in x Grade 8	0.012	0.026	0.47	0.64
Tested?	0.026	0.034	0.78	0.43
Tested x Grade 7	-0.023	0.037	-0.63	0.53
Tested x Grade 8	-0.011	0.037	-0.29	0.77
Constant	0.119	0.025	4.78	0.00

If the driver of this difference is information, we should expect that students with more information about the drug and alcohol use of other students should have the lowest levels of aspirational drug and alcohol use. Within the treatment school, students who have actually been tested as part of the program can be expected to have more information than students who are part of the program but have never been tested, and students who are not part of the random drug testing program. Only 7 percent of the sixth graders in the sample report having been selected for testing, but this figure rises rapidly, to 31 percent of 7th graders and 42 percent of 8th graders.

The regression analyses show some striking results. In general, the level of aspirational alcohol use increases each year of middle school: by .09 in 7th grade, and .14 in 8th grade. However, among students who have been tested, these increases are muted. While students in the tested group have a higher baseline level of aspirational alcohol use in 6th grade, the increases are much smaller: with a small decrease between 6th and 7th grades, and an increase of only .06 between 6th and 8th grades. Whether they opt-in to the random drug testing program or not doesn't make any difference at all: it is the act of testing the students that reduces that student's perception of use among peers and safety of alcohol use.

However, there are no such effects on perception of peer use and safety of drug use. While we observe the same effects of year-on-year increases in perceived use and safety, there is no significant moderating effect of opting in to the random drug testing group, or actually being tested. This could be due to fact that none of the tested students in the treatment school actually test positive for drugs, so students who have been tested do not receive any additional information about rates of use among peers.

Also important to note here is the lack of any significant difference between the control and treatment schools. While there are significant differences between them in the two-way comparisons, and when we do not control for whether or not students have actually been tested, the analysis indicated that differences between the treatment and control groups, and differences between students who are, and are not, part of the random drug testing program, are due to students actually being tested, rather than simply being in the treatment school or part of the program.

Of course, the perception of peer usage and safety is most important to the extent that it drives actual use, and on this, the evidence is unequivocal: students with higher levels of aspirational use also have much higher levels of actual use of both drugs and alcohol.

As expected, students who perceive higher levels of peer use and safety of alcohol are much more likely to use alcohol, and this effect swamps that of the group, whether or not the student opts in to the program, and whether or not the student is actually tested. These factors matter, but only, it seems, indirectly, by driving down perceived peer use and safety. The importance of perceived use and safety on actual use can be seen in figure one: among students with very low levels of aspirational alcohol use, the increase in actual alcohol use over the course of middle school is negligible. Among those with high levels of aspirational use, however, rates of actual use increase dramatically between 6th and 8th grades.

Table Six: OLS Regression Analysis of Actual Alcohol Use

	Coef	Std. Err.	Z	P> z
<i>Effect on Actual Alcohol Use</i>				
White	0.015	0.019	0.78	0.43
Mobility	0.012	0.006	1.91	0.06
White x Mobility	-0.015	0.008	-1.93	0.05
Any Talk?	-0.020	0.011	-1.73	0.08
Regular Talks?	0.004	0.009	0.42	0.67
Opt-in	-0.007	0.010	-0.72	0.47
Control Group?	-0.021	0.015	-1.42	0.16
Tested?	-0.002	0.010	-0.26	0.80
Grade 7?	0.005	0.014	0.33	0.74
Grade 8?	0.040	0.015	2.65	0.01
Asp. Alcohol	0.811	0.062	13.15	0.00
Asp Alcohol x Grade 7	0.209	0.073	2.88	0.00
Asp Alcohol x Grade 8	0.138	0.071	1.96	0.05
Constant	0.003	0.026	0.13	0.90

