

TESTING DRUGS VS. TESTING FOR DRUG USE: PRIVATE RISK MANAGEMENT IN THE SHADOW OF THE CRIMINAL LAW

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INTRODUCTION

GC/MS is the abbreviation for gas chromatography/mass spectrometry, the testing methodology LabCorp uses to confirm presumptive positive drug screen specimens. ...The immunoassay tests used to perform initial drug screening are designed to detect a wide range of chemically similar compounds that react with the antibodies which are at the core of the chemistry making up the tests.¹

The Gas Chromatography process separates a substance into its various component parts. Each component is then sent to the Mass Spectrometer which bombards the components with a beam of electrons in order to give the molecules a charge. ...The separated fragments can then be charted and the chart compared to a database of previously verified molecules for identification....²

Gas chromatography/mass spectrometry (GC/MS) is used to test samples for the presence of a variety of illicit psychoactive substances as well as dangerous and/or benign adulterants. The technical descriptions presented above come from two organizations conducting drug screening. The first, LabCorp, provides occupational testing services for corporate clients. The second, Drug Detection Laboratories (DDL), conducts GC/MS screening of samples provided by DanceSafe, EcstasyData.org, and the

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¹ LabCorp, *Toxicology Frequently Asked Questions*, Occupational Testing Services, Laboratory Corporation of America, http://www.labcorp.com/ots/tox_faq.html

² EcstasyData.org, “About the Data: Test Types.” http://www.ecstasydata.org/test_types.php

Multidisciplinary Association for Psychedelic Studies (MAPS). LabCorp’s samples are obtained by corporate clients’ random or systematic urine testing of their prospective and existing employees. DDL’s samples are obtained – via DanceSafe, EcstasyData, and MAPS – from would-be Ecstasy consumers who voluntarily (but anonymously) seek information on adulterants in samples they have purchased illicitly.

This paper explores what appear to be remarkably different normative and behavioral consequences that follow from using this same basic laboratory protocol (and others like it) to test for illicit drug use (henceforth, “use testing”) vs. testing for illicit drug safety (henceforth, “safety testing”). In this paper, my primary interest is in testing practices conducted by private citizens rather than agents of the legal system. At first glance, one might judge that safety testing and use testing have little shared relevance.³ And I do not contend that they are or should be seen as mutually exclusive alternatives. Use testing and safety testing are each intended to reduce harms, and each presumes to do so indirectly, by influencing the decision to ingest a drug. But despite their common technology and overlapping goals, their broader practices and rhetoric exemplify two distinctly different strategies for thinking about the management of risky behaviors – *prevalence reduction* vs. *harm reduction*. Prevalence reduction seeks to reduce (and to the extent feasible, eliminate) the number of people engaging in the behavior. Harm reduction seeks to reduce (and to the extent feasible, eliminate) the harmful consequences of engaging in the behavior.⁴ Practices and concepts most readily identified with prevalence reduction include “abstinence,” “prevention,” “deterrence,” and “incapacitation.” Practices and concepts most readily identified with harm reduction include “safe-use” and “safe-sex” educational materials, needle exchanges, and free condoms for school students. Prevalence reduction may be deployed in the hope of reducing drug-related harms, but it directly targets use, so any influence on harm is indirect. Harm reduction targets harms directly, and any influence on use is indirect.

³ Mark Kleiman’s initial reaction to this project was “all they have in common is chemistry.”

⁴See Robert J. MacCoun, *Toward A Psychology Of Harm Reduction*, 53 *American Psychologist* 199 (1998). ROBERT J. MACCOUN & PETER REUTER, *DRUG WAR HERESIES: LEARNING FROM OTHER VICES, TIMES, AND PLACES* (2001).

My primary focus is on the private use of these methodologies. But these private uses occur “in the shadow of the law,” and the criminal law influences them, and to some extent, distorts their consequences. The criminal law facilitates the intrusive use of use testing in workplaces and schools that might otherwise have difficulty implementing it – as illustrated by the greater prevalence of drug testing than alcohol testing. Yet alcohol testing does occur, showing that criminal prohibition is not a prerequisite for testing. The criminal law hinders the effective implementation safety testing, making it easier for sellers to distribute adulterated and often more dangerous products. More subtly, the criminal law promotes a “criminal deviance” framing of drug use which encourages some solutions but obscures others. For example, the focus on drug testing overlooks the potentially more harm-reducing use of psychomotor testing. Thus, both practices are hobbled by the facts and meanings of the criminal laws prohibiting these drugs. This is not (necessarily) an argument for ending drug prohibition, nor do I argue for the superiority of safety testing over use testing, or harm reduction over use reduction.⁵ But I do argue for the merits of a less moralistic, more pragmatic approach to conduct drug policy – an approach less speculative than legalization because it has been pursued for several decades in the Netherlands, and increasingly in the UK, Australia, and other nations.⁶

COMPARE AND CONTRAST

Use Testing

Prevalence of Testing

Workplace Testing. Workplace drug testing is now fairly common. The 1994 and 1997 versions of the National Household Survey on Drug Abuse (NHSDA), which each

⁵ See my book-length analysis of that issue (with Peter Reuter) in *Drug War Heresies*.

⁶ See Robert MacCoun & Peter Reuter, *Does Europe Do It Better? Lessons from Holland, Britain, and Switzerland*, *The Nation* (1999, September 20). Robert MacCoun & Peter Reuter (eds.) *The Varieties of Drug Control at The Dawn of The 21st Century* (Special Issue), 582 *Annals of the American Academy of Political and Social Science* (2002).

included a special module of items assessing respondents' workplace characteristics.⁷ Forty-nine percent of workers in 1997 (and 44 percent in 1994) reported that their workplaces conducted drug testing; more commonly in large firms (74 percent) than in medium (58 percent) or small (28 percent) firms. According to the American Management Association, the proportion of its members using drug testing rose from 21 percent to 81 percent between 1987 and 1996.⁸ The NHSDA study found that preemployment testing was more common (39 percent) than testing for cause (30 percent) or random testing (25 percent). Similarly, a NIDA survey of workplace drug testing data in the early 1990s found that preemployment testing was more common (44 percent of testing firms) than random testing (26 percent of testing firms).⁹

In the NHSDA study, about 8 percent of full-time workers reported using illicit drugs in the same month; a similar share reported heavy alcohol use.¹⁰ Full-time workers accounted for 70 percent of current illicit drug users between the ages of 18 to 49; because the household survey is believed to exclude a sizeable fraction of the addicted population, the true employment rate among current drug users is surely lower. Nevertheless, this suggests an upper-bound estimate of a third (viz., $.49 \times .70$) of current adult drug users being subject to drug-testing surveillance.

School-Based Testing. In the 1998 Monitoring the Future survey of high school seniors, 14 percent of schools and 16 percent of students were reported to have some form of drug testing. Similar rates of 16 percent and 16 percent were found in 2001.¹¹ A somewhat lower rate comes from the National Study of Delinquency Prevention in

⁷ *Worker Drug Use and Workplace Policies and Programs: Results from the 1994 and 1997 National Household Survey on Drug Abuse.* <http://www.oas.samhsa.gov/NHSDA/A-11/TOC.htm#TopOfPage>

⁸ Manksi et al (2001), p. 198.

⁹ Jacques Normand, Richard O. Lempert, and Charles P. O'Brien (eds.), *Under the Influence? Drugs and the American Work Force.* NRC/IOM, National Academy Press (1994), p. 75.

¹⁰ Full-time workers had lower rates of use than non-workers. Although 70 percent of past-month users held full-time jobs, note that the household survey is believed to exclude a sizeable fraction of the addicted population.

¹¹ Ryoko Yamaguchi, Lloyd D. Johnston, & Patrick M. O'Malley, Relationship Between Student Illicit Drug Use and School Drug-Testing Policies, 73 *J. School Health* 159 (2003).

Schools, which relied on administrative rather than student respondents. It found that around 1997-1998, “approximately 9 percent of secondary schools conduct some sort of testing program, presumably focused on athletes.”¹² This estimate covers a period just after the Supreme Court held (in *Vernonia School District v. Acton*, 1995) that mandatory drug testing of student athletes is legal under the Fourth and Fourteenth Amendments. A later opinion (in *Board of Education v. Earls*, 2003) further bolstered student testing; the majority opinion by Justice Thomas argued that drug testing “is a reasonable means of furthering the School District’s important interest in preventing and deterring drug use among its schoolchildren.”¹³

Testing in the Criminal Justice System. Most of what we know about drug use among arrestees comes from urinalyses conducted for research (discussed below) rather than as part of criminal justice processing. With the exception of Washington DC and some jurisdictions participating in the TASC (originally “Treatment Alternatives to Street Crimes,” now “Treatment Alternatives for Special Clients”) program or the recently cancelled Arrestee Drug Abuse Monitoring (ADAM) program, drug testing of arrestees is rare; most probationers and parolees are subject to testing, but the testing is very infrequent.¹⁴ Based on his recent study of probation in Los Angeles, San Diego, and Santa Cruz Counties, Kleiman argues that testing of probationers is inadequate as a means of surveillance and monitoring: “Once-a-week testing produces about a 35% chance of detecting any given incident of drug use; twice a week pushes that figure above

¹² This quote is reported from Manski et al., 2001. The NSDPS final reports do not appear to present any results on drug testing. See Gary D. Gottfredson, Denise C. Gottfredson, Ellen R. Czeh, *National Study of Delinquency Prevention in Schools*, Final Report, Grant No. 96-MU-MU-0008 (July 2000). www.ncjrs.org/pdffiles1/nij/grants/194129.pdf. Gary D. Gottfredson, Denise C. Gottfredson, Ellen R. Czeh, David Cantor, Scott B. Crosse, and Irene Hantman, *Toward Safe and Orderly Schools—The National Study of Delinquency Prevention in Schools*. Research in Brief, National Institute of Justice (2004). <http://www.ncjrs.gov/pdffiles1/nij/205005.pdf>

¹³ BOARD OF EDUCATION OF INDEPENDENT SCHOOL DISTRICT NO. 92 OF POTTAWATOMIE COUNTY, ET AL., PETITIONERS v. LINDSAY EARLS ET AL., SUPREME COURT OF THE UNITED STATES, 122 S. Ct. 2559, June 27, 2002, Decided.

¹⁴ See Eric D. Wish; Bernard A. Gropper, *Drug Testing by the Criminal Justice System: Methods, Research, and Applications*, Crime and Justice, Vol. 13, Drugs and Crime. (1990), pp. 321-391. D. Alan Henry and John Clark, *Pretrial Drug Testing: An Overview of Issues and Practices*. U.S. Department of Justice, Office of Justice Programs, Bureau of Justice Assistance, NCJ 176341, July 1999. Adele Harrell & Mark Kleiman, *Drug Testing in Criminal Justice Settings* (2000).

