



PREDICTING DIVERSION PROGRAM OUTCOMES USING DRUG TESTING INFORMATION



Predicting Diversion Program Outcomes Using Drug Testing Information

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Executive Summary

While drug crime-related criminal legal system and victim costs reached \$113 billion across the United States in 2007, just \$14.6 billion was spent on treating substance use disorder (National Institute on Drug Abuse, 2014). Due, in part, to drug crimes, many U.S. citizens are under correctional supervision, with 1 in 66 adults being on probation or parole in 2020 (Bureau of Justice Statistics, 2021). In Illinois, 67,587 individuals were on probation in 2020 (Administrative Offices of the Illinois Courts, 2021) and 26,426 were on parole (Illinois Department of Corrections, 2020). The supervision population rate of substance use is estimated to be two to three times higher than that of the general population, with nearly half of the people under community supervision having a substance use disorder (PEW Charitable Trusts, 2018).

The Illinois Criminal Justice Information Authority's Adult Redeploy Illinois (ARI) program was established by the Crime Reduction Act of 2009 to provide financial incentives to local jurisdictions for programs that divert justice-involved individuals from state prisons by providing community-based supervision and individualized services. While researchers have evaluated ARI, models used in some jurisdictions (DeLong & Reichert, 2016; Kroner, et al., 2021; Mock et al., 2017; Reichert et al., 2016), research on ARI client outcomes related to the impact of drug testing is limited. The research goals for this study included:

- Quantitatively examining all local ARI program drug test data, including tested drugs, drug test frequencies, and drug test results.
- Systematically examining how ARI drug testing contributes to the possibility of revocation including other factors such as age, sex, and race.
- Proposing recommendations for better program practice to reduce the rate of revocation.

This study sought to answer the following research questions:

1. How is drug testing being practiced and observed in ARI in terms of its frequency, pass rates, and tested drugs?
2. Does drug testing have a significant impact on ARI participant outcomes when controlling for demographic variables?

The study included 53,159 records of 1,055 individuals collected from October 3, 2011, to June 20, 2019. The median number of drug tests per individual was 19, and the median of the average days between drug tests was 10 days. The most frequently tested drugs also had the highest positive results: heroin (32%), marijuana/THC (30%), cocaine/crack (14%), alcohol (10%), and other opiates (8%). Logistic regression analyses were used to determine what demographic, drug testing, and criminal justice variables predicted program outcomes of completion or revocation.

Among the demographic variables, only age predicted program outcomes. Neither sex nor race emerged as significant program outcome predictors. Drug test positivity rates predicted revocation, as well as drug test frequency (number of times an individual was tested) and average number of days between the drug tests.

Overall, the average drug positivity rate was 29% and most tests were passed with no drug found. Most successful clients who were older women at medium to medium-high recidivism risk and whom tested monthly with lower test positivity rates. Those most likely to experience program revocation were younger men who tested several times per month with higher test positivity rates during their program tenure. Graphing the programs by test positivity, number of tests, and frequency of tests suggests that individuals enrolled in some programs had higher test positivity rates (>50%) and were subject to less frequent drug tests than other programs.

This study focuses on drug test outcomes, however, it also would be worth exploring data on drug testing rewards, sanctions, and requirements for program completion and their impacts on program outcomes.

Section 1: Introduction

In 2007, it was estimated that the cost to society of drug use disorder was \$193 billion, a substantial portion of which—\$113 billion—was associated with related crime, including criminal legal system costs and costs to victims of crime. Meanwhile, the cost of treating drug abuse (including health costs, hospitalizations, and government specialty treatment) was estimated to be \$14.6 billion, a fraction of these overall societal costs (National Institute on Drug Abuse [NIDA], 2014). Substance use treatment is a cost-effective strategy for reducing drug use and its related healthcare costs (NIDA, 2014). Treatment also consistently has been shown to reduce the costs of lost productivity, crime, and incarceration across various settings and populations (NIDA, 2014). Furthermore, effective treatment decreases future drug use and drug-related criminal behavior, can improve familial relationships, and may improve employment prospects (NIDA, 2014). Most importantly, substance use treatment saves lives.

Many U.S. citizens were under correctional supervision in 2020, with 1 in 66 adults (3,890,400 individuals) on probation or parole (Bureau of Justice Statistics [BJS], 2021). In 2020, 67,587 individuals were on probation in Illinois (Administrative Offices of the Illinois Courts, 2020) and 26,426 were on parole (Illinois Department of Corrections, 2020). Substance use rates among the U.S. correctional supervision population are estimated to be two to three times higher than that of the general population, with nearly half of the people under community supervision having a substance use disorder (PEW Charitable Trusts, 2018).

Regardless of originating offense type, most probation terms include drug testing as a condition (Cadwallader, 2017). Testing clients for drugs is a common practice in Illinois probation departments. In a survey of a sample of Illinois probation department administrators, 95% indicated client drug testing was within their probation officers' job descriptions. Of them, 79% reported the duty was mandatory (Reichert et al., 2020). Respondents also stated that between 45% to 100% of their clients were drug-tested (Reichert et al., 2020).

It is estimated that only about half of those who exit parole or probation successfully complete their supervision terms (PEW Charitable Trusts, 2018). In 2016, 29% of probation exits were unsuccessful and 12% resulted in incarceration; 30% of parole exits were unsuccessful, with 27% leading to incarceration (PEW Charitable Trusts, 2018). A client's positive drug test is typically considered a technical violation of their probation terms and can result in a return to incarceration (Cadwallader, 2017). One study found that probation was revoked after a positive test from 8% of those incarcerated in state prisons (likely a low estimate as absconding violations may be due to avoidance of testing positive) (Kilmer, 2008).

The criminal legal and public health systems have difficulty managing substance use problems within the justice-involved population due to inadequate resource availability (Taxman et al., 2003). Because drug test-related probation or parole revocations contribute significantly to state prison admissions (PEW Charitable Trusts, 2018), probation departments must adhere to the recommended practices for drug testing in a community supervision setting. It also is important for community corrections systems to prepare for an increase in clients as the criminal legal system moves away from incarceration sentences. Additionally, community corrections must consider how it will prevent the backend use of incarceration through violations (Taxman, 2015).

