

Prescription Drug Misuse in America

Laboratory Insights into the New Drug Epidemic



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Summary

In 2008, more than 36,000 people died from drug overdoses, and most of these deaths were caused by prescription drugs.

- The U.S. Centers for Disease Control and Prevention (CDC)¹

The 20th century's War on Drugs focused on curbing the supply and illegal use of dangerous drugs, such as cocaine, marijuana and heroin. While the crisis involving illicit substances continues, a new—and potentially more dangerous—health epidemic has recently emerged: the increasing misuse of legal, heavily regulated prescription medications.

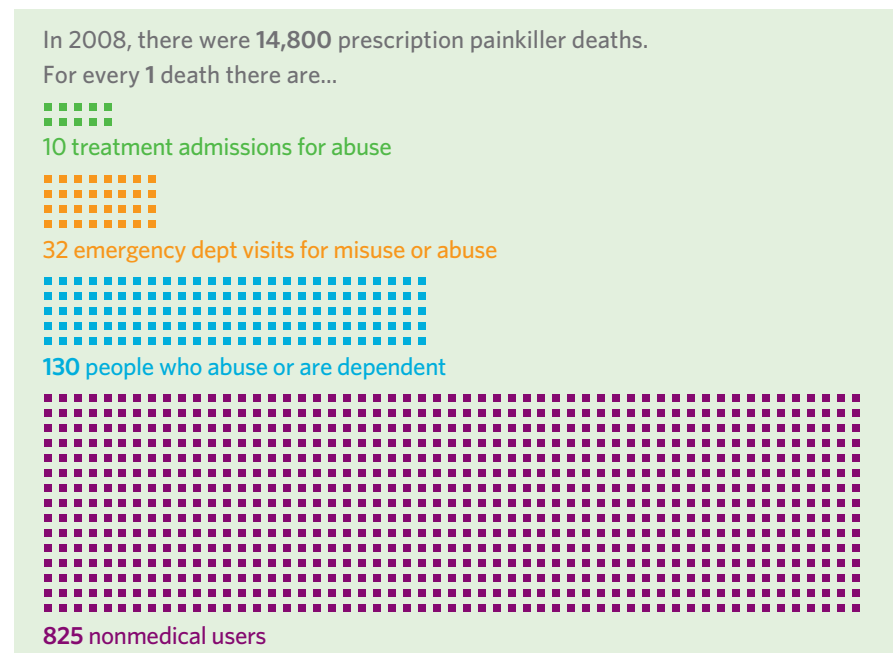
The inappropriate use or diversion of prescription drugs, particularly prescription pain medications, is a national health epidemic. According to the CDC, over 20,000 Americans die each year of prescription drug abuse, 14,800, or 74%, due to misuse of opioid pain medications.¹ Opioid pain relievers now account for more overdose deaths than cocaine and heroin combined. In addition, misuse of prescription pain narcotics was responsible for more than 475,000 emergency room visits in 2009 – nearly double the rate five years prior.¹ Estimated annual costs related to health, crime and productivity associated with illicit drug use, including prescription drug misuse, total more than \$193 billion.²

For those suffering from chronic pain, however, prescription pain medications are often therapeutic necessities. Approximately 116 million Americans suffer from chronic pain – more than the number of people affected by diabetes, heart disease, and cancer combined.³ For many people, pain relief can only be achieved through prescription drug therapies.

Prescription drug misuse takes many forms, such as:

- *selling or giving away medications (diversion)*
- *combining prescribed (and illicit) drugs*
- *patient forgetfulness to take a medication as directed*

FIGURE 1.



Source: Centers for Disease Control and Prevention.¹

Potentially addictive medications are the most commonly abused prescription drugs. They include opioid pain killers, such as oxycodone (e.g. OxyContin®, Percocet®), hydrocodone (e.g. Vicodin®, Lortab®) and methadone (e.g. Dolophine®, Methadose®). They also include central nervous system depressants, mainly prescribed to treat anxiety, including benzodiazepines such as alprazolam (e.g. Xanax®) and stimulants, commonly prescribed to treat attention-deficit hyperactivity disorder (ADHD), primarily amphetamine (e.g. Adderall®).