Figure One: Effect of Aspirational Alcohol and Actual Alcohol Use, by Grade

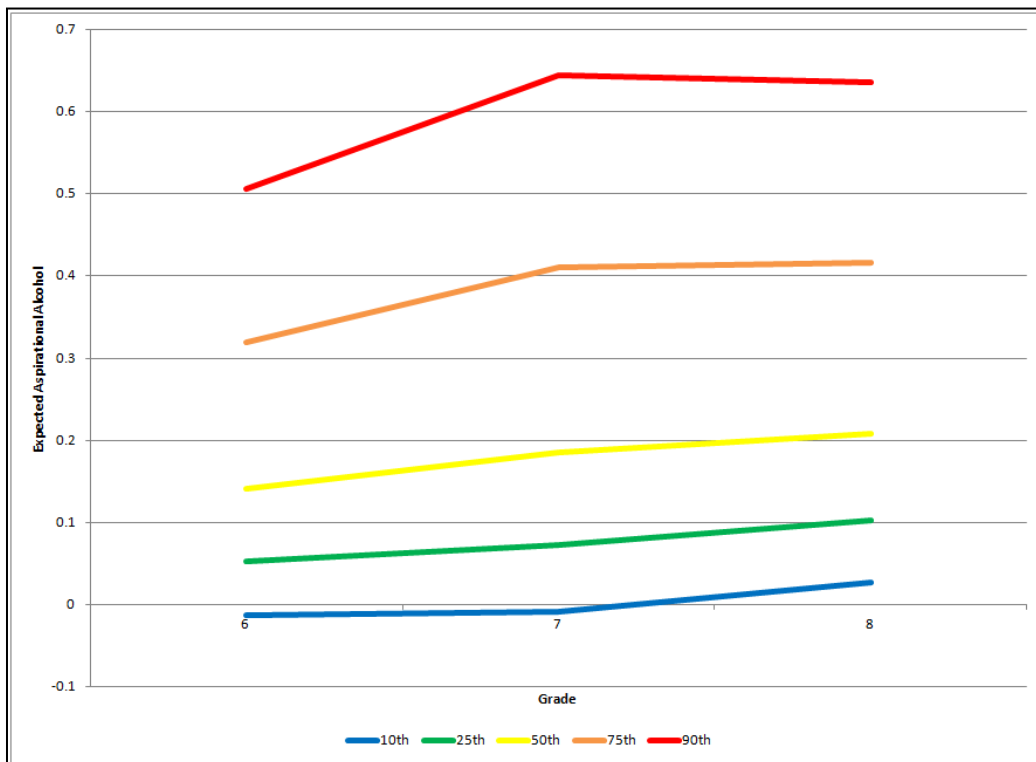


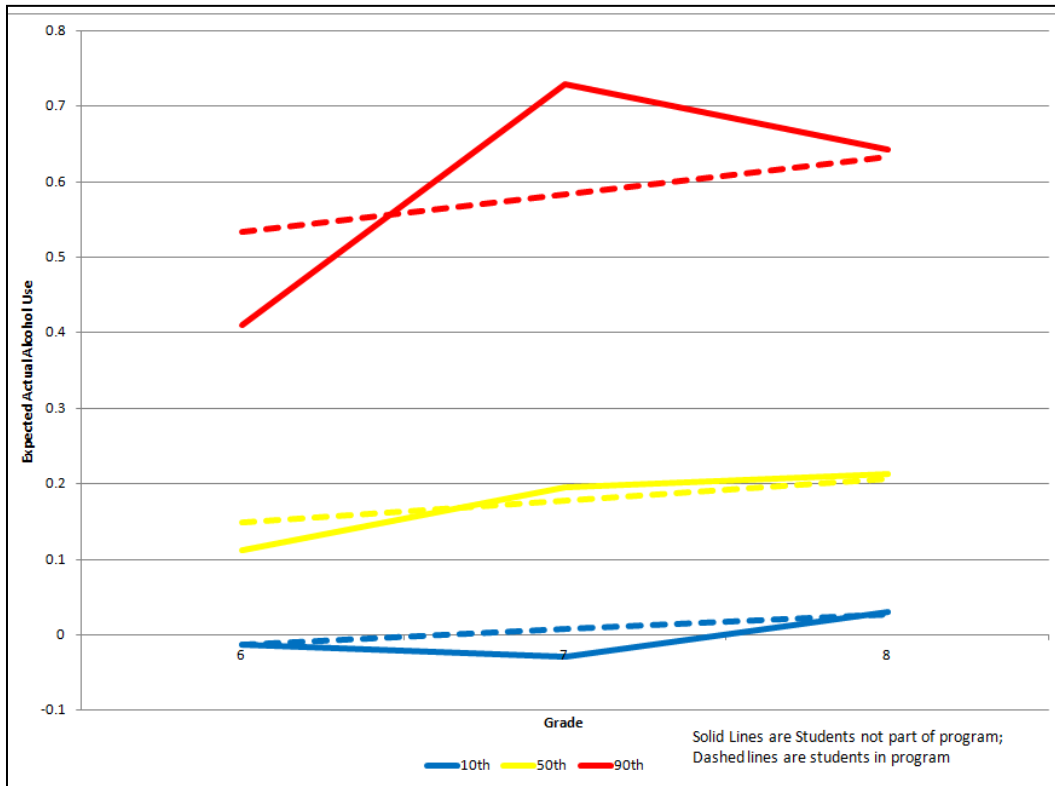
Table Seven: OLS Regression Analysis of Actual Alcohol Use