The ICJIA Adult Redeploy Illinois (ARI) program was established by the Crime Reduction Act of 2009 to provide financial incentives to local jurisdictions for programs that divert justice-involved individuals from state prisons by providing community-based supervision and individualized services. While researchers have evaluated ARI models used in some jurisdictions, research is limited on ARI client outcomes related to the impact of drug testing (DeLong & Reichert, 2016; Kroner, et al., 2021; Mock et al., 2017; Reichert et al., 2016). Probation client drug testing practices can have a substantial impact on participant outcomes. Drug testing is believed to be a useful tool for monitoring participants (Baxter et al., 2017).

By offering critical information about drug testing practices, a primary probation department strategy for tracking progress, this study will inform drug monitoring efforts and provide evidentiary support for continuous quality improvement of probation practices. By examining drug testing and related factors contributing to program outcomes, this research can add to the understanding of drug testing and revocation practices in community corrections.

The research goals for this study were threefold:

- To quantitatively examine all ARI drug test data, including tested drugs, drug test frequencies and drug test results.
- To systematically examine how ARI drug testing contributes to the possibility of revocation including other factors such as age, sex, and race.
- To propose recommendations for better program practice to reduce the rate of revocation.

This study sought to answer the following research questions:

1. How is drug testing being practiced and observed in ARI in terms of its frequency, pass rates, and tested drugs?
2. Does drug testing have a significant impact on ARI participant outcomes when controlling for other demographic variables?

Section 2: Literature Review

Despite ample literature on drug testing, little examines guidance and training, particularly in a supervision setting (Barthwell, 2016). This literature review describes recommended practices for drug testing in supervision, the limitations of drug testing, and the relationship between drug testing and outcomes for community supervision clients.

Drug Testing Recommended Practices

Drug tests use a biological sample to detect the presence or absence of a specific drug or drugs within a specific time period (American Society of Addiction Medicine [ASAM], 2017; DuPont et al., 2014; Jarvis et al., 2017). Drug testing can be used as a substance use prevention, diagnostic, and monitoring tool. (ASAM, 2013). However, no universal standards exist for addiction identification, diagnosis, treatment, medication monitoring, or recovery (ASAM, 2017).

Addiction experts recommend that the elements of a drug test, including the test type, drug panel, frequency, and testing technology, are based on the client's needs (ASAM, 2017); however, due to high probation caseloads and budget restraints, individualizing drug tests to each client is not always feasible. Regardless, drug testing should be used as a tool for supporting recovery rather than for exacting punishment (ASAM, 2017; Jarvis et al., 2017).

The Hendershot and Kramer (2018) adaptation of the *10 Principles of a Good Drug Testing Program* by the National Drug Court Institute (2011) provides an overview of recommended drug testing practices, which are discussed more thoroughly throughout this literature review (Henderson & Kramer, 2018). These adapted principles include:

1. Design an effective drug detection program, establish written policies and procedures of said program, and communicate the details of the drug detection program to staff and clients.
2. Develop a client contract that clearly states the responsibilities and expectations of the client in the drug testing program.
3. Select a drug testing sample and testing methodology that provides results that are scientifically valid, forensically defensible, and therapeutically beneficial.
4. Ensure that the sample collection process supports effective abstinence monitoring practices including random, unannounced selection of clients and the use of witnessed observation sample collection procedures.
5. Confirm all positive screening results using alternative testing methods, unless the client acknowledges use.
6. Determine the validity of samples to support the collection process. Sanction diluted samples and those that indicate subversion of testing.
7. Eliminate the use of urine levels for the interpretation of client drug use.
8. Establish drug testing result interpretation guidelines that have a sound scientific foundation and that meet a strong evidentiary standard.
9. In response to drug testing results, develop therapeutic intervention strategies that promote behavior change and support recovery.

10. Understand that drug tests represent only a single supervision strategy in an overall abstinence-monitoring program.

Drug Testing Frequency

The frequency of court-mandated drug testing is largely dependent upon sample type, but is also dictated by client compliance, program phase (more frequent in the beginning and tapering off according to positivity rates), and probation department resources (Marlowe & Meyer, 2011). Experts recommended performing frequent testing to ensure substance use is quickly and reliably detected (National Association of Drug Court Professionals [NADCP], 2015). Scheduled testing has been found to be ineffective for identifying drug use (Cadwallader, 2017). Rather, testing at least weekly on an unpredictable schedule at the onset of drug testing and moving to less frequent testing after a period of abstinence is recommended (Cadwallader, 2017; Hendershot & Kramer, 2018; Marlowe, 2012; Marlowe & Meyer, 2011; NADCP, 2015). Drug testing less frequently than once a month is not recommended for effective detection of substance use (Cadwallader, 2017). Furthermore, as a basic tenet of behavior modification theory, testing should be continuous and uninterrupted to identify relapsing throughout the intervention period (NADCP, 2015). Drug testing should be among the last supervisory conditions lifted in the last phase of supervision or drug court program because relapse is a risk as services are reduced, which often happens as clients make their way through supervision stages and drug court phases (Marlowe, 2012).

Unannounced and random testing are preferable to announced and fixed testing (Center for Substance Abuse Treatment, 2005; Marlowe & Meyer, 2011; NADCP, 2015). The recommended randomization for drug testing is to have a set probability (e.g., 15%) that a client could be tested on any given day, including holidays and weekends (ASAM, 2015; Kilpatrick, 2000). Testing schedules that use weekly blocks (e.g., clients are tested twice between Sunday to Saturday each week) are not recommended because if a client is randomly selected for drug testing on Monday and Wednesday of a given week on a twice a week random schedule, then the likelihood that the client would be tested again the rest of that week is zero (NADCP, 2015). Additionally, research indicates urine drug testing once a week produces an approximate 35% chance of detecting an incidence of drug use, while twice-a-week urine drug testing increases that chance to greater than 80% (Cadwallader, 2017; Kleiman et al., 2003; NADCP, 2015). Oral fluid testing should be performed at least 3-4 times per week ensure effectiveness (Hendershot & Kramer, 2018). In a survey of a sample of Illinois probation departments, 37 of 38 reported randomly testing their clients, but only 21% stated that they always randomly test (Reichert et al., 2020). Clients should be required to deliver a sample as soon as practicable after being notified that a test is scheduled. It is recommended that urine samples are delivered within eight hours and short detection window tests (e.g., breathalyzers, oral fluid test) are delivered within four hours after the client is notified (Hendershot & Kramer, 2018).