80%. By contrast, a probationer tested once a month—a far more typical pattern in the three departments studied—has less than one chance in ten of being detected for any given incident of use.”¹⁵

One might assume that the criminal justice system occupies the most intrusive and punitive end of the drug-testing spectrum, but Wish and Gropper note that in such settings “a single positive test result will seldom have the drastic consequences it can have in the employment setting. The level of recent drug use in the offender population is so high...that it would be counterproductive to attempt to revoke probation or parole or incarcerate all persons who tested positive.” Instead, a positive tests is usually “used to trigger more assessment, testing, or supervision and not to punish people or deprive them of their liberty.”¹⁶

Testing Results

Quest Diagnostics (“the leading provider of employer drug testing services in the United States”) publishes a regular *Drug Testing Index*® summarizing its results.¹⁷ During January-June 2005 – a period when Quest conducted over 3.6 million drug tests – the positivity rate was 4.7 percent for the general U.S. workforce and 2.3 percent for federally-mandated, safety-sensitive workers. They report a general decline in positivity rates in recent years, particularly for marijuana. In the early 1990s NIDA survey of workplace drug testing, almost 4 percent of samples were positive for an illicit substance; 2 percent for marijuana, 1 percent for cocaine, and less than 1 percent for opiates and benzodiazepines (0.5 percent).¹⁸ Positive rates were highest in the construction sector (6 percent), vs. 3 percent for retail and 2 percent for manufacturing and for transportation.

¹⁵ Mark A. R. Kleiman, Thomas H. Tran, Paul Fishbein, Maria-Teresa Magula, Warren Allen, and Gareth Lacy, *Opportunities and Barriers in Probation Reform: A Case Study of Drug Testing and Sanctions*. California Policy Research Center Brief, Vol. 14, No. 4 (2002), at 2.

¹⁶ Wish and Gropper at 334-335.

¹⁷ Quest Diagnostics, *Amphetamines Drug-Test Positives Are Up Among Safety-Sensitive Workers in the First Half of 2005, According to Quest Diagnostics' Drug Testing Index*®, http://www.questdiagnostics.com/employersolutions/DTI_11_2005/dti_index.html

¹⁸ Jacques Normand, Richard O. Lempert, and Charles P. O'Brien (eds.), *Under the Influence? Drugs and the American Work Force*. NRC/IOM, National Academy Press (1994), p. 75.

Unsurprisingly, positive drug test rates are dramatically higher among criminal justice arrestees. The National Institute of Justice began collecting systematic drug testing data from arrestees with its Drug Abuse Forecasting (DUF) program in 1987; an improved methodology was implemented in 2000 as the Arrestee Drug Abuse Monitoring (ADAM) program.¹⁹ The most recent data are for 2000.²⁰ In that year, more than half of 27 sites reported that 65 percent or more of their male arrestees tested positive for either cocaine, opiates, marijuana, methamphetamine, or PCP (the so-called “NIDA-5”). The most common drugs were marijuana (median = 40 percent) and cocaine (median = 30 percent).

Any consideration of drug test results needs to be qualified by the serious limitations of existing testing methods (Table 1). Blood testing is the most accurate, and the most valid method for identifying current (at the moment of testing) drug influences, but it is rare, intrusive, and expensive. Urine testing is far more common; it is also intrusive, and it is a poor indicator of immediate drug status because drugs cannot be detected in urine until they have been metabolized, many hours after consumption. It is particularly sensitive to cannabis use, and can pick up use dating back several months for a heavy user. It is far less likely to pick up other hard drugs. Saliva and hair testing are less intrusive and becoming more common. Hair testing can pick up use dating back two to three months, and can even “date” the use with some accuracy.

Urine testing is vulnerable to false positives due to contaminants (especially for urine testing), and false negatives due to temporary abstinence (for blood, urine, and saliva testing), “water loading” (for urine testing), and getting a hair cut (for hair testing). One can find detailed advice on how to cheat a drug test at various web sites.²¹ For example, according to www.ipassedmydrugtest.com, false positives for marijuana can be triggered by Advil, Nuprin, Mediprim, Motrin, Bayer Select Pain Relief Formula,

¹⁹ The program was ended on 29 January 2004, depriving criminologists of one of the few systematic tools available for tracking links between drug use and criminality.

²⁰ National Institute of Justice, 2000 Arrestee Drug Abuse Monitoring: Annual Report (April 2003).

²¹ e.g., cocaine.org/drugtestfaq/index.html, www.ipassedmydrugtest.com/drug_test_faq.asp

Excedrin IB Caplets, Genpril, Haltran, Ibuprofen, Midol 200, Pamprin, Trendar Cramp Relief Formula, Cramp End Tablets, Medipren, Roflumilol, Naproxen, Aleve, Ketoprofen, Orudis KT, Anaprox, Tolectin, ifenoprofen, flurbiprofen, oxaprozin, Ansaïd, Clinoril, Dolobid, Feldene, Indocin, Lodine, Meclomen, Motrin, Nalfon, Naprosyn, Orudis, Relafen, Voltaren, Phenergan, Promethegan, Riboflavin (vitamin B2), Dronabinol, and Edecrin.

Table 1. Detection periods for various drugs, by test method.²²

	<i>Blood</i>	<i>Urine</i>	<i>Saliva</i>	<i>Hair</i>
Alcohol	12 hours	12-24 hours	unknown	n/a
Amphetamines	12 hours	2-3 days	3 days	up to 90 days
Cannabis (single use)	24 hours	2-3 days	12-24 hrs	up to 90 days
Cannabis (habitual use)	2 days	up to 12 wks	12-24 hrs	up to 90 days
Cocaine	24 hours	4-5 days	1 day	up to 90 days

Another reason to be wary of the accuracy of use testing results involves sampling. “Random testing” may sound a lot like “random sampling,” but there is selection into and out of the sample, because users and/or those who object to testing may exit or avoid the testing organization – the military, a workplace, or a school sports program. I discuss possible consequences of this selection process below.

Effects on Drug Use

From a deterrence theoretic perspective, use testing ought to be an effective way to reduce drug use. Putting aside ongoing controversies about capital punishment, for drug offenses, drunk driving, and various income-generating crimes, four generalizations

²² Sources: Compiled from Corporate Drug Testing, Testing Methods, <http://www.corporatedrugtesting.com/cdttest.htm>; Erowid, Drug Testing Basics, at www.erowid.org/psychoactives/testing/testing_info1.shtml; ONDCP, What You Need to Know About Drug Testing in Schools: Developing a Testing Program (September 20, 2002); Wikipedia, Drug Test, last modified 03:19, 11 April 2006. http://en.wikipedia.org/wiki/Drug_test

from aggregate econometric analyses and individual-level “perceptual deterrence” studies are possible: (1) the certainty of punishment has a modest but reliable causal impact on offending rates, even for offenses with very low detection probabilities; (2) the severity of punishment has no reliable effect, either in isolation or in interaction with certainty; (3) the celerity or speed of punishing probably matters a lot, but post-arrest criminal justice sanctioning is more delayed than is likely to be effective, and (4) an arrest can trigger informal social sanctions even in the absence of incarceration.²³

Use testing increases the certainty of sanctioning, and even when it does not lead to arrest, the consequences of a positive test can be quite punitive with respect to one’s employment status and one’s reputation with family, friends, and current and potential employers. Nevertheless, the support for a general deterrent effect of drug testing is mixed.

The available studies are correlational and hence subject to a variety of inferential problems. It is astonishing that such an intrusive intervention is being implemented so widely in the absence of a carefully controlled experiment, with random assignment to testing condition, either at the individual or the site or organizational level.²⁴

On the basis of the special workplace modules, the NHSDA 1994/1997 project argued that “there is evidence that workplace policies matter. Employees in three of the four occupations with the lowest rates of drug use (protective service, extraction and precision production, and administration support) were also among employees in the four occupations with the highest rates of drug information and policies in the workplace.”

²³ See Mark AR Kleiman "Getting Deterrence Right: Applying Tipping Models and Behavioral Economics to the Problems of Crime Control," Perspectives on Crime and Justice: 1998-1999 Lecture Series, National Institute of Justice, Vol. 3 (1999); MacCoun, R. J. (1993). “Drugs And The Law: A Psychological Analysis Of Drug Prohibition,” 113 Psychological Bulletin 497 (1993); Daniel S. Nagin & Greg Pogarsky, “Integrating Celerity, Impulsivity, And Extralegal Sanction Threats Into A Model Of General Deterrence: Theory and Evidence,” 39 Criminology 404 (19xx).

²⁴ This complaint applies more generally to most drug policy interventions, with the exception of classroom prevention programs; see Manski et al.

The US military implemented a tough “zero-tolerance” drug policy in 1981, characterized by mandatory drug testing combined with job termination for violations. Two studies have examined the effects of the policy. Bachman and colleagues used the Monitoring the Future (MTF) cohort data from young adults who graduated from high school in 1976 through 1995.²⁵ They found declining rates of drug use among active duty military personnel and non-military cohort members in the two years after graduation, but beginning in 1981, the rate of decline was steeper for the military group, at least for illicit drugs, a pattern “strongly suggestive of causal relationships.” Mehay and Pacula compared National Household Survey on Drug Abuse (NHSDA) and DoD health survey data before and after the military adopted a zero-tolerance policy involving routine drug testing. They estimated a 16 percent drop in the prevalence of past-year drug use, with a lower bound estimate of a 4 percent drop.²⁶

Lange and colleagues examined the effects of a decision at Johns Hopkins hospital to shift from “for cause” testing in 1989 to universal pre-employment testing of employees in 1991.²⁷ In 1989, 10.8 percent of 593 specimens were positive (55 percent of them for marijuana), and there were seven “walkouts” who refused to be tested. In 1991, 5.8 percent of 365 specimens were positive (28 percent for marijuana), with no walkouts. The authors interpret these results as evidence for a deterrent effect of testing. But Levine and Rennie offer a variety of alternative explanations; e.g., in 1991 users had advanced warning of the test and could abstain, water load, or ingest legal substances that would confound the test.²⁸

²⁵ Jerald G. Bachman, Peter Freedman-Doan, Patrick M. O’Malley, Lloyd D. Johnston, & David R. Segal, *Comparing Drug-Using Behaviors Among High School Graduates Entering Military Service, College, And Civilian Employment*. Monitoring the Future Occasional Paper 42, Institute for Social Research, The University of Michigan (1999).

²⁶ Stephen L. Mehay & Rosalie Liccardo Pacula, *The Effectiveness of Workplace Drug Prevention Policies: Does 'Zero Tolerance' Work?* NBER Working Paper No. W7383 (October 1999). Available at SSRN: <http://ssrn.com/abstract=193791>

²⁷ WR Lange, BR Cabanilla, G Moler, et al., Preemployment drug screening at The Johns Hopkins Hospital, 1989 and 1991. 20 Am J Drug and Alcohol Abuse 35 (1994).

²⁸ MR Levine & WP Rennie, Pre-employment urine drug testing of hospital employees: Future questions and review of current literature, 61 Occup Environ Med 318 (2004).