	Coef	Std. Err.	Z	P> z
<i>Effect on Actual Alcohol Use</i>				
White	0.015	0.019	0.78	0.44
Mobility	0.012	0.006	1.94	0.05
White x Mobility	-0.015	0.008	-2.01	0.05
Any Talk?	-0.021	0.011	-1.80	0.07
Regular Talks?	0.002	0.009	0.28	0.78
Opt-in	-0.007	0.026	-0.26	0.79
Control Group?	-0.019	0.015	-1.25	0.21
Tested?	-0.003	0.010	-0.30	0.76
Grade 7?	-0.019	0.030	-0.65	0.52
Grade 8?	0.040	0.031	1.30	0.19
Opt-in x Grade 7	0.041	0.033	1.21	0.23
Opt-in x Grade 8	0.000	0.035	0.00	1.00
Asp. Alcohol	0.643	0.145	4.44	0.00
Asp Alcohol x Grade 7	0.538	0.156	3.44	0.00
Asp Alcohol x Grade 8	0.311	0.157	1.99	0.05
Opt-in x Asp. Alcohol	0.211	0.160	1.32	0.19
Opt-in x Asp. Alcohol x Grade 7	-0.493	0.178	-2.77	0.01
Opt-in x Asp. Alcohol x Grade 8	-0.219	0.176	-1.24	0.21
Constant	0.002	0.034	0.07	0.95

Finally, to test for potential deterrent effects of the random drug testing program, it is necessary to see if these effects of aspirational use on actual use are mitigated by being in the random drug testing program. If it is the case that students in the random drug testing program are simply afraid to use drugs because of the increased likelihood of being caught, then they should have lower levels of actual use for a given level of aspirational use. However, as seen in Table Seven, this does not seem to be the case.

When we control for the possibility that being part of the opt-in group has a mitigating effect on the relationship between aspirational and actual alcohol use, there are significant effects, but nothing to indicate that opting in to the program has an effect on actual use. Among only group – 7th graders with high levels of perceived use and safety – students who are part of the testing group have lower actual use than students not part of the testing group. And, even among those students with very high levels of perceived use and safety, there is a quick return to no effect among 8th graders.

Figure Two: Effect of Aspirational Alcohol, opt-in to testing, on Actual Alcohol Use, by Grade



Findings

With these analyses, we can evaluate the hypotheses and explanations for the effect of the random drug testing program. The first set of hypotheses was based on the idea that the existence of the program would lead students in the treatment school to be more likely to discuss drugs and alcohol with their parents, whether they opted in to the program or not, and that these conversations would have a significant effect reducing perceived use among peers, perceived safety, and actual use. The results were clear. While conversations with parents about drugs and alcohol do drive down actual and aspirational drug and alcohol use (allowing us to reject the null hypothesis of no effect in H2), students in the treatment school were no more likely to report family conversations than students in the control school. Additionally, neither opting in to the program, or actually being tested, had any significant effect on the likelihood of having a conversation with parents about drugs.

While we had not hypothesized a negative effect of being in the treatment school on conversations about drugs and alcohol, it seems likely that one is present. This could be due to parents using the testing program as a way to avoid having an uncomfortable discussion: there's no need to find out about a child's drug or alcohol use, as they school is doing it. Further research should be carried out on parents to see if such perceptions exist, and the extent to which they may cancel out any positive effects of the program.

The second set of hypotheses dealt with potential informational effects of the drug testing program on students in the treatment school. Since students in the treatment school have some knowledge about the aggregate number of students who have tested positive for drugs and alcohol in their school, and potentially have personal knowledge as well, they may have more realistic views of how many students in the school actually use drugs and alcohol. However, the results indicate that while there is a significant effect of the program, it does not spread to the whole school, or even all of the students enrolled in the random testing program. Rather, it seems that students who have actually been tested for drugs and alcohol – a group which constitutes a large portion of our sample, especially in 7th and 8th grade – have much lower levels of perceived peer use and safety than other students. While there is some evidence for a difference in aspirational use based on school (as in Hypothesis 3), it seems to be driven almost entirely by the students who have actually been tested for drugs and alcohol. The results also show, however, that the testing has little effect on the perceived use and safety of drug use, perhaps because of the lower baseline levels of drug usage.

This difference in the perceived safety and peer use of alcohol also has significant impacts on actual alcohol use (as in Hypothesis 4). While there is generally a significant year-to-year increase in alcohol use among middle schoolers, lower levels of perceived peer use and safety – which are driven by having been tested, among other factors – mitigate these increases.