Drug Panels

Drugs and drug analytes included in the testing panel should be based upon client information whenever possible (Barthwell, 2016; Marlowe & Meyer, 2011). Tests panels, a one-size-fits-all approach in which the substances are predetermined by a laboratory or forensic-testing

standards, are discouraged as they often test for substances that are not clinically relevant to the individual client and increase costs (Barthwell, 2016). However, in a probation setting with high caseloads, it is difficult to individualize testing panels for each client. If testing panels cannot be customized to individual clients, probation departments should stay informed of prevalent and emerging drugs being used in their communities and update drug panels to reflect those trends (ASAM, 2017).

To become aware of emerging substances in the population, experts recommend randomly selecting and testing additional specimens for a broader range of substances (NADCP, 2015) and seeking input from law enforcement and treatment professionals who can develop a suitable drug screening list (Marlowe & Meyer, 2011). At a minimum, community supervision professionals should consider screening for amphetamines, barbiturates, benzodiazepines, cannabinoids (marijuana), cocaine, opiates, and alcohol (Marlowe & Meyer, 2011). Certain substances, such as steroids, inhalants, and hallucinogens, are difficult to detect using routine methods and testing can be cost prohibitive (Marlowe & Meyer, 2011). In a survey of a sample of Illinois probation departments, 78% of respondents indicated that they tested for alcohol and 95% indicated that they tested for marijuana, cocaine, amphetamines, and opiates (Reichert et al., 2020).

Interpretation of Results

Probation professionals must understand that drug testing is a tool that can be used to support probation clients through recovery. Drug testing is only one measure of one supervision goal and should not be the only method used to detect substance use or monitor treatment outcomes (ASAM, 2017). In Illinois, probation officers are required to incorporate effective risk-need-responsivity interventions into behavior change management techniques with clients rather than simply enacting punishments when a violation occurs (Administrative Office of the Illinois Courts, 2019). Positive test results or violations of supervision should be seen by the probation officer as an opportunity to hold clients accountable and enable them to learn from their mistakes (Lovins et al., 2018). Probation officers should work to build relationships with their clients, use reinforcement and authority to assist their clients in managing their behavior, and model pro-social behavior through cognitive restructuring and social skills training (Taxman, 2015). To aid in the recovery aspect of drug testing, the language used regarding the test should be neutral and not further stigmatize addiction and its symptoms (ASAM, 2017). For instance, test results should be referred to using the terms *present* or *absent* as opposed to *clean* or *dirty*.

The results of a drug test should be combined with other information, such as the client's self-reports, to give context before interpreting the results. Drug testing can aid in the exploration of a client's denial of drug use, motivate a client to remain or become abstinent, determine when an individual is having difficulties with recovery, and serve as a source of encouragement when the results are negative (ASAM, 2017; NIDA, 2014). The National Institute on Drug Abuse recommends that the first response to a detected drug use should be a clinical one; for example, increasing treatment intensity or switching to an alternative treatment that requires coordination between the probation department staff and the treatment provider (NIDA, 2014).

Drug Testing Limitations

Drug testing limitations include the cost, potential for error, risk of sample tampering, lack of quantitative information provided by the results, and delayed result time.

Cost

Frequent urine drug testing is expensive; however, the cost of other methods is often higher. Sweat patches are more expensive than the research-recommended three urine tests per week combined (Kleinpeter et al., 2010). In a survey of a sample of Illinois probation departments, the average price per drug test was \$8 (Reichert et al., 2020). There is also a personal cost to drug testing. Urine drug tests in particular are personally invasive, a complaint of many justice-involved individuals required to submit to drug testing (Polzer, 2009).

Tampering

Clients on probation have acknowledged engaging in widespread efforts to defraud drug and alcohol tests (Polzer, 2009). Urine can be tampered with quite easily (Polzer, 2009). Client tampering efforts include, but are not limited to, consuming excessive amounts of water to dilute the sample (dilution), adulterating the sample with chemicals intended to mask a positive result (adulteration), and substituting another person's urine or a look-alike sample that is not urine, such as apple juice (substitution) (Marlowe & Meyer, 2011; NADCP, 2015). Overhydrating (92%), urine substitution (89%), and sample adulteration (55%) were the most commonly reported forms of client drug test tampering in a sample of Illinois probation departments (Reichert et al., 2020).

Drug Testing and Client Outcomes

Evidence to indicate drug testing leads to positive outcomes is limited. Little empirical evidence exists to show whether drug testing in substance use disorder treatment settings leads to improved clinical outcomes (Javis et al., 2017) or that drug testing reduces drug use or promotes pro-social behavior in a criminal legal setting (Kilmer, 2008).

However, evidence does show the use of drug testing with specific conditions of frequent and random drug tests with rapid results, swift and certain consequences, and substance use treatment when requested significantly reduces drug use, criminal recidivism, and incarceration (Cadwallader, 2017). For instance, Kleiman et al. (2003) argued that a focused probation program with frequent drug testing; swift and consistent, but not severe, sanctions for violations; and formal drug treatment for those who want it may reduce the volume of drug use, reduce the recidivism rate among people on probation, and reduce periods of incarceration for justice-involved people who use drugs. Another study demonstrated lower levels of recidivism and drug use among participants in a court program involving drug testing and sanctions for positive drug tests compared to justice-involved individuals who received only drug testing (Lindquist et al., 2006). Research on specialized processes for probation clients with behavioral health issues shows using behavioral health strategies within justice settings can have positive impacts on client outcomes (Taxman, 2015). Additionally, studies of probation intensive supervision

programming with drug treatment found lower levels of recidivism among participants compared to those on standard probation (Taxman, 2015). The National Association of Drug Court Professionals (2015) found that more frequent drug testing resulted in better client outcomes in terms of graduation rates, lower drug use, and lower recidivism and that client outcomes improved significantly when detection of drug use was likely and when participants received incentives for abstinence and sanctions for positive test results. While special programming reduces recidivism for probation clients, it has little impact on long-term drug use (Taxman, 2015).