The most comprehensive analysis of the effects of school testing on student use comes from analyses of data from the Monitoring the Future (MTF) annual survey of high school seniors.²⁹ This analysis found no measurable association between either random or “at cause” drug testing and students’ self reported drug use. The study is cross-sectional rather than prospective, and is somewhat limited by the relative rarity of exposure to testing.

A more focused test was provided by the “pilot test” of the SATURN (Student Athlete Testing Using Random Notification) project.³⁰ During the 1999-2000 academic year, the authors compared two Oregon schools using mandatory drug testing and a comparison school without drug testing. Neither students nor schools were randomly assigned to condition. The authors report a significant treatment effect; though statistical details were not presented the conclusion is apparently based on a difference-in-difference estimate of changes from pre-to-posttest in the control vs. treatment schools. But caution is warranted for several reasons. First, though there was a slight decrease in drug use at the treatment schools (e.g., from .33 to .31 for past-month use), the effect is largely attributable to an increase in drug use at the control schools (e.g., from .34 to .42). Because assignment to condition was not random, there is limited warrant for assuming that a similar increase would have occurred at the treatment schools absent testing. Second, “most drug use risk factors, including norms of use, belief in lower risk of drugs, and poorer attitudes toward the school” actually *increased* among the target group: athletes at the treatment school. These puzzling results may explain why the study was labeled a “pilot test,” and a more ambitious and rigorous followup was launched.

²⁹ An initial study was reported by Ryoko Yamaguchi, Lloyd D. Johnston, & Patrick M. O’Malley, Relationship Between Student Illicit Drug Use and School Drug-Testing Policies, 73 J. School Health 159 (2003). An extended analysis adding the 2002 data is reported by Ryoko Yamaguchi, Lloyd D. Johnston, & Patrick M. O’Malley, Drug Testing in Schools: Policies, Practices, and Association with Student Drug Use, Institute for Social Research, University of Michigan (2003).

³⁰ Linn Goldberg et al., Drug Testing Athletes to Prevent Substance Abuse: Background and Pilot Study Results of the SATURN (Student Athlete Testing Using Random Notification) Study, 32 J. Adol. Health 16 (2003).

Unfortunately, the study was terminated by the federal Office for Human Research Protection due to human protection concerns.³¹

At present, the evidence supports a deterrent effect of the military's testing program, but there is little support for a deterrent effect as assessed by drug use patterns in the workplace or in schools. Still, the absence of evidence is not evidence of absence; there are very few rigorous studies, and low statistical power, noisy measurement, and other factors may hide genuine effects. Alternatively, it may be that the military program is more effective as a deterrent, due to differences in its implementation, its population, consequences for users, or the institutional setting.

Effects on Drug-Related Harm

Proponents of use testing see both use-reduction (“deterrence”) and harm-reduction (“safety”) benefits of testing. In the court, the harm reduction rationale has generally trumped the use reduction rationale. For example, in *Vernonia School District v. Acton* (1995), the majority opinion by Justice Scalia held that “The importance of deterring drug use by all this Nation's schoolchildren cannot be doubted. Moreover, the Policy is directed more narrowly to drug use by athletes, where the risk of physical harm to the user and other players is high.” And the DC Circuit has ruled that random testing is an unreasonable invasion of employee privacy except for safety-sensitive positions.³² Based on its reading of three Supreme Court decisions,³³ the Substance Abuse and Mental Health Services Administration has identified four classes of presumptive testing designated positions “that are to be included in every plan if such positions exist in the

³¹ The authors defend their study against these criticisms in Gary T. Chiodo, Linn Goldberg, & Esther L. Moe, *Orbiting SATURN: Countering Politically-Charged Misinformation with Facts*, 4 *American Journal of Bioethics* 43 (2004).

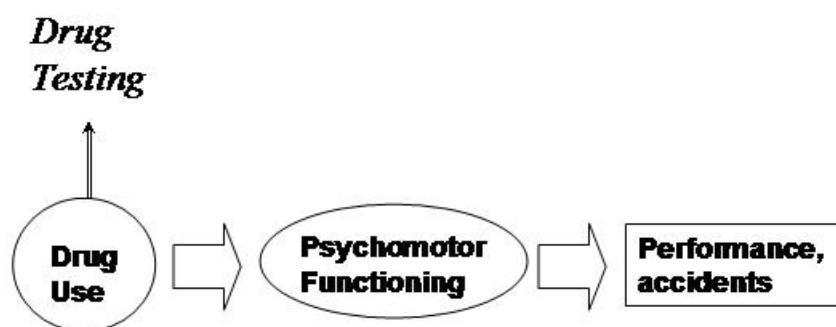
³² *Harmon v. Thornburgh*, 878 F.2d 484 (D.C. Cir. 1989) cert. denied 493 U.S. 1056 (1990).

³³ *Skinner v. Railway Labor Executives' Assn.*, 489 U.S. 602 (1989), *National Treasury Employees Union v. Von Raab*, 489 U.S. 656 (1989), and *Vernonia School District 47J v. Acton*, 515 U.S. 646 (1995).

agency”): Employees who carry firearms, motor vehicle operators carrying passengers, aviation flight crew members and air traffic controllers, and railroad operating crews.³⁴

The National Research Council took a comprehensive look at the evidence for a safety-promoting benefit of drug testing in the workplace. They concluded that the evidence linking alcohol and drug use to workplace accidents was largely inconclusive, partly because both workplace accidents and workplace intoxication were relatively rare events.³⁵ “Despite the wide variety of research in the studies reviewed above, few definitive statements can be made about the impact of using alcohol and other drugs on job performance. The abundance of evidence presented here indicates that the relationship between use and job behaviors is clearly negative. However, the magnitude of the relationships found is generally small, and causal spuriousness and direction are problems that have not been adequately addressed in the literature.”³⁶

The intuition that drug testing might prevent accidents involves an implicit causal chain, from drug use to impaired cognitive/psychomotor functioning to accidents, as illustrated in Figure 1. Drug testing should allow detection of drug use, the earliest link in the chain, and hopefully deter or prevent it.



³⁴ Interagency Coordinating Group (ICG) Executive Committee, Guidance for Selection of Testing Designated Positions (TDP's). Division of Workplace Programs, Substance Abuse and Mental Health Services Administration (August 2, 1999). <http://dwp.samhsa.gov/FedPgms/Files/TDPs.aspx>

³⁵ Normand, Lempert, & O'Brien, 1994, at 144.

³⁶ Normand, Lempert, O'Brien, 1994, at 158.

Figure 1. Simple causal chain linking drug use to drug testing and to accidents.

But the model also makes explicit some of the drawbacks of relying on drug use to prevent accidents. To explain this point, I draw upon the statistical logic of path analysis, first articulated by Sewall Wright in 1934. In a causal chain (e.g., $A \Rightarrow B \Rightarrow C$) where the effect of a variable at one end (A) on the other end (C) is “mediated” by a variable in the middle (B), the distal A-C correlation equal the product of the two intermediate correlations, and will thus be smaller than either one.³⁷ Figure 2 shows graphically the consequences for prediction. The percentage of variance in accident risk due to drug use will drop rapidly with less than perfect correlation in the two intermediate links in the chain. At every point, the psychomotor functioning variable will be a better predictor of accidents than the drug use variable. (The picture is even more bleak because drug tests are an imperfect proxy for drug use.)

³⁷ See Herbert B. Asher, *Causal Modeling* (Sage, 1976); Judea Pearl, *Causality: Models, Reasoning, and Inference* (Cambridge, 2000); John C. Loehlin, *Latent Variable Models* (LEA, 1987); Reuben Baron & David Kenny, *The Moderator-Mediator Variable Distinction in Social Psychology: Conceptual, Strategic, and Statistical Considerations*, 51 *J. Pers. Soc. Psychol.* 1173. The use of path analysis to infer causal structure is problematic because various statistical threats to validity, involving bidirectional association, omitted variables, and measurement error. But my argument is about the actual causal structure among latent constructs, not about the observed relationships among measured indicator variables.

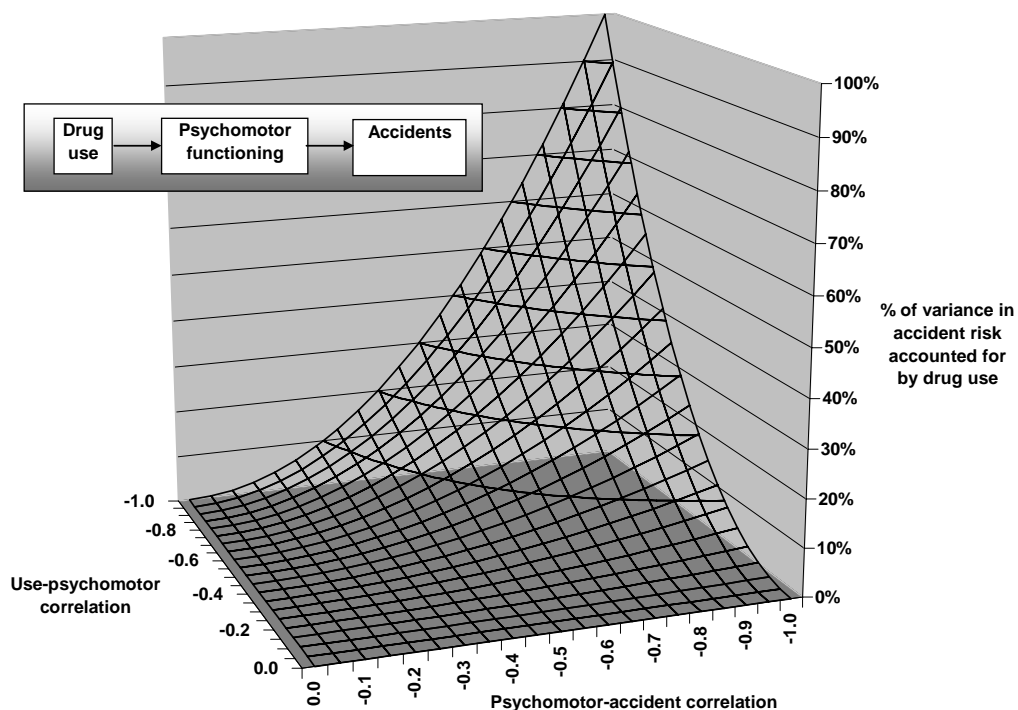


Figure 2. Variance in accident risk accounted for by drug use, if psychomotor functioning mediates the drug-accident relationship

A possible objection to my causal chain model is that drug use might have an additional indirect association with accident risk via some common cause; e.g., poor self-control skills. The NRC committee noted that any observed link between drug use and accidents or work behavior could be spurious, due to common causation by a third variable. Specifically, they hypothesized that “deviance may be a better explanation than impairment of the links between alcohol and other drug use and undesirable work behavior. If so, confronting deviant behaviors and attitudes may be a more effective strategy than narrow antidrug programs for both preventing workplace decrements and treating poorly performing workers.”³⁸

³⁸ Normand, Lempert, O’Brien, 1994, at 133.

