Abstract Title Page
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Title: The Effectiveness of Mandatory-Random Student Drug Testing

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Abstract Body

Limit 5 pages single spaced.

Background / Context:

Description of prior research and its intellectual context.

One approach some U.S. schools now use to combat high rates of adolescent substance use is school-based mandatory-random student drug testing (MRSDT). Under MRSDT, students and their parents sign consent forms agreeing to the students' participation in random drug testing as a condition of participating in athletics and other school-sponsored competitive extracurricular activities. The first MRSDT programs started in the late 1980s, in the wake of similar programs started by U.S. military and many civilian workplaces (DuPont & Brady, 2005). The most recent national estimates indicate that 14 percent of U.S. public school districts conducted random drug testing during the 2004–2005 school year (Ringwalt et al., 2008). Two U.S. Supreme Court decisions have upheld the use of MRSDT for students participating in athletics and other extracurricular activities (Vernonia School District 47J v. Acton, 1995; Board of Education of Independent School District No. 92 of Pottawatomie County et al. v. Earls et al., 2002). The Court has not ruled on a case involving random drug testing of all students in a public school.

The few prior studies of MRSDT offer little definitive evidence on the effectiveness of these programs. Two nonexperimental studies of MRSDT programs in New Jersey and Indiana high schools found that student substance use declined after the programs were implemented (Dupont & Brady, 2005; McKinney, 2002). Similarly, a nonexperimental comparison group study of two Oregon high schools found lower rates of student-reported substance use in the one school that had MRSDT (Goldberg et al., 2003). However, quasi-experimental studies based on national survey data have found no statistically significant differences in substance use between schools with and without drug testing programs (Yamaguchi, Johnston, & O'Malley, 2003a, 2003b). Moreover, some research suggests that MRSDT can have unintended negative consequences on student attitudes toward school and other risk factors for future substance use (Goldberg et al., 2003, 2007).

The one previous experimental study of MRSDT produced mixed results (Goldberg et al., 2007). In that study, nine Oregon high schools were randomly assigned to implement an MRSDT program for student athletes and nine were randomly assigned to a control group that deferred implementation of the program for two years. At two of the four follow-up periods, student-reported past-year substance use was lower in the treatment schools than control schools. However, there were no differences in past-month use at any of the four follow-up periods. In addition, seven of the 18 participating schools (39 percent) left the study and were not included in the analysis, which undermined the experimental design and could have introduced systematic differences between the treatment and control groups.

Purpose / Objective / Research Question / Focus of Study:

Description of the focus of the research.

This study is the largest experimental evaluation to date of school-based MRSDT. The study tested the effectiveness of MRSDT in reducing substance use among high school students.

Setting:
Description of the research location.

Our study is composed of 36 high schools from seven school districts that received grant funding in 2006 from the U.S. Department of Education's Office of Safe and Drug-Free Schools (OSDFS) to implement MRSDT programs. The districts—required to participate in the study as a condition of their grant awards—were spread across seven states, primarily in the South and Midwest.

Population / Participants / Subjects:
Description of the participants in the study: who, how many, key features or characteristics.

The study included 4,723 students. Within each school, we sought a representative sample of students enrolled at the time of the follow-up survey in spring 2008. To achieve this goal, we drew samples at two time points. First, in early 2007, we drew stratified random samples of students in grades 9, 10, and 11. Students in grade 12 were excluded because they would not be present at the follow-up data collection point in spring 2008. Second, in fall 2007, we selected a random sample of incoming 9th-grade students who were new to the study schools.

Intervention / Program / Practice:
Description of the intervention, program or practice, including details of administration and duration.

The OSDFS grant program required that all grantee districts follow a basic set of testing procedures in the schools that were randomly assigned to the treatment group. All districts had to administer tests to a minimum of 50 percent of eligible students in the treatment group and test for a minimum of five substances (marijuana, amphetamines, cocaine, methamphetamines, and opiates). Districts also had to establish safeguards to maintain the confidentiality of the drug test results, to subject any positive test results to review and verification by a certified medical-review officer, and to refer students with positive drug test results to treatment and counseling services. Although not explicitly required by the grant program, all districts contracted with an outside drug testing company to administer the tests.

Other implementation decisions were left to the discretion of the individual grantees. The frequency of drug testing ranged across schools from four times per year to five or six times per month. Three districts tested for alcohol in addition to drugs. Five districts tested both student athletes and participants in competitive extracurricular activities (for example, school clubs, marching band, and choir), whereas two districts limited MRSDT to student athletes. In four districts, students who participated in covered activities were subject to testing all year (or from the time their participation in a covered activity began through the end of the year). In two districts, students who participated in covered activities were subject to testing only while participating in the activity.

Across the seven grantee districts, a total of 3,476 drug tests were conducted during 324 testing events during the study's one-year evaluation period. Of these tests, a total of 38 positive drug tests were reported. Positive drug tests were most common for marijuana (23 of the 38 positive drug tests). A total of 17 of the 38 positive drug tests were submitted for confirmatory testing, and all 17 confirmatory tests were positive. The rate of positive drug tests—38 of 3,476 tests—

was lower than the rate at which students reported using substances, which is consistent with reports elsewhere in the literature (DuPont, Campbell, & Campbell, 2008).

Schools assigned to the control group were permitted to continue implementing other substance use prevention efforts they had in place before the study. Staff in 63 percent of control schools reported offering a substance use prevention curriculum, 31 percent reported offering substance use prevention trainings for teachers, and 25 percent reported offering behavioral or therapeutic counseling for students. Thus, the study measured the effects of MRSDT as a supplement to these other substance use prevention efforts.