In recent years, physicians have unexpectedly found themselves at the center of the new front of the prescription drug epidemic. The U.S. Drug Enforcement Administration (DEA) and state licensing boards regulate prescription of controlled substances for legitimate medical use, and set forth requirements for physicians to exercise oversight of controlled prescription medications. Physicians who do not comply may face malpractice liability and criminal prosecution.⁴ In addition, 48 states and one territory have operating prescription monitoring programs or have passed legislation to implement them.⁵

Physicians have several tools to help monitor patients for prescription drug adherence, including: clinical observation and evaluation; requiring patients to sign 'pain contracts' that specify rules patients must follow; self-reporting questionnaires; interviewing a patient's prior doctors; and reviewing past medical records. Yet, research suggests some physicians do not commonly employ these tools in practice.⁶ In addition, some patients may mislead their physicians about their drug use and urine drug tests may therefore provide an objective basis for assessing appropriate medications.

Laboratory testing to identify the presence of prescribed or non-prescribed drugs and drug metabolites aids physician monitoring for drug misuse. Organizations such as the American Pain Society and American Academy of Pain Medicine in their 2009 Clinical Guidelines on "The Use of Chronic Opioid Therapy in Chronic Noncancer Pain", and the American College of Occupational and Environmental Medicine in their 2011 "Guidelines For The Chronic Use of Opioids", have included recommendations for urine drug testing.

About this study

This study provides insight into trends in the misuse of prescription drugs. As the world's leading diagnostic testing company, Quest Diagnostics is well positioned to identify trends in prescription drug monitoring and misuse. Our comprehensive prescription drug testing services build on our long-standing leadership in workplace drug testing for employers. For information about the use of drugs by American workers, refer to Quest Diagnostics Drug Testing Index™ reports at QuestDiagnostics.com/DTI.

For the present study, Quest Diagnostics medical and health informatics experts analyzed a national sample of 75,997 de-identified urine specimen results performed in 2011. The study included results of patients of both genders, ranging in age from 10 years old and above, from 45 states and the District of Columbia. The objectives of our study were to assess the scope and demographic drivers of prescription drug misuse in America and the impact of laboratory testing on monitoring for prescription drug adherence.

All patients were tested using our proprietary prescription drug monitoring service and medMATCH™ reporting methodology for tests for up to 26 commonly prescribed and abused drugs, including pain medications, central nervous system medications and amphetamines, as well as illicit drugs such as marijuana and cocaine. Our medMATCH service reports if a prescribed drug(s) and drug metabolite(s) are in a specimen, as indicated by the ordering physician, as well as other drugs. A physician's orders specify medications prescribed and which drugs, including illicit, the physician orders for testing. Consistent results are those which indicate only the prescribed drug(s) for the patient was detected. Inconsistent results suggest that the patient did not take the specified drug(s), took the drug with other drugs, or took drugs not indicated by the physician. For more information, refer to "Interpreting a Test Result" called out in the margin.

All specimens are screened by immunoassay-based methods and all positive results were confirmed by mass spectrometry, the most sensitive drug testing method.

Our findings include:

Interpreting a Test Result

Prescription drug monitoring testing identifies whether a drug and/or drug metabolite is present in a urine specimen. The Quest Diagnostics service compares the laboratory results to the prescribed medication(s) indicated by the ordering physician. The "consistency rate" measures the extent to which laboratory test results match the prescribed medication(s) indicated by the ordering physician for the patient.

Laboratory testing does not identify addiction, physical dependence or impairment due to drug use. A negative result typically indicates that the patient did not take the drug. Patient variations, such as hydration state, time since last drug use, genetic differences in drug metabolism and methodology limitations can contribute to a failure to detect a drug in a specimen. However, we believe these factors adversely affected results of a small minority of specimens in our study.

- **The majority of patients tested misused their prescription medications, potentially putting their health at risk.** Test results of the majority of patients (63%) were inconsistent with a physician's orders. Comparable rates of inconsistency were found among all commonly prescribed drug classes tested.
- **Many patients took or combined additional drugs without physician oversight.** Of those patients whose results were inconsistent, more than half (60%) tested positive for drugs not specified by the ordering physician. This finding demonstrates that a large number of patients are using drugs, potentially in dangerous combinations, without the oversight of a trained healthcare professional.
- **A large number of patients showed no drug in their specimen.** In 40% of inconsistent cases, no drug was detected. This finding suggests many patients are failing to take their prescription medication as directed, possibly due to financial constraints (medications too costly), poor compliance or diversion (illegal sale).
- **Anyone is at risk of misuse.** While some groups, such as the very young, were more likely to misuse, our data suggests that women and men of all ages are at risk, regardless of income level and health plan membership.
- **Repeat testing was associated with lower prescription drug misuse.** Among patients tested 30 days or more after an initial screen, the number of patients with inconsistent results declined by 10%. Our data supports medical recommendations that physicians perform routine urine testing to monitor prescription drug misuse.