The more consistently clients are awarded for accomplishments and sanctioned for infractions, the more effective the program will be at behavior modification (Marlowe, 2012). Furthermore, drug testing with graduated sanctions improves employment and education outcomes in the short-term for people on community supervision (Kilmer, 2008). Evidence suggests that sanctions tend to be least effective at the lowest and highest magnitudes and most effective within the intermediate range (Marlowe, 2012). Sanctions that are too weak can lead the individual to become accustomed and less responsive to punishment (Marlowe, 2012). Sanctions that are too harsh can lead to resentment, avoidance reactions, and ceiling effects, in which the probation officer runs out of sanctions before treatment has had a chance to take effect (Marlowe, 2012). The success of any rewards and sanctions program will depend largely on its ability to craft a creative range of intermediate-magnitude incentives and sanctions that can be intensified upward or downward in response to clients' behaviors (Marlowe, 2012).

Studies of 67 drug courts across six states and one U.S. territory found programs that drug testing two to three times per week, return test results within 48 hours, and allow zero positive drug tests for at least ninety days before graduation were factors related to best client outcomes (higher graduation rates, lower recidivism, and greater cost savings) (Carey et al., 2012). Drug testing in a therapeutic court environment provides a deterrent to future drug usage as participants learn to develop and refine their coping and refusing skills, identifies clients who are remaining abstinent, guides incentives and rewards, identifies clients who have relapsed allowing for rapid intervention, allows for the effective use of finite resources by targeting clients most in need of assistance, provides support and accountability, and serves as an adjunct to treatment (Marlowe & Meyer, 2011).

Principles of Substance Use Treatment with Justice-Involved Populations

Community supervision professionals must be aware of key ideologies of substance use treatment for justice-involved populations, especially when drug testing is a condition of supervision or programming to understand its role in overall treatment. Pew Charitable Trusts (2018) outlined research identifying supervision strategies that can reduce recidivism, increase public safety, and cut spending (PEW Charitable Trusts, 2018). The strategies include using scientifically validated tools to assess risk levels and treatment needs, providing individual case management plans that match clients with appropriate treatment levels and treatment programs, using evidence-based therapies to change behavior, and implementing swift and certain sanctions and rewards for violations and compliance of supervision (PEW Charitable Trusts, 2018). The National Institute on Drug Abuse (2014) created guiding principles of drug abuse treatment for justice-involved populations that include:

- Drug addiction is a brain disease that affects behavior.
- Recovery from drug addiction requires effective treatment, followed by management of the problem over time.
- Treatment must last long enough to produce stable behavioral changes.
- Assessment is the first step in treatment.
- Tailoring services to fit the needs of the individual is an important part of effective drug abuse treatment for criminal justice populations.
- Drug use during treatment should be carefully monitored.
- Treatment should target factors that are associated with criminal behavior.
- Supervision should incorporate treatment planning for clients who use drugs, and treatment providers should be aware of correctional supervision requirements.
- Community of care is essential for justice-involved individuals who use drugs re-entering the community.
- A balance of rewards and sanctions encourages pro-social behavior and treatment participation.
- Justice-involved individuals with co-occurring drug abuse and mental health problems require an integrated treatment approach.
- Medications are an important part of treatment for many justice-involved individuals who use drugs.
- Treatment planning for justice-involved individuals who use drugs living in or re-entering the community should include strategies to prevent and treat serious, chronic medical conditions, such as HIV/AIDS, hepatitis B and C, and tuberculosis.
- Justice-involved individuals have often been marginalized by institutional racism, classism, homophobia, sexism, religious intolerance, and other forms of oppression resulting in family difficulties, limited social skill development, lack of quality education and employment opportunities, mental health disorders, infectious disease, and other medical issues. Treatment should take these societal problems and their impacts on individuals into account, because they may increase the risk of drug relapse and criminal recidivism if left unaddressed.

Friedmann et al. (2007) identified three key components of substance use disorder programs for justice-involved individuals: assessment and treatment matching, program services and content, and compliance management. Assessment and treatment matching include the use of standardized substance abuse assessment tools to identify the appropriate clients for services (Friedmann et al., 2007). Program services and content include interventions to engage clients in services, the use of cognitive-behavioral or standardized behavioral modification techniques, family involvement in treatment, treatment for at least 90 days, and the integration of treatment systems and a continuum of care (Friedmann et al., 2007; NIDA, 2014). Lastly, compliance management includes routine drug testing to monitor treatment progress and the use of sanctions and incentives to improve program retention (Friedmann et al., 2007). Substance use disorder programs for justice-involved individuals that adopt these key evidence-based practices have been associated with better treatment outcomes and reduced recidivism for clients than programs that do not adopt these practices (Friedmann et al., 2007). Unfortunately, Friedmann et al. (2007) found in a sample of 384 criminal legal and community-based programs providing substance use disorder treatment to justice-involved populations, most had implemented fewer than 60% of the evidence-based practices. The programs that provided more evidence-based practices were

community-based, accredited, and network connected, with a performance-oriented, nonpunitive culture, more training resources, and leadership with a background in human services. In addition, they held a high regard for the value of drug treatment and an understanding of evidence-based programs (Friedmann et al., 2007).

Substance use disorder treatment improves outcomes for justice-involved individuals and positively impacts public health and safety (NIDA, 2014). Outcomes for justice-involved individuals who use drugs can be improved when court and supervision personnel work in tandem with treatment providers on treatment needs and supervision requirements (NIDA, 2014). Lessons learned emphasize the importance of providing a justice and treatment team that is knowledgeable on patterns of relapse and remission to foster better outcomes and reduce recidivism (Taxman, 2015).

Section 3: Methodology

This study utilized ARI client and drug testing databases. The client database contains demographic data of ARI participants and their dates of entry, dates of termination, and program outcomes. The drug testing database assembles the results of every ARI site drug test and a list of tested drugs. Client data retrieved from the two databases were joined with matching unique case identifiers assigned to each ARI participant. Once matched, the individual identification numbers were removed to ensure research subject confidentiality.

Program outcomes were re-coded at 1 as completion and 0 as non-completion caused by revocation to jail or the Illinois Department of Corrections or termination for other reasons. Active cases that could not be coded by 1 or 0 were kept for descriptive analysis but not included in the logistic regression models. Second, drug tests that occurred before the individual's entry date and after their termination date were excluded from the drug testing database, along with individuals who had taken only one drug test (n = 122 were removed from the drug testing database). Third, the test frequency of each individual was measured by the date range between the first and the last drug test divided by the total number of tests. The median frequency of all individuals at one site was used as the test frequency of that site. Fourth, the Level of Service Inventory – Revised (LSIR), a measure of prison recidivism risk, score was re-coded from 1 to 7: (1) minimum risk, (2) low risk, (3) low medium risk, (4) medium risk, (5) medium high risk, (6) high risk, and (7) very high risk. Lastly, the results of drug tests were re-coded to 1 as absent and 0 as present. All other results that were not reported as “absent” or “present”, such as diluted, no-show, were considered present.