From a prediction standpoint, one might argue that drug tests can serve as a double proxy – tapping both drug use *and* low self control. But psychometrically, a far better strategy would be to directly assess low self control *and* psychomotor functioning, as illustrated in Figure 3. Psychologists and ergonomic specialists have developed a wide variety of valid psychomotor tests for use in the laboratory, and many are already in use in the military and other “mission-critical” organizations,³⁹ and the private sector has begun to recognize potential advantages of directly testing impaired psychomotor performance via “performance” or “impairment” tests.⁴⁰ There are a variety of psychometrically reliable and valid measures of impulsivity, sensation seeking, and self control.⁴¹ More controversially, there are paper-and-pencil “integrity tests” that allow corporations to assess drug and alcohol use, honesty, and other behavioral factors.⁴²

³⁹ This literature is reviewed in Ronald K. Knippling et al., *INDIVIDUAL DIFFERENCES AND THE “HIGH-RISK” COMMERCIAL DRIVER*, Transportation Research Board (2004); and in Kennedy RS, Compton DE, Drexler JM, “Application of a computerized battery of mental tests for driving and workplace safety,” *Proceedings of the Int. Council on Alcohol, Drugs, and Traffic Safety* (2000). <http://www.icadts.org/proceedings/2000/icadts2000-149.pdf>

Rebecca S. Spicer, Ted R. Miller and Gordon S. Smith, “Worker substance use, workplace problems and the risk of occupational injury: a matched case-control study,” *64 Journal of Studies on Alcohol* 570 (2003).

⁴⁰ See National Workrights Institute, “Impairment Testing: Does it Work?” (not dated), http://www.workrights.org/issue_drugtest/dt_impairment_testing.html. “Vendors Promote Performance Testing As Better Way to Measure Impairment,” *The National Report on Substance Abuse*, March 12, 1993, p. 4; L. Maltby, “Performance Testing: New Approach to Workplace Drug Abuse,” (SOURCE??). In 1995, only 7 percent of worksites used performance testing; see Tyler D. Hartwell, Paul D. Steele, and Nathaniel F. Rodman, *Workplace Alcohol-Testing Programs: Prevalence and Trends*, *121 Monthly Labor Review* 32 (1998).

⁴¹ See G. S. Acton, “Measurement of Impulsivity in a Hierarchical Model of Personality Traits: Implications for Substance Use,” *38 Substance Use & Misuse* 67 (2003); J. Arnett, “Sensation seeking: a new conceptualization and a new scale,” *16 Personality and individual differences* 289 (1994); P. Horvath & M. Zuckerman, “Sensation seeking, risk appraisal, and risky behavior,” *14 Personality and individual differences* 41 (1993); A. R. Piquero & A.B. Rosay, “The Reliability And Validity Of Grasmick Et Al.'S Self-Control Scale: A Comment On Longshore et al.,” *36 Criminology* 157 (1998).

⁴² See Wayne J. Camara & Dianne L. Schneider, “Integrity tests: Facts and unresolved issues,” *49 American Psychologist* 112 (1994). In a meta-analysis of 650 estimates, integrity tests had validity coefficients of .52 and .41 for predicting job accidents and supervisory ratings of job performance, respectively; see D.S. Ones, C. Viswesvaran, & F. L. Schmidt, “Comprehensive meta-analysis of integrity test validities: Findings and implications,” *78 J. Applied Psychology* (entire monograph) 679 (1993). While integrity test performance can be faked, the resulting bias does not eliminate their usefulness. In one study, the predictive validity of the test was .26 among fakers; see R. D. Pannone, “Predicting test performance: A content valid approach to screening applicants,” *37 Personnel Psychology* 507 (1984). This is lower than the validity for non-fakers (.55), but still higher than typical estimates for the validity of the

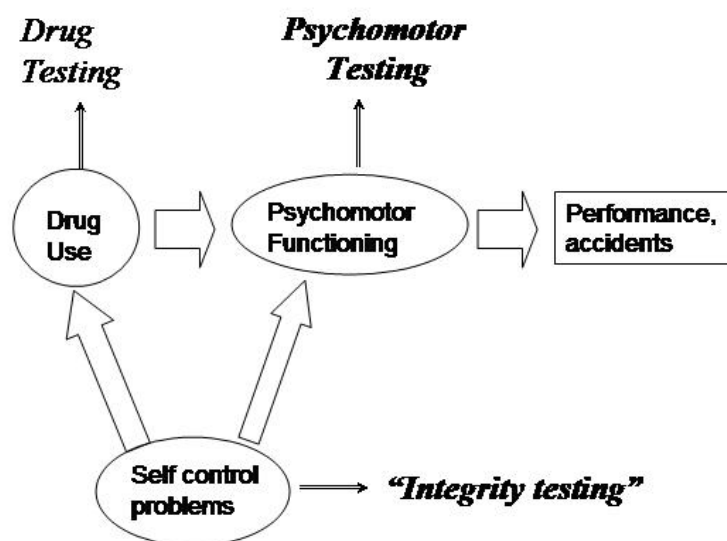


Figure 3. Expanded causal chain.

Psychomotor testing and integrity testing need not replace drug testing; they can complement it. But they may be less intrusive,⁴³ and in the case of psychomotor testing, more diagnostic of accidents. Of course, psychomotor testing will pick up impaired performance due to factors other than drug use – alcohol consumption, age, lack of sleep, depression, and so on. Some, but not all, of these other factors are preventable. Hence, a program of random psychomotor testing may well be an effective deterrent against drug use, but also against alcohol use, sleep deprivation, and other factors that impair safety. At the same time, not everyone who is using a psychoactive drug will show impaired performance on such tests. The NRC notes that “...many employees who do work under the influence may be able to compensate for their impairment, and there is a substantial

most popular screening method: the job interview. Integrity tests also predict drug and alcohol use, with validity coefficients around .30; see Frank L. Schmidt, Vish Viswesvaran, and Deniz S. Ones, “Validity of integrity tests for predicting drug and alcohol abuse: A meta-analysis,” in *Meta-Analysis of Drug Abuse Prevention Programs*, NIDA Research Monograph, Number 170, 69-95 (1997).

⁴³ But one study found that some workers preferred urinalysis testing to personality testing; see Joseph G. Rosse1, Richard C. Ringer, & Janice L. Miller, “Personality and drug testing: An exploration of the perceived fairness of alternatives to urinalysis,” 10 *J. Business and Psychology* 459 (1996).

amount of variation across individuals as to how a specific drug at a given dose affects performance.”⁴⁴

As discussed below, this illustrates the tension between the “criminal deviance” and a “safety regulation” framings of the problem. It also calls into question the relative importance of the stated motives for use testing – deterring drug use and preventing accidents. A preference for drug testing over psychomotor functioning would suggest that use testing is really about drug control rather than safety. Another fact that hints at this idea is that drug testing is more common than alcohol testing,⁴⁵ even though the link between alcohol and accidents is better established than the drug-accident link.⁴⁶ Granted, it may be easier to consume alcohol without intoxication than cannabis or other drugs.⁴⁷ And alcohol is far more prevalent, meaning far more positive tests – though from a safety perspective that isn’t much of an argument at all.

There are also some reasons why use testing may have unintended consequences. Theoretically, use testing could encourage users to substitute less detectable intoxicants. In 1998, twenty percent of worksites tested for illicit drugs but not alcohol.⁴⁸ The most commonly tested-for substances are the so-called “NIDA-5”: Marijuana, cocaine, PCP, opiates, and amphetamines. Thus, one might see a substitution from the NIDA-5 to other illicit substances (e.g., MDMA, barbiturates), and from illicit drugs to alcohol.⁴⁹ I am unaware of

⁴⁴ Normand, Lempert, O’Brien, 1994, p.145.

⁴⁵ “Clearly, drug testing is still more prevalent than alcohol testing. For example, 36 percent of worksites with more than 50 employees conduct alcohol testing for applicants or current employees or both, while the corresponding prevalence for drug testing is 53.7 percent. ...20.2 percent of worksites test for drugs, but do not test for alcohol. ...the prevalence of drug testing for applicants is more than twice that of alcohol testing (45.9 percent, versus 21.7 percent).” Tyler D. Hartwell, Paul D. Steele, and Nathaniel F. Rodman, Workplace Alcohol-Testing Programs: Prevalence and Trends, 121 Monthly Labor Review 30 (1998).

⁴⁶ See Wayne Hall and Rosalie Liccardo Pacula, *Cannabis Use and Dependence* (pp. 40-45). Cambridge University Press (2003)

⁴⁷ On the other hand, some illicit substances (cocaine, amphetamines) in modest doses *improve* psychomotor functioning, as American and other militaries have long known.

⁴⁸ Tyler D. Hartwell, Paul D. Steele, and Nathaniel F. Rodman, Workplace Alcohol-Testing Programs: Prevalence and Trends, 121 Monthly Labor Review 29 (1998).

⁴⁹ Curley, 1994

studies examining such effects of testing,⁵⁰ but substitution effects have been linked to other policies. There is some evidence for substitution from hard drugs to marijuana following marijuana decriminalization,⁵¹ and from alcohol to marijuana following statutory increases in the legal drinking age⁵² and increases in beer prices.⁵³ And as noted earlier, marijuana has the longest duration of detectability in urinalysis testing; one might see a shift toward less readily detectable substances (e.g., MDMA, amphetamines, barbituates).

A related concern is that use testing might drive users away from testing organizations -- workplaces, schools, sports teams, and the military. This might make those organizations safer, but displace the harms to other settings, and use might even escalate in those other settings. Taylor offers a formal model of this mechanism, arguing that random testing of student athletes will have two opposing effects⁵⁴:

“(1) Use will decrease among those inframarginal athletes who continue to participate. (2) Use will likely increase among those marginal athletes who cease to participate. The net effect on overall drug use is ambiguous in sign—overall student drug use may fall or rise after the imposition of testing, and any reduction achieved will likely be smaller than expected. ...Holding overall use fixed, redistributing drug use from low-level users

⁵⁰ One study presents some evidence consistent with a shift from marijuana and cocaine use to increased alcohol use among tested athletes, relative to non-tested athletes, although the authors did not draw such a conclusion, and the design precludes causal inference. See Robert H. Coombs & Frank J. Ryan, Drug Testing Effectiveness in Identifying and Preventing Drug Use. 16 Am. J. Drug Alcohol Abuse 173 (1990).

⁵¹ Model, K. E. (1993). The effect of marijuana decriminalization on hospital emergency room drug episodes: 1975-1978. *Journal of the American Statistical Association*, 88, 737-47.

⁵² Dinardo, J., & Lemieux, T. (1992). Alcohol, marijuana, and American youth: The unintended consequences of government regulation (WD-59220-DPRC). Santa Monica, CA: RAND.