Majority of Americans Misused Their Prescribed Medications

Key Findings:

- Of patients tested, 63% were inconsistent with a physician's orders.
- Evidence of misuse was found across all commonly prescribed, controlled substances.
- More than half (60%) of inconsistent reports showed evidence of drugs that had not been prescribed by the ordering physician.
- In 40% of inconsistent cases, the prescribed drug was not detected by lab testing.

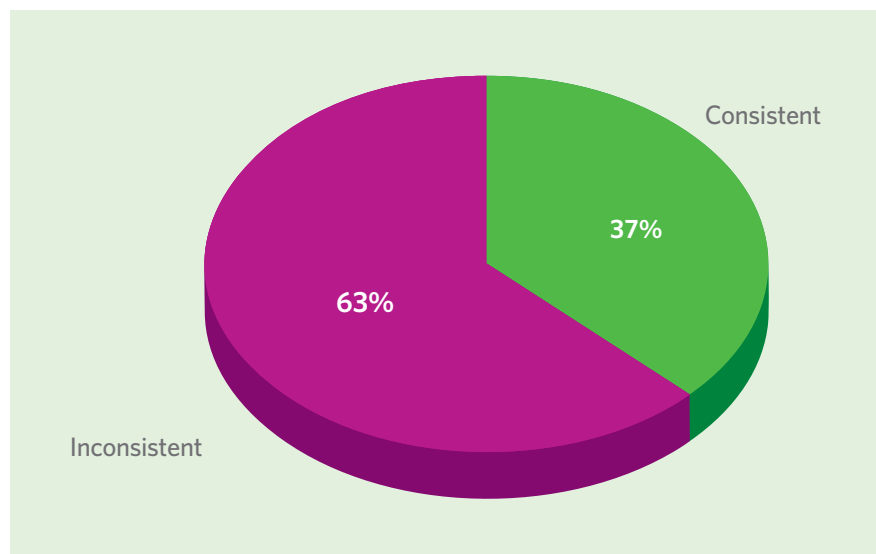
Of patients tested, 63% were inconsistent with a physician's orders. High rates of inconsistency were found among all classes of commonly prescribed drugs tested, including pain (44%), central nervous system (50%), and amphetamine medications (48%). (In any analysis of diagnostic data, the probability of finding a positive result increases as the number of analytes tested increases. For this reason, the overall inconsistency rate is higher than for any specific drug class, and inconsistency rates across drug classes are not directly comparable.)

Factors ranging from hydration state to genetic influences on drug metabolism can result in false negatives in a small minority of patients. Our data suggests that the majority of patients tested misused their prescribed drugs.

"Our data provides unsettling evidence that the prescription drug epidemic affects a wide range of patients in the United States."

- Harvey W. Kaufman, M.D.
Senior Medical Director
Quest Diagnostics

FIGURE 2. DISTRIBUTION OF PRESCRIPTION DRUG MONITORING RESULTS



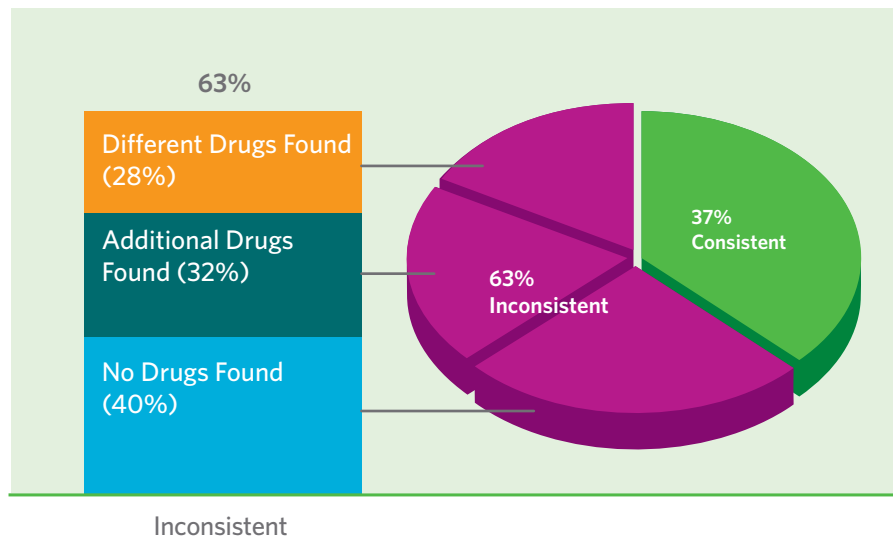
Source: Quest Diagnostics, January - December 2011