Study Limitations

Included in this study were probation programs funded by ICJIA's Adult Redeploy Illinois. Data collected on these programs do not represent the overall probation population, nor do ARI programs represent all diversion programs in Illinois. As such, the findings will not be generalizable to all probation departments in Illinois. However, these analyses may shed some light on how drug tests influence diversion program outcomes.

Each program had individualized target populations. For instance, the DuPage County site specifically targeted emerging adults for programing, assisting individuals between the ages of 18 and 25 with needs and risks specific to that developmental phase.

Administrative data used in this study were collected by various individuals over 7 ½ years. The consistency and uniformity of the data analyzed may have impacted the results. Also, Winnebago and Will counties and Illinois' Second Judicial Circuit contributed a significant amount of the drug test result data and the number of tests in the data will be biased toward those contributors. And, due to differing data structures between sites, the names of the tested drugs in Winnebago County and the Second Judicial Circuit datasets could not be included.

Type of program may have been an important variable to include in the study. However, inconsistency in the number and type of programs reported by the counties and judicial circuits

made this distinction unavailable. With this experience, we recommend ensuring program types at the individual level is included in future data collection.

Section 4: Study Findings

Descriptive Data

After recoding, the drug testing dataset contained 53,159 records of 1,055 individuals collected from October 3, 2011, to June 20, 2019, for the following ARI-funded programs. The majority of drug tests were collected at programs in the 2nd Judicial Circuit and Will and Winnebago counties (78%). The majority of individuals sampled were at programs in the 2nd Judicial Circuit and DuPage, Peoria, Will, and Winnebago counties (81%).

Table 1

Frequencies of ARI Participants and Drug Tests by Grantee October 2011- June 2019

Judicial circuit/county	Number of individuals	Percentage of total individuals	Number of drug tests	Percentage of total drug tests
2nd Circuit	57	5	6,532	12
9th Circuit	5	<1	190	0
Boone	40	4	3,175	6
Cook	46	4	1,441	3
DeKalb	5	<1	473	1
DuPage	158	15	1,320	2
Grundy	11	1	155	0
Kendall	8	1	1,318	2
Macon	20	2	84	0
Madison	25	2	1,315	2
McLean	30	3	171	0
Peoria	173	16	1,180	2
Sangamon	7	1	631	1
St. Clair	4	<1	328	1
Will	159	15	8,013	13
Winnebago	307	29	27,013	51
Total	1055	100	53,159	100

Note. Source is ICJIA Center for Community Corrections Research ARI Drug Test Data September 2020

The sample was predominately comprised of white (65%) men (69%) of ages 30 to 49 (45%, with a median age of 31). The sample's risk level was bi-modal with 47% medium and 43% high or very high. This is consistent with ARI requirements, as 80% of all program participants must be assessed as medium- or high-risk for prison recidivism. Over half of the study participants completed their program (55%) and the program was revoked from 45%. Excluded were those individuals with other outcomes, which could include being deceased, dropping out, transferring, or an unspecified conditional release from probation.

Table 2
Participant Characteristics (N = 1,055)

Variable	n	%
Gender		
Men	730	69
Women	324	31
Age at program intake (years)		
Emerging adults (18-24)	262	25
Young adults (25-29)	209	20
Adults (30-49)	474	45
Older adults (Over 50)	110	10
Race		
White	680	65
Black	319	30
Other	56	5
Recidivism risk level		
Minimum	2	<1
Low	31	3
Low medium	2	<1
Medium	497	47
Medium high	4	<1
High	416	39
Very high	41	4
Missing	62	6
Probation status		
Completed	584	55
Revoked	471	45

Note. Source is ICJIA Center for Community Corrections Research ARI Drug Test Data September 2020

The sample averaged about 50 drug tests per person, with a range of two to 421 tests. The average number of days between tests was 29 days. On average, the positivity rate was 29%. However, given the wide ranges of drug test totals per participant and the average number of days between drug tests, the median statistics may be more representative than the average statistic. The median number of drug tests was 19 and the median of days between drug tests was 10.