⁵³ Chaloupka, Frank J. and Adit Laixuthai. "Do Youths Substitute Alcohol And Marijuana? Some Econometric Evidence," *Eastern Economic Journal*, 1997, v23(3,Summer), 253-276. "...the results imply that the reduction in accidents resulting from substitution away from alcoholic beverages and other intoxicating substances to marijuana as its full price is lower more than offsets the increase in accidents related to marijuana use."

⁵⁴ Robert Taylor, *Compensating Behavior and the Drug Testing of High School Athletes*, 16 *Cato Journal* (Winter 1997).

to high-level users may be considered undesirable, especially if the negative health effects are very small for low-level use but extremely large for high-level use.”

A similar argument is suggested by the labeling theory tradition in criminology.⁵⁵ Labeling theory predicts that legal controls can actually enhance the likelihood of future offending if the stigma associated with criminal sanctioning alienates the individual from conventional society, encourages contact with criminally involved referent groups, and weakens the reputational costs that may restrain deviance—creating a self-fulfilling prophecy.

Several lines of evidence speak to this prediction but the results are not conclusive. Neither Mehay and Pacula nor Bachman et al. found any evidence linking past drug use to self-selection into the military.⁵⁶ On the other hand, using the 1994 NHSDA survey, Hoffman and Lavison (1999) found that those using marijuana or cocaine at least weekly were more likely to work for companies that had no testing program.⁵⁷ And the NHSDA 1994/1997 workplace analysis suggested that current users were more likely than non-users to say they might avoid working for an employer who conducts pre-employment screening (22% vs. 4%), random drug testing (29% vs. 6%), or testing on suspicion (24% vs. 10%).⁵⁸

⁵⁵ Braithwaite, J. (1989). *Crime, shame, and reintegration*. Cambridge, England: Cambridge University Press.

⁵⁶ Mehay and Pacula (1999); Bachman et al. (1999).

⁵⁷ Hoffman and Lavison (1999).

⁵⁸ *Worker Drug Use and Workplace Policies and Programs: Results from the 1994 and 1997 National Household Survey on Drug Abuse*. <http://www.oas.samhsa.gov/NHSDA/A-11/TOC.htm#TopOfPage>

Safety Testing

Prevalence of Testing

The Seventies. Even in its heyday, safety testing of illicit drugs was extremely rare. Between roughly 1972 and 1984, there were quite a few independent local labs, run by universities, non-profits, health centers, and so on.⁵⁹ These labs tested anonymous samples dropped off at street locations or sent in via mail; the samples involved a wide variety of alleged substances, including cannabis products, amphetamines, barbituates, opiates, and various psychedelics. Although they were located in communities around the country, relatively few communities had such a center, and utilization of the national services was sparse. For example, PharmChem's national testing program – the largest in the 1970s -- analyzed a total of 10,778 samples alleged to be cocaine between 1973 and 1983.⁶⁰ In 1982, PharmChem's busiest year of cocaine testing, they received 1,385 samples. But there were at least 3 million U.S. cocaine users in 1973, and at least 12 million in 1983.⁶¹ Under the most optimistic assumption that each sample came from a different user, only 0.012 percent of all users participated in their testing. Even if PharmChem only accounted for 1 percent of the national market for street testing (almost certainly far below their actual share), that would still only imply that only 1 percent of all users had samples tested that year.

The Rave Era. The picture is similar for the second era in the late 1990s and early 2000s. DanceSafe.org – the major source of samples for the EcstasyData.org testing operation -- currently lists chapters in Atlanta, Baltimore/DC, Calgary, Detroit, Los Angeles, Madison, New York City, Northern New Mexico, Phoenix, Sacramento, Salt Lake City, San Francisco-Oakland Bay Area, Seattle, Southern Illinois University, and

⁵⁹ See John K. Brown & Marvin H. Malone, "Some U.S. Street Drug Identification Programs," NS13 J. American Pharmaceutical Association 670 (1973); Edward R. Kealy & Randall Webber, "An Interpretation of Trends in Street Drug Analysis Programs: Whom Do They Serve?," 7 J. Psychoactive Drugs 281 (1975).

⁶⁰ Renfroe & Messinger, 1985, Table1.

⁶¹ Susan S. Everingham and C. Peter Rydell, *Modeling the Demand for Cocaine* (RAND, 1994).

St. Louis.⁶² The EcstasyData.org operation only tested 1503 samples alleged to be MDMA between 1996 and 2006.⁶³ To put this in perspective, in 2001 an estimated 3.2 million Americans used Ecstasy at least once⁶⁴ – 1.7 million of them for the first time.⁶⁵ But in that year DanceSafe only tested 332 samples – again, accounting for at most 0.01 percent of users, and this time their operation nearly cornered the market.

At present, use testing is far more common than safety testing. While safety testing may have an important impact on the lives of those who submit samples, they account for only a negligible fraction of users. Thus, any aggregate impact of safety testing would necessarily be due to its more diffuse effects via its test-data reporting and the behavior of rave organizers and harm reduction activists.

The low prevalence of safety testing is not difficult to explain. The legal risk to participants is the most obvious factor,⁶⁶ but there are others. Volunteering a useable sample means giving away a valuable commodity. And the test results, once publicized, are a public good, and hence subject to free riding by non-participants. Another

⁶² <http://www.dancesafe.org/localchapters.php>

⁶³ EcstasyData.org

⁶⁴ SAMHSA, Office of Applied Studies, *National Household Survey on Drug Abuse, 2000 and 2001*, Table 1.1A.

⁶⁵ SAMHSA, Office of Applied Studies, *National Household Survey on Drug Abuse, 2002, 2003, and 2004*, Table 4.8A.

⁶⁶ I have found surprisingly little discussion of the legal status of anonymous testing. By definition, the samples are illegal, and I presume that only those labs with a specific DEA license to handle illicit drugs may do so without legal risk. A Frequently Asked Question (“FAQ”) at a website discussion of Ecstasy test kits is: “Are the kits legal? There is some question as to the legal status of testing kits in the U.S. Many states include wording in their paraphernalia laws which include anything which “identify, analyze, or test” scheduled substances. This wording is not included in the federal paraphernalia laws. Arguably, the ecstasy testing kits do not fit within this category as they only verifiably test for the absence of MDMA or other controlled substances. (i.e. if a sample does not turn a color, we can be reasonably sure that there is no MDMA present, however if the sample turns black it could mean that MDMA is present or it could indicate the presence of another completely unrelated substance). These kits have been widely available for over a year and we have heard of no legal problems either with their sale or possession. We know this isn't a very satisfactory answer, but the U.S. legal system is often confusing on points like this. As a general rule, if people aren't being prosecuted for it, it's unlikely that you will be. Because it's not federally illegal, importation should not cause any legal problems, but many people choose to avoid having to deal with customs by order from a vendor on their own continent. We do not currently have any information about the legality of testing kits in countries other than the United States. http://www.erowid.org/chemicals/mdma/mdma_faq_testing_kits.shtml

consideration is the high cost. Most of the 1970s testing programs appear to have collapsed due to loss of funding rather than legal intervention, and few users can or will pay the high cost of screening.⁶⁷

Testing Results

The Seventies. Table 2 shows variations in the purity of amphetamine and cocaine samples at several different testing centers circa 1973 to 1983. The results cover different time spans and different geographic locations, so the lack of convergence is not meant to indict the reliability of the estimates. But it does suggest that over this time span, street drug buyers were extremely vulnerable to fraudulent sales. For three of five laboratories, a majority of samples alleged to be amphetamines contained adulterants; in two sites, a half to two thirds contained *only* substances other than amphetamines. For cocaine, the quality was more predictable, but in the three labs for which data are available, at least a third of cocaine samples were adulterated, and around one in five contained no cocaine at all.

⁶⁷ The EcstasyData web page currently announces: “Ecstasy Testing Project Currently Out Of Funds (Aug 1, 2005). The Ecstasy Testing Program has run out of funds. Testing costs \$1,700 per month in laboratory fees for 15 pills / month with a \$30 co-pay. If you would like to pay for the entire lab cost for the pill (\$115 USD), you can have your pill tested.” <http://www.ecstasydata.org/>

Table 2. Percent of amphetamine and cocaine samples that were adulterated, various laboratories, circa 1973-1983.⁶⁸

PROGRAM	Amphetamine				Cocaine			
	#	Same as alleged	Alleged + adulterants	Adulterants only	#	Same as alleged	Alleged + adulterants	Adulterants only
Analysis Anonymous (PharmChem), 1973 - 1983	2018	12%	21%	67%				
LA County Street Drug Identification Program, 1971 - 1980	473	27%	23%	50%	614	58%	23%	19%
Univ of the Pacific, early 1970s	68	54%	18%	28%	27	67%	19%	15%
LAC-USC Med Ctr, early 1970s	123	18%	45%	37%	100	57%	23%	20%
Metro Drug Awareness, early 1970s	46	72%	4%	24%				

Table 3 shows data from the national testing program of PharmChem's Analysis Anonymous® for 1973 to 1983. The likelihood of adulteration varied considerably across years. This partly reflects small year-by-drug sample sizes, and may also be influenced by variations in geographic locations of the samples. But the data do suggest that cocaine and MDMA were less likely than the amphetamines and methamphetamine to be adulterated with other drugs. But unadulterated samples never exceeded 80 percent (60 percent across the full period), and in only one year (1983) could users have a better than even chance of buying cocaine without any sugar added.

⁶⁸ JK Brown & MH Malone, Status of Drug Quality in the Street-Drug Market--An Update, 9 Clin Toxicol. 145 (1976). Charles L. Renfro and T.A. Messinger, Street Drug Analysis: An Eleven Year Perspective on Illicit Drug Alteration, 1 Seminars in Adolescent Medicine 247 (1985).

Table 3. Percent of unadulterated samples in Analysis Anonymous® tests, 1973-1983.⁶⁹

	Amphet- amine	Metham- phetamine	Cocaine	Cocaine (no sugar)	MDMA
1973	48%	40%	70%		
1974	25%	33%	63%	25%	
1975	6%	36%	63%	5%	0%
1976	8%	51%	56%	12%	100%
1977	9%	38%	55%	28%	20%
1978	6%	32%	56%	25%	17%
1979	7%	30%	48%	25%	58%
1980	1%	12%	47%	30%	25%
1981	5%	25%	53%	36%	78%
1982	18%	22%	54%	38%	93%
1983	6%	37%	77%	61%	57%
1984	0%	78%	80%		100%
1985	0%	63%	59%		52%
Averages	11%	38%	60%	29%	55%

The Rave Era. Figure 4 plots trends in MDMA samples collected by DanceSafe and other organizations and tested by EcstasyData.org. Over this period (1999 to 2005), sample sizes ranged from 69 to 333. A fairly constant 40 to 50 percent of the samples contained no MDMA – most commonly some other stimulant (30 percent), some ecstasy-like near-analogue of MDMA (15 percent), or a dissociative drug (12 percent). The rate of pure MDMA dropped from around 50 percent in 1999-2001 to a low near 10 percent in 2004, as an increasing number of samples contained MDMA plus adulterants. In 2005, samples containing pure MDMA, adulterated MDMA, and no MDMA were all about equally likely.