Many patients take drugs without physician oversight

More than half (60%) of inconsistent reports showed evidence of drugs that had not been specified by the ordering physician. Specifically, among inconsistent results, 32% tested positive for the prescribed drug(s) and at least one other additional drug. Twenty-eight percent tested positive for a drug, but not the one for which they were prescribed.

Our findings demonstrate that a large number of patients are using drugs, potentially in dangerous combinations, without physician oversight.

FIGURE 3. DISTRIBUTION OF INCONSISTENT RESULTS



Source: Quest Diagnostics, January – December 2011

Laboratory test results for many other patients showed no drug in their specimen

In 40% of inconsistent cases, no drug – including medications specified by the ordering physician – was detected by lab testing. This finding suggests that many Americans are not taking medications prescribed for them to treat a medical condition. It is possible that some patients cannot afford their medications, and skip days (or do not take the drug), while others divert drugs, including potentially selling them to others. Some patients may fill medication prescription(s), but for whatever reason, decide not to use them, wasting healthcare resources.

Anyone is at Risk of Misuse

Key Findings:

- Risk of misuse was highest for younger ages, but all ages are at risk.
- Men and women were at nearly equal risk of misuse, although men were more likely to use illegal drugs.
- Income level correlated only modestly with drug misuse.
- Medicaid beneficiaries tested were more likely to have inconsistent results than those in a private health plan or Medicare.

Age

The risk of misuse was greatest in patients 10 to 24 years of age, according to test results. As many as 73% of adults 18 to 24 years of age and 70% of children 10 to 17 years of age were inconsistent with physician orders. The inconsistency rate was more than 20 percentage points higher in young adults 18 to 24 years of age than patients 65 years of age or older.

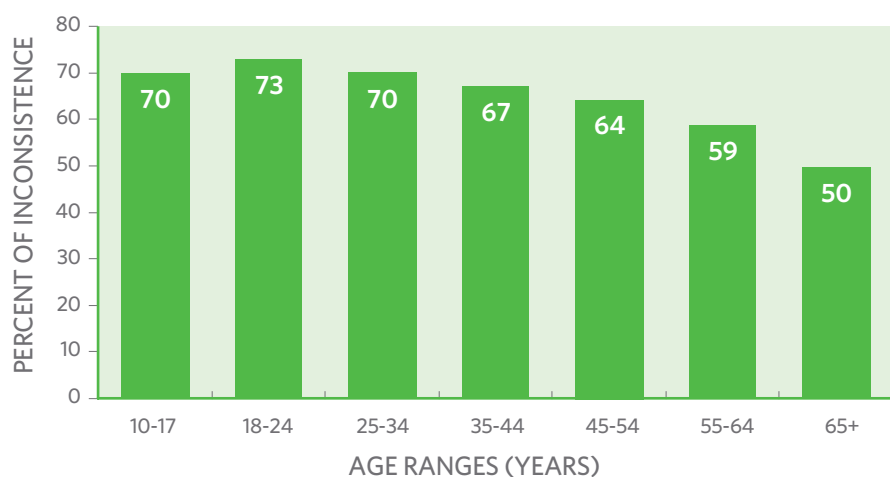
Our finding of high rates of misuse in the young confirms results of other studies on drug use by teenagers, and reinforces the need for stepped up public and physician education of children and young adults about the dangers of prescription drug abuse.⁷

Older patients were also at risk of misuse, with inconsistent results found in one of two (50%) adults 65 years of age and older.

As the number of persons 65 years of age and older skyrockets with the aging of the baby boomers, experts predict that prescription drug abuse among the elderly also will rise significantly.