Research Design:
Description of research design (e.g., qualitative case study, quasi-experimental design, secondary analysis, analytic essay, randomized field trial).

The study was designed as a cluster randomized trial with staggered implementation of the intervention. Because MRSDT programs are implemented schoolwide, with expectations of spillover to students not directly covered by the MRSDT program, we randomly assigned schools, not individual students. After baseline data collection in spring 2007, about half the schools were randomly assigned to a treatment group that was permitted to begin implementing MRSDT immediately and about half were assigned to a control group that had to delay MRSDT until after the follow-up survey was completed a year later, in spring 2008. Thus, impacts were calculated over the one-year period (spring 2007–2008) of staggered implementation. The study was approved by the Portland State University Human Subjects Research Review committee.

To reduce the probability of an imbalance between the treatment and control groups, random assignment was conducted separately within blocks of schools. Blocks were formed first by grouping schools within the seven grantee school districts. For the three largest grantees, additional blocks were formed within districts by grouping schools with similar characteristics. In total, random assignment was conducted separately within each of 15 blocks of schools. The number of schools per block ranged from 2 to 4. In blocks with three schools, two schools were always assigned to the treatment group.

Data Collection and Analysis:
Description of the methods for collecting and analyzing data.

The study uses data collected from six sources: (1) student rosters provided by each district, (2) student surveys administered at baseline (spring 2007) and follow-up (spring 2008), (3) school-records information collected from each study school, (4) forms documenting the drug testing procedures used in the study's treatment schools, (5) structured interviews with a key staff member at each study school, and (6) structured interviews with a staff member from each district.

The study's primary outcome was student self-reported substance use. On both the baseline and follow-up student surveys, students were asked how frequently they used each of 10 different substances (alcohol, tobacco, marijuana, cocaine, and so on) over three reference periods: the past 30 days, the past 6 months, and ever in their lifetimes. We used responses to these items to create binary composite measures (yes/no) of the following: use of any substance; use of any

substance excluding alcohol and tobacco; and use of any substance that was covered under the drug testing policy of the student's district. We constructed separate measures for past 30-day and 6-month use.

The study also examined impacts on four secondary outcomes, all of which were collected using the follow-up student survey. The outcomes were students' (1) intentions to use substances in the future, (2) perceived consequences of substance use, (3) participation in covered activities, and (4) school connectedness.

To measure the impacts of MRSDT on student substance use and other dichotomous outcomes, we estimated multivariate logistic regression models that included a binary indicator of treatment status, random assignment block indicator variables, and any demographic or outcome measures that showed statistically significant baseline differences. Standard errors were adjusted for the clustering of students within schools, using the generalized estimating equations (GEE) approach. Weights were used to adjust for random assignment, sampling, consent, and nonresponse probabilities. Students were classified by the school they attended at the time they were sampled, yielding "intent-to-treat" estimates of the program's impact. For continuous outcomes, comparable linear regression models were estimated.

Analyses were conducted separately for two analysis samples. First, to determine whether MRSDT affects the substance use and attitudes reported by students who are subject to testing, we limited the analysis to students who participated in athletics or other extracurricular activities covered by their districts' testing programs during the 2007–2008 school year. For example, if football and soccer were covered activities, we compared rates of substance use reported by football and soccer players in the treatment and control schools. Second, to examine whether MRSDT has spillover effects to other students in the school, we limited the analysis to students who did *not* participate in covered activities during the 2007–2008 school year.

To control for multiple hypothesis testing (MHT), *p*-values from the regression models were adjusted to control the familywise error rate (FWER) at 5 percent. The adjustment is based on the multivariate t-distribution and takes into account correlations among test statistics (Hothorn, Bretz, & Westfall, 2008). We applied the adjustment separately for each analysis sample (activity participants or nonparticipants) and for each group of related outcome measures (self-reported substance use, intention to use substances, perceived consequences of substance use, covered activity participation, or connection to school). No adjustment for MHT was applied across the two analysis samples or groups of different outcome measures.

Findings / Results:
Description of the main findings with specific details.

Students subject to MRSDT reported less substance use than comparable students in high schools without MRSDT. In particular, covered-activity participants in treatment schools were significantly less likely than students in control schools to report any past 30-day use of substances covered by their district's MRSDT policy. Rates of self-reported substance use were also lower for covered-activity participants in treatment schools than for those in control schools

on the five other substance use measures, although these differences were not statistically significant after accounting for multiple hypothesis testing.

MRSDT had no statistically significant spillover effects on the retrospective substance use reported by students not participating in covered activities. For nonparticipants, there were no significant differences in self-reported substance use between the treatment and control schools.

Conclusions:
Description of conclusions, recommendations, and limitations based on findings.

MRSDT can be effective in curbing illicit substance use among high school students. The results of this study—the largest experimental evaluation to date of school-based MRSDT—found that students subject to MRSDT reported less substance use than comparable students in schools without MRSDT. However, the program had no spillover effects on the substance use reported by students not subject to testing and had no effect on any group of students' intentions to use substances. The program had no unintentional effects on the proportion of students participating in activities subject to drug testing or on students' attitudes toward school and perceived consequences of substance use.

Appendices

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Appendix A. References

References are to be in APA version 6 format.

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Appendix B. Tables and Figures

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