⁶⁹ Charles Renfro, MDMA on the Street: Analysis Anonymous®, 18 J. Psychoactive Drugs 363 (1986).

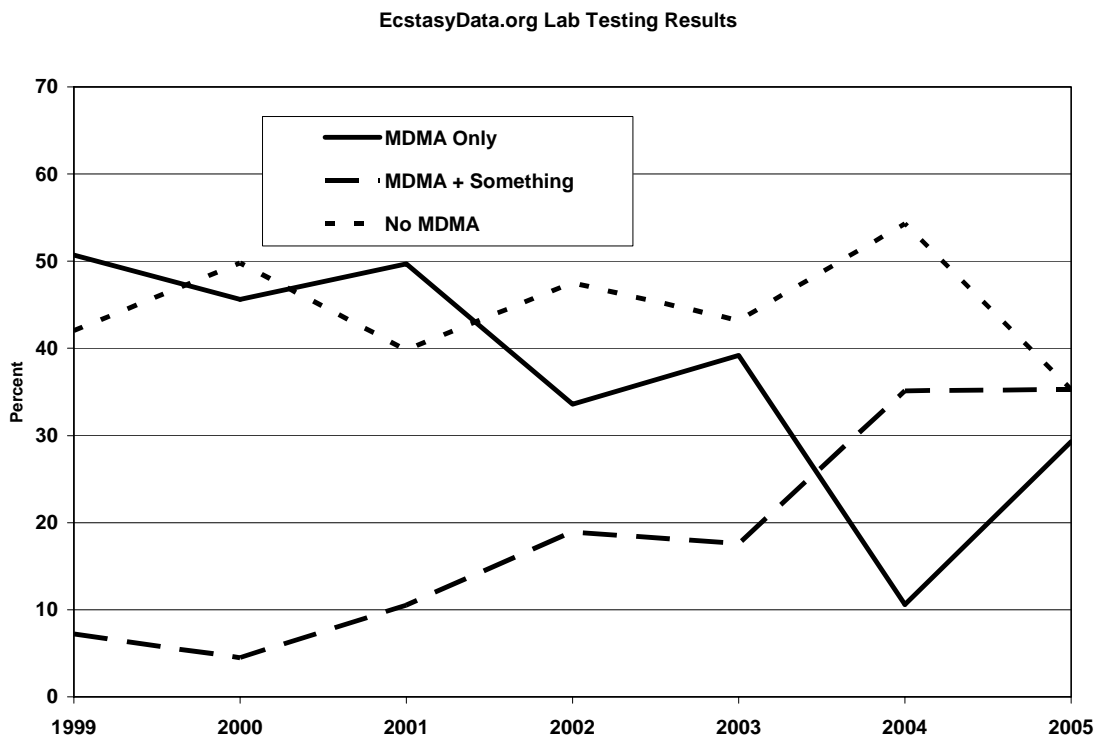


Figure 4. EcstasyData.org lab results 1999 to 2005

A more systematic analysis of 107 Ecstasy street samples circa 2000 was reported by Baggott and colleagues in the *Journal of the American Medical Association*.⁷⁰ They found that 29 percent “contained identifiable drugs but no MDMA or an analogue.” Twenty three pills contained the antitussive dextromethorphan (DXM), which can be dangerous in high doses or in combination with MDMA. Other pills contained caffeine, ephedrine, pseudoephedrine, and salicylates; nine contained no drugs at all.⁷¹

⁷⁰ M. Baggott, B. Heifets, R.T. Jones, J. Mendelson, #. Sferios, J. Zehnder, *Chemical Analysis of Ecstasy Pills* (Research Letter), 284 *J. Am. Med. Assoc.* 2190 (2000).

⁷¹ A recent literature review by Parrott paints a different picture, arguing that “non-MDMA tablets are now very infrequent, with purity levels between 90% and 100%” and that “the ecstasy purity problem was predominantly a phenomenon of the mid to late 1990s, when many tablets contained substances other than MDMA.” See A. C. Parrott, *Is Ecstasy MDMA? A Review of the Proportion of Ecstasy Tablets Containing MDMA, Their Dosage Levels, and the Changing Perceptions of Purity*, 173 *Psychopharmacology* 234 (2004). But most of Parrott’s data come from European and Australian sources, where the higher purity rates may be attributable to less vigorous law enforcement.

There are two reasons to expect *any given test result* to be far more accurate for safety testing than for use testing. First, with safety testing, samples come from *intended users*, and the providers *label* what the sample is alleged to be (“MDMA,” etc.). Thus there is no risk of falsely identifying a person as a user, and the tester has a more focused idea of what to look for. Second, use testing is necessarily distorted by the fact that the samples *come from the body*, and thus (as noted above) vulnerable to contaminants, water loading, and other factors.

At an *aggregate* level, test results would seem to be less accurate for safety testing than for use testing, at least for random use testing. Because safety testing is voluntary, there is no coercion or threat to civil liberty, but the samples are also unlikely to be statistically representative. The direction of any selection bias is hard to identify: safety testing volunteers may be more cautious, more wealthy, and/or better educated, but at the same time, safety testing samples may disproportionately represent the results of “suspicious” transactions and dealers. Still, tests of drugs seized by law enforcement agents often show high levels of impurity, despite a very different set of sampling biases.⁷²

The remarkably low and variable purity rates in the SF data have implications for the interpretation of use testing data, as well other sources of drug indicator data. Typically, use testing testing tests for a specific set of illicit drugs (the NIDA-5) and does not test for or attempt to identify adulterants. Because the samples are not volunteered *as drugs*, and labeled with street names, use testing samples may test negative even when the source was using street drugs. As noted above, such false negatives will occur due to non-tested street drugs, or because of the critical sampling periods of the target drugs. But the safety testing data suggest that false negatives will also occur because tested individuals who were trying to use a NIDA-5 drug unwittingly used something else. On the other hand, the Drug Abuse Warning Network (DAWN) annual series, which records

⁷² Seized samples of heroin and cocaine base in the DEA’s STRIDE database are typically at or below 50 percent purity. J. Horowitz, “Should the DEA’s Stride Data Be Used for Economic Analyses of Markets for Illegal Drugs?,” 96 Journal of the American Statistical Association 1254 (2001).

emergency room drug mentions, may overstate the link between the “mentioned” drugs and acute health crises, because someone who mentions, say, methamphetamine may have consumed something entirely different.

Effects on Drug Use

To date, I have not been able to locate any empirical study of the effects of safety testing on levels of drug use. This is hardly surprising; safety testing has always been rare and research on safety testing is even rarer; so far as I can tell, the entire published literature fits on my desk. Moreover, safety testing is not intended to influence the prevalence of drug use per se; it is intended to prevent harmful consequences and make users more cautious about their behavior.

Still, there are good reasons to consider the question. From a hawkish perspective, one may reasonably ask whether safety testing encourage drug use, either wittingly or unwittingly. Put another way, does safety testing “send the wrong message”? I have analyzed this phrase elsewhere, suggesting two plausible interpretations.⁷³

One is a rhetorical mechanism; a harm reduction intervention may encourage use by implying (or being interpreted as saying) that drug use is acceptable or even desirable. What messages does safety testing communicate? DanceSafe’s statement of purpose describes its goal as harm reduction – protecting the health and safety of “non-addicted, recreational drug users”:

DanceSafe is a nonprofit, harm reduction organization promoting health and safety within the rave and nightclub community. ...Our volunteers staff harm reduction booths at raves, nightclubs and other dance events where they provide information on drugs, safer sex, and other health and safety issues concerning the electronic dance community (like driving

⁷³ MacCoun, R. (1998). Toward a psychology of harm reduction. *American Psychologist*, 53, 1199-1208. MacCoun, R., & Reuter, P. (2001). *Drug war heresies: Learning from other vices, times, and places*. Cambridge University Press. MacCoun, R. J. (2004). Anticipating unintended consequences of vaccine-like immunotherapies for addictive drug use. In H. R. Harwood & T. G. Myers (eds.), *New treatments for addiction: Behavioral, ethical, legal, and social questions*. National Research Council and the Institute of Medicine. Washington, D.C.: National Academy Press.

home safely and protecting one's hearing). We also provide adulterant screening or pill testing services for ecstasy users. Pill testing is an important harm reduction service that saves lives and reduces medical emergencies by helping ecstasy users avoid fake and adulterated tablets that often contain substances far more dangerous than real ecstasy. Our information and services are directed primarily towards non-addicted, recreational drug users. Non-addicted drug users are an under-served population within the harm reduction movement, despite the fact that they comprise the vast majority of drug users in our society. While many organizations exist that provide services to drug-dependent individuals, few groups address the needs of the majority of non-addicted, recreational users. We hope to fill this gap. When needed, we will always refer people to appropriate treatment programs.

<http://dancesafe.org/documents/about/index.php>

They also provide a disclaimer:

Disclaimer: This website provides health and safety information only. We neither condemn nor condone the use of any drug. Rather, we recognize that recreational drug use is a permanent part of our society, and that there will always be people who use drugs, despite prohibition. The drug information we provide, therefore, is meant to assist users in making informed decisions about their use. We do not make the claim, nor do we imply, that the use of any drug can ever be completely safe. All drug use contains inherent risks. We assume no responsibility for how the information on this site is used.

I have not conducted a systematic content analysis of the DanceSafe and related harm reduction web sites. But in my casual perusing, I have not identified anything that might be characterized as an overt endorsement of drug use. The web site www.googlism.com makes it possible to scan the web and see what others say about DanceSafe (try http://www.googlism.com/what_is/d/dancesafe/). I found 66 “DanceSafe is...” statements; only one raised a red flag: “DanceSafe is controversial...” This turned out to be a favorable review from the DisasterLinks.com web site, which provides and evaluates web information on natural and man-made hazards and disasters.⁷⁴ But it is

⁷⁴ “DanceSafe is controversial because in their promotion of safe drug use, they will test pills for kids at raves to make sure they are what the kids think they are. Then they give the pills back to the kids. ... Regardless of whether you think their mission is helpful or harmful, we did find a very interesting educational slideshow called "This is your brain on Ecstasy" <http://www.dancesafe.org/slideshow/> on the DanceSafe.org website. ... While we can't verify its accuracy, it looked pretty good. We found it very informative and recommend viewing it if you'd like to know more about just what this drug is. We found

possible that consumers infer tacit messages from DanceSafe and related organizations. Psycholinguistic theory and research do suggest that people readily draw additional inferences that are pragmatically implied by an actor's conduct, regardless of whether those inferences were intended, or even endorsed, by the actor.⁷⁵ The very way that test results are implicitly framed suggests that safety testing treats drug use in a less stigmatizing way than does use testing. In safety testing, a positive test is pure, and a negative test denotes failure and contamination. In use testing, it is the positive test that connotes failure; the user is the contaminant.