– Prescription Drug Abuse in the Elderly, *The Consultant Pharmacist* ⁸

FIGURE 4. RATE OF INCONSISTENT RESULTS BY AGE RANGE



Source: Quest Diagnostics, January – December 2011

"No single demographic group, it appears, wholly escapes risk of misuse, abuse or diversion."

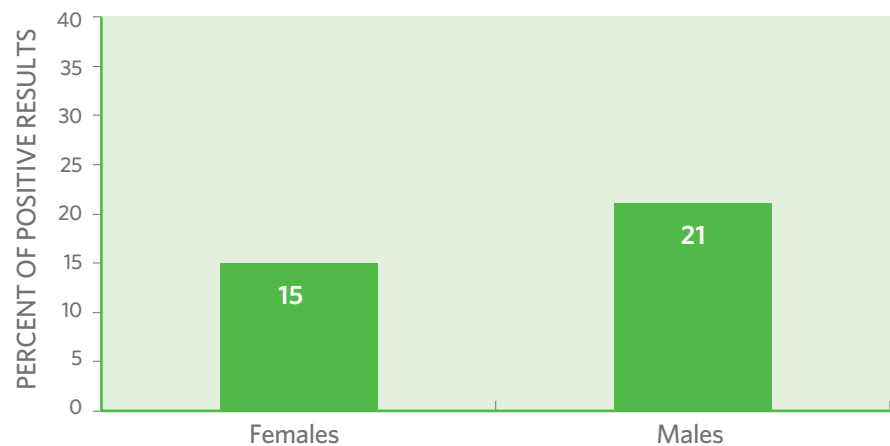
- Harvey W. Kaufman, M.D.
Senior Medical Director
Quest Diagnostics

Physicians should carefully maintain records of their patients' medication, particularly of older Americans, who may be more inclined to use multiple prescribed therapies. Physicians who suspect a patient is misusing one or more medications may also consult with the pharmacist(s) to investigate the prospect of diversion, addiction or other forms of misuse.

Gender

Gender correlated modestly with misuse. The rate of inconsistency between men and women was virtually identical at 63%. However, men were more likely to use illicit drugs: 21% of males tested positive for at least one illicit substance compared to 15% of females.

FIGURE 5. PERCENT OF PATIENTS POSITIVE FOR ONE OR MORE OF THE ILLICIT DRUGS (COCAINE, MARIJUANA, PHENCYCLIDINE)



Source: Quest Diagnostics, January - December 2011

Income

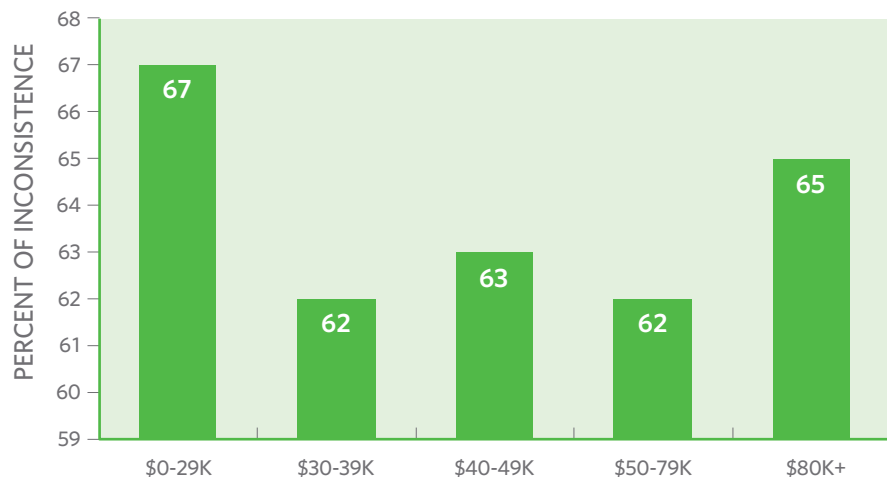
Our analysis of prescription drug use and income is based on U.S. Census data of median income by ZIP code, not by the known annual income of the individual patients.

Two thirds (67%) of patients residing in areas with median income of \$29,000 or less misused prescription drugs, only slightly higher than the rate of 65% for patients in areas with median income of \$80,000 or more, according to lab tests.

However, income did correlate strongly with particular patterns of misuse at a ZIP code level. Among patients with inconsistent results, about 42% in the lowest income category had no reportable drug in their specimen, compared to 35% for those with the highest income. It is possible that less affluent Americans maybe more likely to limit or forgo using their prescribed medications for financial reasons.