Still, while having been tested has a significant effect on the increases in actual alcohol use over time, the mechanism is not entirely clear. While having been tested could reduce perceived use and safety by increasing levels of knowledge about the rates of alcohol use, it could also do so by increasing the fear of being caught, as in Hypothesis 5. While anyone in the random drug testing program could be tested, and could rationally fear being caught for using, this fear could easily be greatest among students who have actually been tested, and are therefore most cognizant of the threat of being caught. However, the evidence from the regression analyses seems to argue against this mechanism. If it is the case that students who opt-in to the random drug testing program are prevented from using drugs and alcohol by the possibility that they will be caught, we would expect that opting in would mitigate the relationship between aspirational and actual use. That is, students in the program would be no different in terms of the perceived use and safety of drugs and alcohol than students not in the program, but they would be less likely to actually use drugs and alcohol. There is, however, no evidence for this mitigating effect: controlling for the level of perceived use and safety, there is no difference between those who do and do not opt-in to the random drug testing program, and we fail to reject the null hypothesis of no effect in H5.

Discussion

The general trend most obvious from our analyses is the steady increase in the perceived levels of peer use and the perceived safety of drugs and alcohol year-on-year. It is difficult to imagine any school-based intervention that could halt these increases, but the results do show some ways in which the treatment school has been effective at slowing them.

While the random drug testing program does have a significant effect reducing alcohol use among middle schoolers, it is far from a panacea. While our findings confirm previous findings that increased discussion with parents about drugs and alcohol lead to a significant reduction in perceived and actual use of drugs and alcohol, we find no evidence that the random drug testing program actually leads parents to talk with their children more. To the contrary, there is some indication that it may actually reduce the amount of conversation parents have with their children about drugs, perhaps because they see the school as taking more responsibility.

Similarly, there did not seem to be any deterrent effect of potential drug testing on drug and alcohol use. In all cases, the biggest driver of drug and alcohol use was the perception of peer use, and the belief that the use was not a health threat. The strength of this relationship was in no way moderated for students enrolled in the drug testing program relative to other students at the treatment school, or students at the control school. This, in itself, is not surprising: it may be asking too much of adolescents to think of potential long-term consequences of behavior when they are faced with peer pressure or immediate gratification.

The major effect that did seem to moderate the increases in actual and perceived use in middle school was the actual testing of students. Students who had been tested showed much smaller increases in perceived and actual use of alcohol – but not drugs – year-to-year. The exact mechanism behind this difference isn't clear from the data, but a few possibilities present themselves. From the perspective of the student being tested, the testing process means that the student is placed into a small group – the others being tested at the time – in which drug and alcohol use is both undesirable and has immediate consequences. Affiliation with this group may extend beyond the short testing period, leading to a reduction in the perception of peer use. Second, the fact of the testing may lead the student to put drug use in a more medical context than it would otherwise be seen in, leading the student to perceive greater potential risk arising from drug use. Third, the fact that the student has been tested may continue to be important in decisions about and perceptions of drug use: the potential of being caught may be more salient for students that have been tested than the potential for testing is among students who have not been tested. However, our findings suggest that such an effect would work by reducing the perceived usage among peers, rather than as a direct deterrent.

While this is a significant effect, it is not as strong an effect as proponents of random drug testing in school might hope for. The strongest case for random drug testing of middle school students arises from spillover effects, or what economists refer to as positive externalities. These spillover effects would arise when testing some students has a significant benefit for other students who have not been tested: by creating an environment in which drug and alcohol use is less socially acceptable, or students are less likely to perceive their peers as using illicit substances. Even the fact that friends or classmates have been called in for random drug testing could lead students to think more carefully about drug and alcohol use. However, there is no evidence for any of these spillover effects: the effect of random drug testing seems to be a one-to-one proposition. When a student is tested for drugs, it significantly reduces their perception of peer use and safety of use, which, in turn, drives down the likelihood of usage, but only for that student. These individual level effects can be seen throughout the whole school – but only because of the large number of students who are tested.

This does not mean, however, that random drug testing does not have the potential to create spillover effects. Research on virginity pledges in high schools, for instance, have found that they impact individual level behavior only when the proportion of students taking such a pledge reaches a certain threshold (Bearman and Bruckner 2000), and it could be the case that drug testing works in a similar way. For instance, there may be no spillover effects when 30 or 40 percent of students in a school have been tested, but testing 60 percent of students may lead to an environment in which students who have not been tested are less likely to use as well. In this case, absence of evidence is not evidence of absence.

Any debate about the cost and benefit of suspicionless random drug testing, for the time being, must focus on the benefit to the individual student being tested. The evidence presented here is clear that the act of testing a student significantly, though indirectly, reduces the likelihood that that student will use drugs and alcohol while in middle school. Holding all else equal, the results here show that testing leads to a mean reduction of 6 points in the likelihood that a student will use alcohol in 8th grade, reducing the likelihood from about a 13 percent chance to a 7 percent chance. There is no question that this is a significant effect, and many studies have shown the benefit of delaying the incidence of first use of alcohol by a few years to be dramatic.

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