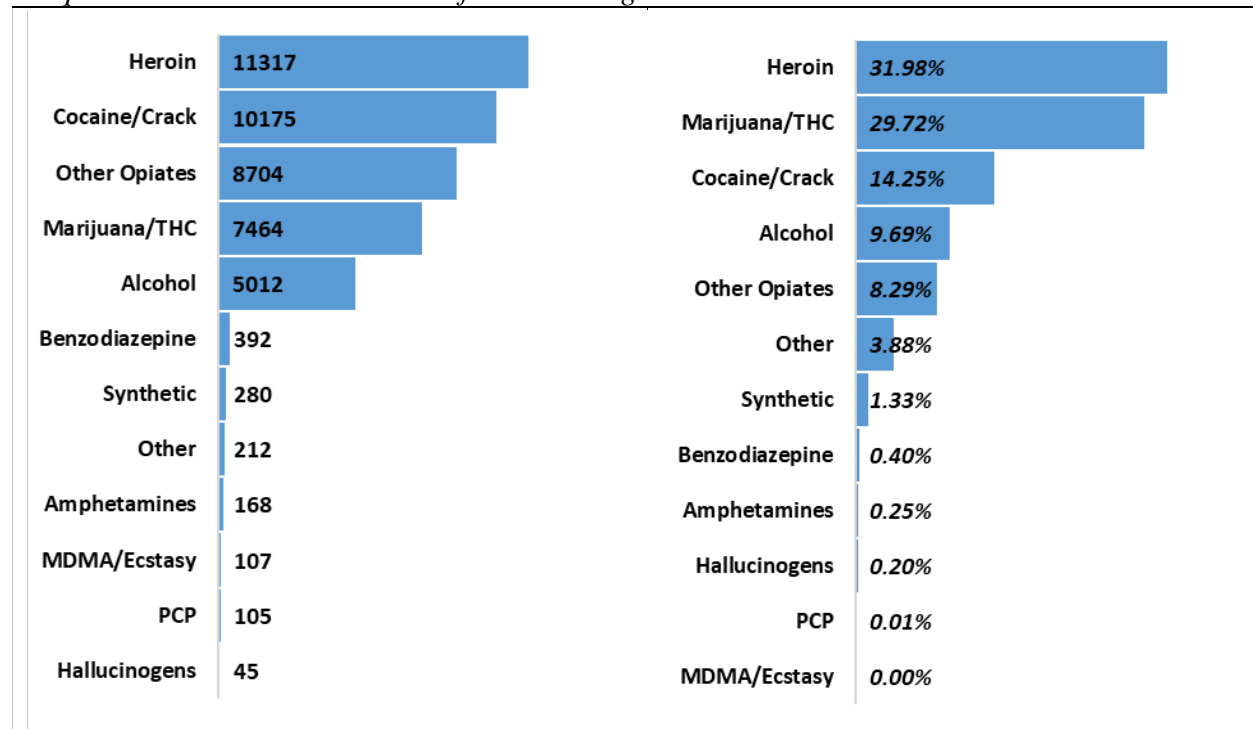
Table 3
Drug Test Variables

Variable	Mean	Standard deviation
Test frequency	50.39	64.61
Days between drug tests	28.89	41.48
Positive rate percentage	29%	34%

Note. Source is ICJIA Center for Community Corrections Research ARI Drug Test Data September 2020

An aggregate view of the data shows that the choice of tested drugs varied significantly across sites. Heroin was most frequently tested, followed by cocaine/crack, other opiates, marijuana/THC, and alcohol. Participants most often tested positive for heroin, marijuana, cocaine/crack, alcohol, and other opiates (Figure 1).

Figure 1
Frequencies and Positive Results of Tested Drugs



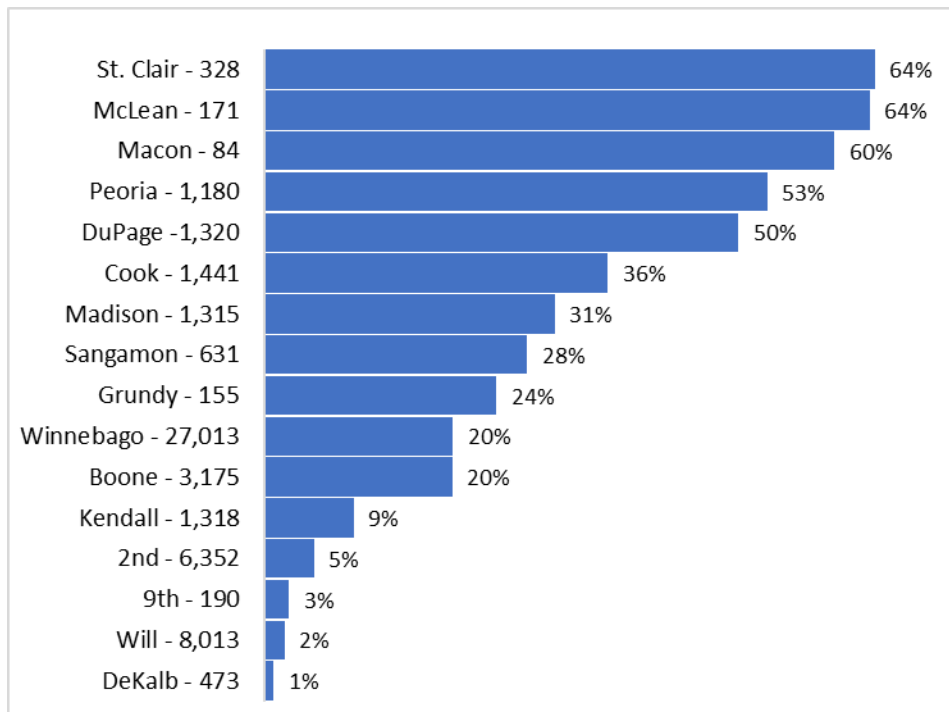
Note. Source is ICJIA Center for Community Corrections Research ARI Drug Test Data September 2020

Among the 16 sites studied, the Intensive Supervision Probation with Services (ISP-S) programs in St. Clair, McLean, Peoria, DuPage, and Macon counties lead the chart with the highest percentages of positive drug tests, averaging 58%, while drug and mental health courts demonstrated a significantly lower percentage of positive results at under 10% (Figure 2). It is

important to note that St. Clair's ISP-S program serves a population with mental health and substance use disorder diagnoses.

Figure 2

Percentage of Drug Tests with Positive Results by Site



Note. Source is ICJIA Center for Community Corrections Research ARI Drug Test Data September 2020

Table 4

Number of Tests, Drug Presence, and Test Frequency by ARI Program

Site	Total no. of tests	Percent drug present	Test frequency (median days between tests)
Winnebago	27,013	20	8
Will	8,013	2	9
2nd Circuit	6,352	5	17
Boone	3,175	20	6
Cook	1,441	36	14
DuPage	1,320	50	53
Kendall	1,318	9	3
Madison	1,315	31	7
Peoria	1,180	53	76
Sangamon	631	28	5
DeKalb	473	1	6

Site	Total no. of tests	Percent drug present	Test frequency (median days between tests)
St. Clair	328	64	16
9th Circuit	190	3	18
McLean	171	64	44
Grundy	155	24	22
Macon	84	60	56

Note. Source is ICJIA Center for Community Corrections Research ARI Drug Test Data September 2020