The analysis of the results in the more affluent ZIP codes showed higher likelihood of supplemental medications in the urine than what was specified by the ordering physicians. Individuals with high incomes may have the financial resources to access healthcare services – including multiple prescription drugs.

FIGURE 6. RATES OF INCONSISTENT RESULTS BY MEDIAN INCOME RANGE



Source: Quest Diagnostics, January – December 2011

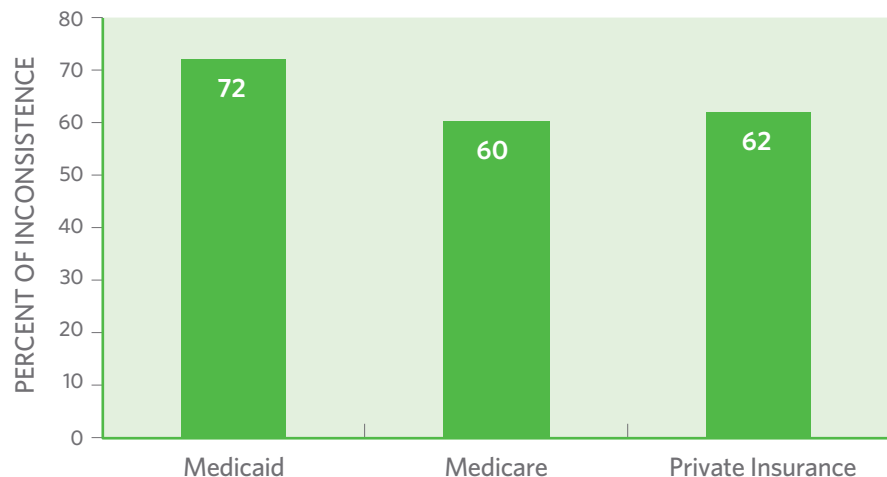
Health Plan Coverage

Comparisons by type of health plan showed broad variation, with Medicaid patients demonstrating lower rates of consistency than Medicare patients and those with private insurance. For all drugs tested, evidence of misuse was found in 72% of samples of Medicaid beneficiaries, compared to 60% of patients on Medicare and 62% in a private health plan.

Our finding that a large number of government beneficiaries are misusing prescription medications is a source of concern, given efforts by states and the federal government to fund overburdened government healthcare programs.

The average “doctor shopper” – someone who gets prescriptions for the same drugs from multiple doctors – costs insurers \$10,000 to \$15,000 a year.

FIGURE 7. RATES OF INCONSISTENT RESULTS BY HEALTH INSURANCE COVERAGE



Source: Quest Diagnostics, January – December 2011

– Prescription for Peril, Coalition Against Insurance Fraud ⁹

Repeat Testing Correlated with Lower Prescription Drug Misuse

Key Findings:

- Our study found that among patients tested at least twice, the number of patients with inconsistent results declined by 10%.
- We also found that repeat testing reduced the number of patients with inconsistent use of pain medications by 17%.
- This finding supports medical recommendations to perform routine urine testing for prescription drug monitoring.

“Urine testing is currently underutilized in the clinical setting and should be considered part of an integrated drug compliance regimen.”

– Pain Physician¹⁰

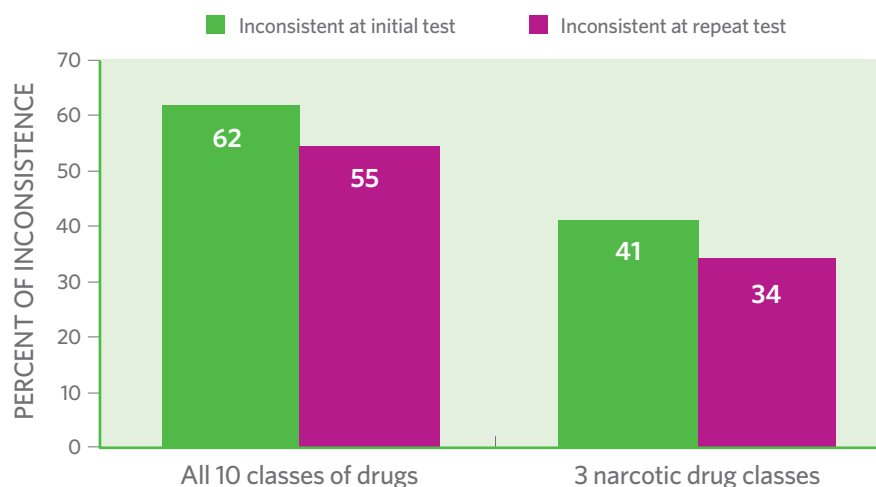
We analyzed 2011 data on 6,858 results of patients who were tested at least twice, 30 days or more apart. Our study found that among patients tested at least twice, 30 or more days after an initial screen, the number of patients with an inconsistent result declined by 10% and the inconsistency rate fell from 62% to 55%.