The second mechanism is indirect, via perceptions of risk. At the margin, a harm reduction mechanism might change users' and potential users' assessments of the expected value of taking drugs. If an intervention reduces harm, then at the margin it should increase the attractiveness of the activity for all but the most risk-loving people. In my earlier treatment of this topic, I have reviewed evidence for this mechanism, much of it appearing under the labels "compensatory behavior response," "offsetting effects," or "risk homeostatis." For example, there is good evidence that people drive faster when they have seat belts and airbags (in econometric analyses but also in controlled experiments on driving test tracks). People smoke more when they have filters and low-tar cigarettes. And there is some evidence that improved HIV treatments are associated with increases in risky sexual behavior.

How might safety testing have such effects? Conceivably, users who were worried about drug quality in the illicit market may become less worried if they learn, via safety testing, that drugs are generally safe in the local market. For better or worse, the purity rates presented below suggest little cause for this concern. A somewhat different concern is that the presence of a safety testing organization, like DanceSafe, might make people feel more comfortable about using MDMA. One survey has examined this

out for instance that because Ecstasy speeds up the release of serotonin in the brain and it can take your body a couple of weeks to rebuild the serotonin, you can't just take more and more Ecstasy to keep feeling good, your body hasn't had time to rebuild the serotonin. Also, the "down" from Ecstasy looks to us to be quite a dangerous state in that the kids can become very depressed."
<http://www.disasterlinks.com/SafetyBitsJuly2001.htm>

⁷⁵ Cite Harris & Monaco, 1978; Wyer & Gruenfeld, 1995

possibility.⁷⁶ Seven hundred and nineteen students at McDaniel College in Maryland were asked whether they had ever used Ecstasy, and whether their decision to use would be affected by whether “I were sure of what I was actually ingesting and knew that an organization of knowledgeable volunteers [DanceSafe] was present.” Among the 75 percent who had never used, most (69 percent) said they wouldn’t use under any condition, 19 percent said they might be more likely to use under such conditions, and 12 percent said if they did decide to use they wouldn’t be influenced by the presence of DanceSafe. Past ecstasy users were equally divided between those who thought they might be influenced (51 percent) and those who did not (49 percent).⁷⁷

But there are also reasons to think that safety testing, with its historically dire purity statistics, might scare off some drug use. At the very least, some fraction of participants who submit samples that turn out “dirty” presumably quit using, scale back their use, or at least delay their use while seeking better samples. And to the extent that other, non-participating, potential users see these statistics, the deterrent effect might be much broader than the limited participation rates would indicate.

Do current and potential users consider health risks (and the risk of being ripped off) when they consider drug use? The health risks of illicit drugs have long been a major focus of prevention campaigns, and various studies show that current users monitor, and worry about, the potential health risks of their use.⁷⁸ One such study reported that users and non-users of MDMA frequently relied on the internet for information about MDMA (about 50 percent of each group).⁷⁹ Users were more likely to

⁷⁶ Lauren Dundes, *DanceSafe and Ecstasy: Protection or Promotion?* 17 J. Health & Social Policy 19 (2003).

⁷⁷ These results should be interpreted cautiously, not only because of the limited sample coverage, but because people are not accurate judges of how they will behave in a hypothetical situation. See Richard Nisbett & Timothy Wilson, “Telling more than we know: Verbal reports on mental processes. 84 Psychological Review 231 (1977).

⁷⁸ E.g., Robert G. Carlson et al., *Perceived Adverse Consequences Associated with MDMA/Ecstasy Use Among Young Polydrug Users in Ohio*, 15 Int. J. Drug Policy 265 (2004).

⁷⁹ Russel S. Falck, Robert G. Carlson, Jichaun Wang, & Harvey A. Siegal, *Sources of Information about MDMA (3,4-methylenediodymethamphetamine): Perceived Accuracy, Importance, and Implications for Prevention Among Young Adult Users*, 74 Drug and Alcohol Dependence 45 (2004).

seek out information from non-government sites (a quarter of all users) than from government sites (less than 10 percent of users), and the non-governmental sources were perceived to be more accurate (58 very or mostly accurate) than the governmental sources (36 percent very or mostly accurate).

I make no claim that health fears matter more than legal fears. It is surprisingly difficult to find surveys comparing the relative importance of fear of legal risk and fear of health risk. The Monitoring the Future annual high school survey conflates the two dimensions by asking “How much do you think people risk harming themselves (physically or in other ways) if they...” (try marijuana once or twice, smoke marijuana occasionally, etc.). In the very large literatures on drug prevention and on the application of attitudinal theories (the theories of reasoned action, planned behavior, and the health belief model) to drug use, there is almost no research directly reporting perceived fear or risk of arrest or other legal sanctions.⁸⁰ On the other hand, the smaller “perceptual deterrence” literature assesses perceived legal risk (mostly for marijuana rather than other drugs), but does not examine health beliefs.⁸¹ But a few studies do suggest that health concerns are at least as important as legal risks. An Australian survey by Weatherburn and Jones found that those not using cannabis were more likely to cite “worried about your health” (41 percent) than “cannabis is illegal” (29 percent), “you are afraid you will be caught by the police” (10 percent), or “you have drug testing in your workplace” (12 percent).⁸² And the aforementioned McDaniel College survey, which suggested that

⁸⁰ Two prominent examples of this approach are Bachman, J. G., Johnston, L. D., & O'Malley, P. M. (1998). Explaining recent increases in students' marijuana use: Impacts of perceived risks and disapproval, 1976 through 1996. *American Journal of Public Health*, 88, 887-892.; J. David Hawkins, Richard F. Catalano, & Janet Miller, “Risk and protective factors for alcohol and other drug problems in adolescence and early adulthood: Implications for substance abuse prevention,” 112 *Psychological Bulletin* 64 (1992).

⁸¹ MacCoun, R. (1993). *Drugs and the law: A psychological analysis of drug prohibition.* *Psychological Bulletin*, 113, 497-512. Paternoster, R. (1987). The deterrent effect of the perceived certainty and severity of punishment: A review of the evidence and issues. *Justice Quarterly*, 4, 173-217.

⁸² Don Weatherburn and Craig Jones, *Does Prohibition Deter Cannabis Use?* Bureau of Crime Statistics and Research, Number 58, New South Wales, Australia (2001). This survey was conducted in New South Wales; a state that retains marijuana criminalization at a time when several other Australian states have decriminalized possession. But enforcement is still more lax there than in the US.

people might be influenced by DanceSafe, found that both users and nonusers worried more about the purity of ecstasy than about legal sanctions (Figure 6).⁸³

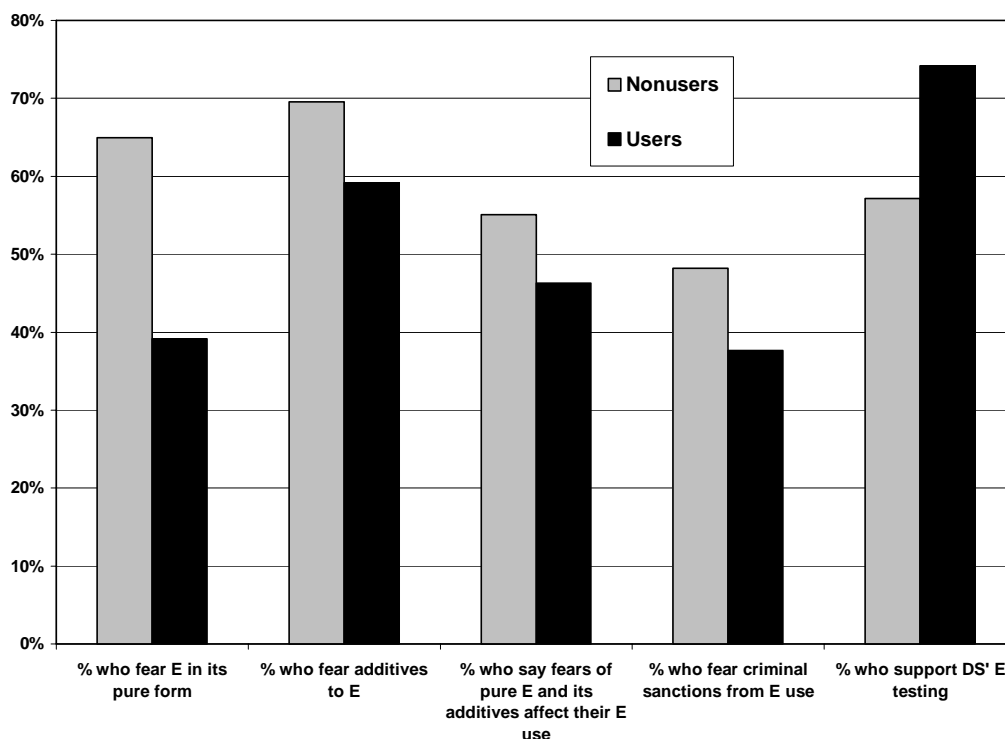


Figure 6. Survey of college students by Dundes (2003). E = Ecstasy (MDMA); DS = DanceSafe. I calculated these plotted percentages from data organized differently in her Tables 3 and 4.

Effects on Drug-Related Harm

Surprisingly, I can find no direct evidence on the harm reducing benefits of anonymous safety testing. It is reasonable to assume that those who voluntarily submit samples care about the results, and that the testing allows them to avoid ingesting adulterants – many of them quite dangerous or addictive. If so, we can say that the

⁸³ Calculated from data in Dundes (2003). By my calculation, both factors were significantly associated with drug use, with $\chi^2(1) = 4.11$ ($p < .05$) and 5.95 ($p < .02$), respectively.

aggregate direct impact is small (due to the rarity of the tests), but that the impact on the participants is quite valuable.

But a broader harm reduction benefit occurs through the testing messages posted by safety testing organizations. These messages can be quite specific. For example, DanceSafe and EcstasyData.org post photographs of contaminated or adulterated “brands” of MDMA, together with the date and geographic region of the purchase (Figure 7). I have already reviewed evidence that a sizeable fraction of MDMA users say they read such information on the web, that they view the information as credible, and that health and safety of drug use does matter to them. So it is possible that for every anonymous sample provider who is helped, there are many more potential users who are also helped. But again, I am not aware of direct evidence on harms averted by safety testing.