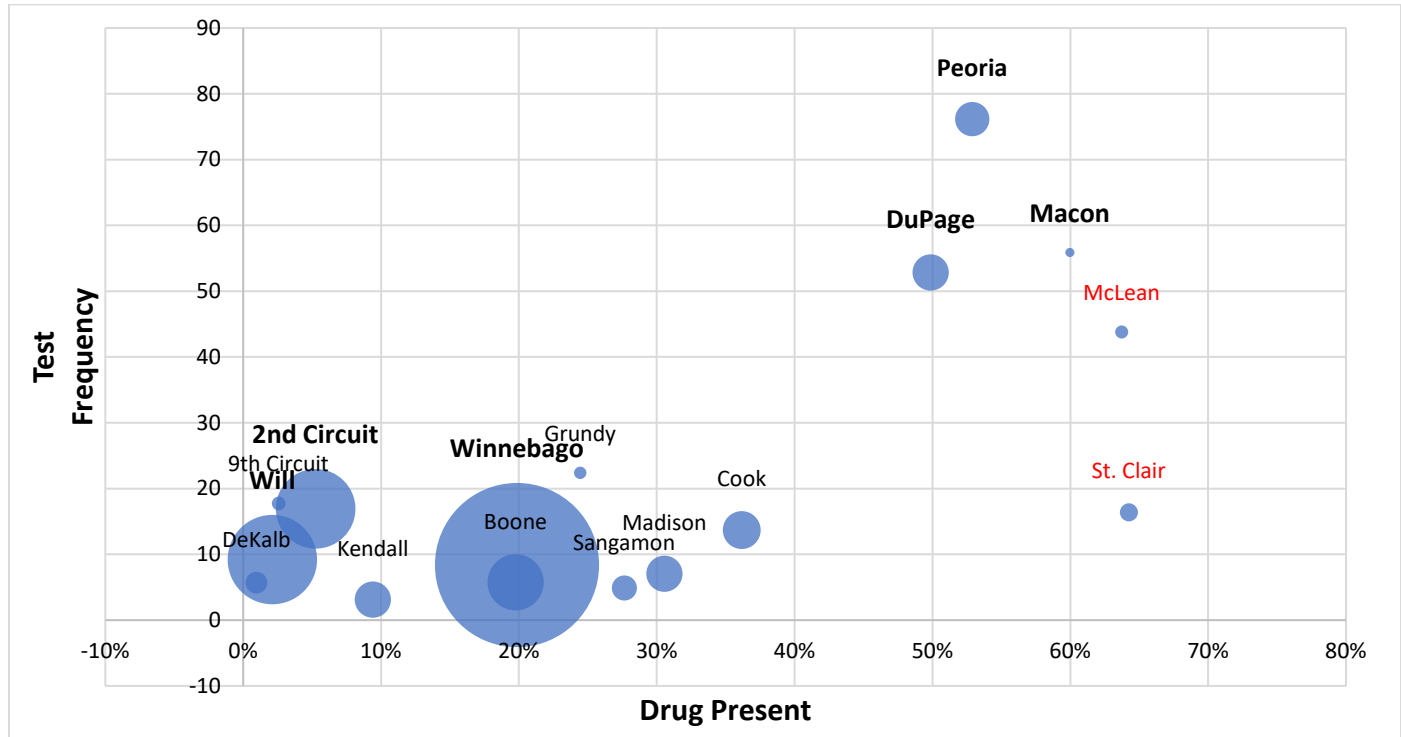
Figure 3 is a visual representation of Table 4. In Figure 3, each dot represents a county. The size of the dot represents the number of drug tests reported by the site that was included in the study. The larger the dot, the more drug tests reported. The horizontal position of the dot, or *Drug Present* percentage, was based on the percentage of drug tests where drugs were found. The vertical position of the dot represents the median number of days between tests or *Test Frequency*. Those counties with dots closer to the zero in the graph had better drug tests outcomes than those in the upper right section of the graph.

Two groups of counties emerged in the drug testing data. Data on the first group, containing Will and Winnebago counties (the larger dots), showed positivity result of less than 25% in the 6,000-25,000-total number of test range, with test frequencies of less than 10 days. Both counties run multi-program courts. These counties had high numbers of tests but relatively low drug test present percentages.

The second group contained Peoria, DuPage, and Macon, all ISP-S programs, showed positivity results of over 50% with less than 1,500 tests taken. St. Clair and McLean counties were outliers, with the highest positivity results, both 64%, after taking between 100 and 400 drug tests and with less than 20 days between each one. These counties had fewer drug tests but relatively high drug test present percentages.

Figure 3

Test Frequency, Drug Presence, and Total Number of Tests



Note. Source is ICJIA Center for Community Corrections Research ARI Drug Test Data September 2020

Regression Analyses

We used logistic regression analyses to determine which demographic, drug testing, and criminal justice variables predicted program outcomes of completed or revoked. With all variables gathered, the regression model used was:

$$O_i = \alpha + \beta_1 D_i + \beta_2 J_i + \varepsilon$$

In this model, O_i stands for program outcome of individual, with i coded as 1 for completion and 0 for revoked. The independent variables include demographic factors D_i measured as age, gender, and race, and justice-related factors J_i measured as LSIR risk scores, test frequency, and drug presence percentages.

We excluded individuals who could not be matched by the two databases. This resulted in a 6% sample size reduction, dropping from 1,055 individuals to 988. Using program outcome as the dependent variable, a bivariate overview of the variables used in the regression model is shown in Table 5.

Table 5*Frequencies or Mean Values of Predictor Variables as a Function of Program Outcomes*

Variable	Completed (<i>n</i> = 564)	Revoked (<i>n</i> = 471)	Chi- square or T-test	Significance level
Men (%)	53	47		
Women (%)	60	40		
Gender			4.49	0.020
White (%)	55	45		
Non-white (%)	56	44		
Race			.03	ns
Age (years)	35.26	31.64	5.35	0.000
Test frequency (median days between drug tests)	34.68	21.71	5.37	0.000
Drug present (%)	23	38	-7.18	0.000
Average number of drug tests	66.19	30.79	-9.72	0.000

Note. Source is ICJIA Center for Community Corrections Research ARI Drug Test Data September 2020

To check for statistical correlations between the variables in the study, intercorrelations were performed and significant associations were found among the study predictor variables, and with program outcomes (Table 5). Categorical variables such as sex and race were not included in this analysis. Every variable was correlated with each other except for risk and age; and risk and test frequency. Although most correlations coefficients were relatively small, all were significantly correlated. Age, total drug tests and test frequency were positively correlated with the program outcome. In other words, higher age, total drug tests, and test frequency were associated with program completion. Risk level and percent of drug present were negatively correlated with program outcomes, i.e. higher risk levels and drug presence were associated with revocation. *Total drug tests* and *Test frequency* were strongly, negatively correlated, suggesting that the fewer days between drug tests, the higher the total number of drug tests.