Image	Pill Name	Size (mm) Weight (mg)	Location Date Received	Contents	Marquis Reaction
	Miracle	8.0 x 3.0 237mg	Cincinnati, OH May, 2004	Caffeine (83.3%) MDMA (16.7%)	Black / Purple
	Smiley	8.0 x 4.0 215mg	Houston, TX May, 2004	Caffeine (66.7%) Methamphetamine (16.7%) MDMA (16.7%)	Black / Purple
	Honda	7.0 x 4.0 178mg	Memphis, TN May, 2004	MDMA (100.0%)	Black / Purple
	Riddler	10.0 x 4.0 324mg	Los Angeles, CA May, 2004	Unidentified (100.0%)	No Reaction
	Cupid	8.0 x 5.0 273mg	Memphis, TN May, 2004	Caffeine (61.5%) Pseudo/Ephedrine (7.7%) MDMA (30.8%)	Black / Purple
	Nemo	8.0 x 4.0 202mg	Memphis, SD May, 2004	Pseudo/Ephedrine (16.7%) MDMA (83.3%)	Black / Purple

Figure 7. Variance in accident risk accounted for by drug use, if psychomotor functioning mediates the drug-accident relationship

As with use testing, there may be other, less direct, consequences, some of which are undesirable. There may be a substitution from one type of drug to another; e.g., users may come to distrust MDMA and seek out other substances. Some of those substances are arguably more benign (e.g., psilocibin); others may be more health-threatening (e.g., alcohol, methamphetamine).

In theory, widespread safety testing could improve the quality of illicit drugs in the marketplace. This would provide a stark illustration of the tension between harm reduction and use reduction, because better drug quality should increase demand. But higher quality drugs should also cost more, offsetting this increase somewhat.

It is hard to make firm predictions here. In an ordinary market, sellers should charge more for higher quality goods, and buyers should be willing to pay more. In the long run, sellers of low quality (or at the limit, fraudulent) goods can expect to lose customers to sellers offering higher quality at the same price. But illicit drugs are not an ordinary market. Caulkins and Padman found that (log) prices rose with (log) purity for white and brown heroin and powder cocaine, but surprisingly, they were unable to detect an effect of purity on prices of a given quantity of crack, methamphetamine, or black tar heroin.⁸⁴ To help explain this puzzle, Reuter and Caulkins detail a number of distinctive features of illicit drug markets, including the multi-stage distribution networks connecting producers and consumers, uncertainty about quality (purity), turn-over of buyers and sellers, and a limited ability to signal quality through consistent branding.⁸⁵ Many of these features produce the kind of informational problems discussed in

⁸⁴ Caulkins, J. P., and R. Padman. "Quantity Discounts and Quality Premia for Illicit Drugs." *Journal of the American Statistical Association*, 88(423), 1993, 748–57.

⁸⁵ Peter Reuter and Jonathan Caulkins, "Illegal Lemons: Price Dispersion in Cocaine and Heroin Markets", *Bulletin on Narcotics*, Volume LVI, Nos. 1 and 2, 2004, pp. 141-165.

Akerlof’s classic paper on “the market for lemons.”⁸⁶ A lemons market – named after cars bought used that are only later discovered to be faulty – occurs when there is an informational asymmetry such that sellers know more than buyers about a good’s quality. This asymmetry increases the supply of low quality goods, or even the collapse of the market if potential buyers refuse to make new purchases. One major difference from the classic lemons model is the higher likelihood of repeat buyer-seller transactions. But in drug markets, the retail seller also has imperfect knowledge of and control over quantity.

From a use-reduction standpoint, the highly variable quality of drugs at any given price probably reduces the demand for illicit drugs. But from a harm-reduction standpoint, this feature of illicit markets is quite troubling. First, it creates a high risk of overdose and illness, because of the toxic effect of adulterants but also because customers have difficulty calibrating their dosage. And second, it encourages disputing between sellers and buyers, and given the illicit nature of their transaction, these disputes cannot be taken to legal authorities and frequently result in violence.⁸⁷

CONCLUSIONS

In various laboratories throughout the United States, technicians in white lab coats are scanning samples with gas chromatography/mass spectrometry equipment. Some of these samples have not yet entered a human body; others come from a body’s hair, blood, or urine. The laboratory protocols are similar, but they are embedded in very different ways of thinking about the control of drug-related harms. Yet both are shaped – and in some ways distorted – by the criminal law and its “criminal deviance” framing of the act of drug use.

⁸⁶ George A. Akerlof, 1970, “The Market for ‘Lemons’: Quality Uncertainty and the Market Mechanism”, *Quarterly Journal of Economics*, , Vol 84, pp. 488-500.

⁸⁷ For a review of evidence, see Robert MacCoun, Beau Kilmer, & Peter Reuter, “Research on drug-crime linkages: The next generation (commissioned paper),” In *Toward a Drugs And Crime Research Agenda For The 21st Century*, National Institute of Justice Special Report (2003). For a theoretical analysis, see Jonathan P. Caulkins, Peter Reuter, and Lowell J. Taylor, "Can Supply Restrictions Lower Price? Violence, Drug Dealing and Positional Advantage," *Contributions to Economic Analysis & Policy*, Vol 5(1), 2006.

Though it still receives heavy criticism,⁸⁸ use testing has a far less malevolent public image than it did in 1972, when an essay in the *New England Journal of Medicine* called it “Chemical McCarthyism.”⁸⁹ Today, opinion surveys show that most citizens are generally accepting of drug testing, at least if it is done fairly,⁹⁰ and it continues to spread into more and more schools and workplaces. Use testing advocates try hard to avoid the undesirable connotations of the criminal deviance framing. In his 2004 State of the Union address, George W. Bush stated “tonight I proposed an additional \$23 million for schools that want to use drug testing as a tool to save children's lives. The aim here is not to punish children, but to send them this message: We love you, and we don't want to lose you.”⁹¹ Similarly, a website run by Robert DuPont’s Institute for Behavioral Health (www.preventionnotpunishment.org) states that “student drug testing programs are designed to prevent drug use, not to punish use.”

Still, it seems clear that the criminal law and its criminal deviance framing shape the way use testing has spread and the way it frames thinking about the drug problem. Operating in the shadow of the criminal law, use testing has been able to overcome the resistance of those employees and students who resent its intrusive (and sometimes embarrassing and degrading) surveillance. The criminal law framing creates a rhetorical asymmetry favoring testing advocates. Those who argue against testing can be covertly or even overtly portrayed as advocates for drug use rather than for civil liberties. And the

⁸⁸ See for example, the web pages dedicated to the topic by the ACLU (<http://www.aclu.org/drugpolicy/testing/index.html>), the Drug Policy Alliance (<http://www.drugpolicy.org/law/drugtesting/>), and the National Organization for the Reform of Marijuana Laws (NORML; http://www.norml.org/index.cfm?Group_ID=3406).

⁸⁹ GD Lundberg, *Urine Drug Screening: Chemical McCarthyism*, 287 *N Eng J Med* 723 (1972).

⁹⁰ See review by Manski et al (2001, p. 198, “For-cause testing is uncontroversial because it is generally perceived as fair and most likely helps deter workers from becoming intoxicated on the job”). Also see MA Konovsky & R Cropanzano, “Perceived Fairness Of Employee Drug Testing As A Predictor Of Employee Attitudes And Job Performance,” 76 *J Appl Psychol* 698 (1991). Joseph G. Rossel, Richard C. Ringer, & Janice L. Miller, “Personality and drug testing: An exploration of the perceived fairness of alternatives to urinalysis,” 10 *J. Business and Psychology* 459 (1996). Paul M. Mastrangelo & Paula M. Popovich, “Employees' Attitudes Toward Drug Testing, Perceptions of Organizational Climate, and Withdrawal from the Employer,” 15 *J. Business and Psychology* 3 (2000). Raciot, B. M. & Williams, K. J. (1993). Perceived invasiveness and fairness of drug-testing procedures for current employees. *Journal of Applied Social Psychology*, 23, 1879-1891.

⁹¹ <http://www.whitehouse.gov/news/releases/2004/01/20040120-7.html>

criminal law framing makes any non-penal consequences of a positive test look more benevolent and less intrusive than they might otherwise seem. Being coerced (by an ultimatum) into treatment or being rejected for a job or a basketball team may be aversive, but far less so than a prison sentence. The criminal deviance framing also distorts thinking about the effective management of risk. It focuses attention on use (the crime) but distracts us from more direct ways of identifying safety risks, like routine psychomotor testing and mental health screening. Finally, the fear of use testing and its social and legal sanctions may drive users away from schools, activities, and jobs that might otherwise benefit them. It may deter some drug use, while displacing some drug use to other settings.

The criminal law and its framing have an equally powerful effect on safety testing. In a prohibition regime, there are few incentives for sellers to participate in safety testing – indeed, there are incentives for adulterating drugs -- and nontrivial legal risks for users who wish to test their street purchases. Yet a remarkably high fraction of tested samples are full of adulterants. In 2005, almost one in five American high school students used an illicit drug *other than* marijuana;⁹² 12 percent of 8th graders and 27 percent of 12th graders have done so in their lifetimes.⁹³ Those drugs are already risky, and because those drugs are obtained in an illicit market, their consumers face the additional risk of unknown adulterants, some of which are quite toxic. Safety testing not only protects participants from those adulterants, it also provides credible information about the risks of the market in a way that may discourage more use than it ever encourages.

The expressive and crime controlling functions of criminal law is often in tension with other social goals, including distributive justice, restorative justice, and risk regulation. The tension is often framed in terms of a contrast between an ex-ante signal

⁹² <http://www.monitoringthefuture.org/data/05data/pr05t2.pdf>

⁹³ <http://www.monitoringthefuture.org/data/05data/pr05t1.pdf>

and an ex-post situation, as in Meir Dan-Cohen's analysis of conduct vs. decision rules,⁹⁴ or John Braithwaite's analysis of deterrence vs. reintegrative shaming.⁹⁵ But the contrast between use testing and safety testing involves a tension is between three ex-ante goals: Moral expression, deterrence, and consumer safety. Ex ante, the criminal law tells potential users that our society disapproves of drug use, and that we will punish it when it occurs. But empirically, it is clear that the fear of legal sanctions plays only a small role in citizens' decisions about intoxicants. Many will use drugs despite the law and its messages. We routinely provide consumer safety information for a wide variety of risks – cold medicines, lawn mowers, breakfast cereals, and alcoholic beverages. But because MDMA and cocaine and heroin are illegal, if we provide safety information, we make them less risky but we risk making them more popular.

This tension isn't insurmountable; it is simply a challenge. As with needle and syringe exchange, free condoms in high schools, airbags, and sunblock, the tension between use reduction and harm reduction is a matter of degree.⁹⁶ The tension can and should be assessed empirically, and it can be managed skillfully – we do so in other domains, and other countries do so for illicit drugs – but it requires us to accept some ambivalence and ambiguity.

⁹⁴ Meir-Dan Cohen, "Decision Rules and Conduct Rules: On Acoustic Separation in Criminal Law," 97 Harvard Law Review 625 (1984).

⁹⁵ Braithwaite (1989).

⁹⁶ I explore this tension in much greater detail elsewhere. See MacCoun (1996); MacCoun & Reuter, DRUG WAR HERESIES: LEARNING FROM OTHER VICIES, TIMES, AND PLACES; and Robert J. MacCoun, "Anticipating unintended consequences of vaccine-like immunotherapies for addictive drug use," in H. R. Harwood & T. G. Myers (eds.), New treatments for addiction: Behavioral, ethical, legal, and social questions(National Research Council and the Institute of Medicine. Washington, D.C.: National Academy Press, 2004).