Table 5*Intercorrelations for Program Outcome and Predictor Variables*

	Measure	1	2	3	4	5	6
1	Program Outcome	1					
2	Participant age	.166**	1				
3	Risk level	-.148**	-.034	1			
4	Total drug tests	.218**	.100**	-.138**	1		
5	Test frequency	.125**	-.065*	.035	-.585**	1	
6	Percent drug present	-.091**	.002	.038	.100**	-.083**	1

Note: Program outcome coded as 1 is completed and 0 is revoked.

*p<.05. **p<.001

In the logistic regression model, among the demographic variables only age predicted program outcomes (*Table 6*). The odds of a completed program outcome increased by 103% with an increase in age category. Neither sex nor race emerged as significant program outcome predictors.

The analyses showed individuals at higher risk were more likely to experience probation revocation. As risk level increases, the odds of being revoked increased by 83%. In addition as drug present percentages increased, the chances of revocation increased by 40%. Test frequency demonstrated a significantly positive association. Program completion increased by 100% with more days between tests. This phenomenon might be a positive indication that as a participant progresses through their phases, they were required to take fewer drug tests and were given more time between random drug tests as a reward for their sobriety.

Table 6*Logistic Regression Predicting Program Outcome*

Predictor	B	S.E.	Wald	df	Sig.	Exp(B)
Age	0.027	0.006	18.34	1	.000	1.027
Men	-.0270	0.151	3.328	1	.068	0.759
White	-0.149	0.148	1.012	1	.314	0.862
Risk level	-0.184	0.059	9.664	1	.002	0.832
Test frequency	0.008	0.001	35.846	1	.000	1.008
Positivity rate	-0.498	0.218	5.187	1	.023	0.396
Constant	0.332	0.417	0.634	1	.426	1.394

Note. Source is ICJIA Center for Community Corrections Research ARI Drug Test Data September 2020

Section 5: Discussion

Several variables analyzed in this study predicted program outcomes of completion or probation revocation. Predictive variables included drug test results, drug test frequency, age, and risk level. Those most likely to complete drug court programs were older women at medium to medium-high risk for prison recidivism who tested monthly throughout program participation with lower percentages of drugs found in their tests. Those likely to experience program revocation were younger men who tested several times per month throughout the program with higher percentages of drugs found in their tests.

An analysis of programs graphed by drug test present percentages, number of drug tests, and frequency of drug tests suggests that ISP-S programs resulted in higher client *drug present test* results (>50%), conducted fewer tests, and gave less frequent drug tests than the other programs. Discussion with ISP-S program staff revealed drug testing is random but also used with suspicion of drug use or relapse. Selective use of drug testing may explain the programs' higher drug presence percentages. Drug and mental health courts also conduct random tests and may do so more often with an emphasis on sobriety and on monitoring the use of prescription drugs for psychiatric symptoms and/or medication assisted treatment for treating addictions to alcohol, heroin and opioids (SAMHSA, 2020).

Future program outcome studies should include variables shown to be predictive in this study and others to improve the regression model for ARI funded program outcomes. Here the focus was on the drug test outcome, but what of the aftermath of the drug test? To what extent were sanctions or rewards used to shape drug use behavior? ARI funded programs take a variety of approaches to how they use sanctions and rewards with drug testing. Most consider drug test results along with progress toward completing requirements to apply sanctions and rewards to shape ARI participant behavior. These data are collected with program documentation of every reward, however, many programs do not document smaller rewards, such as candy bars or household items due to their sheer volume. However, major sanctions, such as jail time, increased drug testing, increased probation visits, and decrease in phase or level were more likely to be documented within the ARI database.

No national source of information exists to inform of other widely used sanctions associated with drug testing results or violating other conditions of probation and parole (Kilmer, 2008). The available evidence suggests that sanctions range from “a slap on the wrist” to a return to custody, likely depending on the type of drug, number of times drugs were found in tests, and other client behaviors (Kilmer, 2008). Forty-seven percent of a sample of Illinois probation departments indicated that they apply sanctions after a client has an initial test in which drugs were found and 55% reported they apply sanctions after continuous finding drugs in the tests (Reichert et al., 2020). A future study of the relationship between outcomes, drug testing variables, and sanctions/rewards based on drug test outcomes may result in an improved predictive model for program outcomes.

Finding drugs present in a test may indicate a need for a clinical intervention, rather than a sanction. Cadwallader (2017) argues that more resources have gone toward monitoring and incarceration than to treatment for substance use disorders in community supervision. Instead,

the emphasis should be placed on behavioral techniques over monitoring and compliance-driven approaches (Taxman, 2015). Similarly, Kilmer (2008) highlighted that drug testing under supervision is primarily used for conducting surveillance, monitoring compliance, or detecting use, rather than supporting recovery. Another strategy for improving the predictive model could be the use, or lack of use, of therapeutic approaches to address substance use in community corrections. As mentioned above, a clinical approach to drug use should be the initial response, recommended by The National Institute on Drug Abuse (2015).

Section 6: Conclusion

ARI-funded program data showed drug tests occurred every nine days with an average of 29% finding illicit drug use. The drugs most commonly tested for were heroin, cocaine, opiates, marijuana, and alcohol. Age, test frequency, test positivity rates, and risk level predicted program outcome, whereas sex and race were not predictive. Future program outcome studies should include additional variables to improve the regression model.

The research goals for this study were threefold: to quantitatively examine all drug test data, including tested drugs, drug test frequencies, and drug test results; to systematically examine how drug testing contributed to the possibility of revocation when including other factors, such as age, sex, and race; and to propose recommendations for better program practice to reduce the rate of revocation. We determined drug testing frequency and results influenced the possibility of probation revocation.

In the quantitative examination, we discovered a lack of uniformity in drug testing data structures across sites. The data from two of the sites with the largest amount of drug testing data was structured in a way that made it difficult to include information on the actual drugs tested. This is an issue that would require further study for the next study using ARI drug tests. Currently, there are efforts to create a statewide, uniform probation database that would likely include drug testing data. It is our hopes that such data would be used for future studies.

Recommendations garnered from this study include suggesting that the ARI Performance Measurement Committee continue working with the sites to improve the consistency and uniformity of drug test data submitted, continuing to analyze and interpret the results with additional program variables, and exploring how drug test results are most commonly used by ARI grantees, either as a monitoring device that results in sanctions or rewards, as a therapeutic tool to identify treatment needs, or some combination of the two. Recommendations to reduce the rate of revocation can be developed following a future examination on how drug test results trigger rewards, sanctions, or therapeutic adjustments.

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