We also analyzed 2011 data on 6,457 results of patients who were tested at least twice, 30 days or more apart, for the three classes of pain medications: opiates, oxycodone and methadone. Pain medications are the most likely to be abused, and prescription drug monitoring, at least theoretically, may be expected to aid in improving appropriate use. Among these patients, the number of patients whose results were inconsistent declined by 17% and the inconsistency rate fell from 41% to 34%.

The improvement was particularly striking for patients who were inconsistent on their first screen for the pain medications: 50% of these patients were consistent on repeat testing. However, these favorable findings were tempered by data showing that more than 23% of patients whose tests were consistent on an initial screen were inconsistent with repeat testing.

Our findings support medical recommendations to perform routine urine testing.

FIGURE 8. REPEAT TESTING LOWERS INCONSISTENT RATE



Source: Quest Diagnostics, January – December 2011

Research Methodology

Study Objectives

The objectives of our study were to assess the scope of prescription drug misuse in America, identify patterns of misuse and evaluate the impact of laboratory testing on monitoring for prescription drug adherence.

We assessed:

- Inconsistency rates by age, gender, median income and type of health plan membership (Medicare, Medicaid and private health plan).
- The patterns of misuse, including (1) use of non-prescribed illicit or prescription drugs in combination with a prescribed medication; (2) the use of additional, non-prescribed (illegal or controlled) medications; and (3) the failure to use prescribed drugs.
- The effect of repeated testing on patterns of misuse.

“Quest Diagnostics uses advanced mass spectrometry techniques, such as LC-MS/MS, to perform prescription drug monitoring services in its clinical laboratories. Mass spectrometry provides the basis for the highest quality drug testing available to clinicians.”

– F. Leland McClure III
MSci, PhD, D-ABFT

Director, Pain Management and LC-MS/
MS Operations, Quest Diagnostics

Quest Diagnostics Health Trends™ Reports

Quest Diagnostics maintains the largest private clinical laboratory database in the United States. Consisting of de-identified data on more than 1.5 billion patient encounters since 2000, the database provides laboratory information on the vast majority of conditions and diseases affecting Americans. Quest Diagnostics Health Trends reports are designed to identify and track disease and wellness benchmarks to inform patients, healthcare professionals, and policy makers about the current status of the nation's health. Quest Diagnostics Health Trends reports include *Allergies Across America™*, the largest study ever conducted on allergy and asthma testing in the U.S. (2011), as well as peer reviewed and publicly available reports on gestational hypothyroidism, gestational diabetes, type 2 diabetes, cardiovascular disease, H1N1 influenza and rotavirus. For more information, visit QuestDiagnostics.com/HealthTrends.

Prescription Medication Monitoring - Study Population

Quest Diagnostics medical and health informatics experts analyzed a national sample of 75,997 de-identified urine specimen results performed between January 1 and December 31, 2011. Each report represents a single instance of testing per patient. Each report identifies results of testing for as many as 10 drug classes. The study included results of patients of both genders, ranging in age from 10 years old and above, from 45 states and the District of Columbia. The procedures used to de-identify the test results were approved by the Western Institutional Review Board.

All patients were tested using our proprietary prescription drug monitoring service and medMATCH™ reporting methodology for tests for up to 26 commonly prescribed and abused drugs, including pain medications, central nervous system medications and amphetamines, as well as certain illicit drugs, such as marijuana and cocaine. Our medMATCH service reports if a prescribed drug(s), drug metabolite(s) and other drugs are in a specimen, as indicated by the ordering physician.

Our analysis included results of testing services ordered by physicians, such as family practitioners and internists, serving patients in a primary care setting. We also included results of specialists that may be expected to use our prescription drug monitoring services, including psychiatrists, podiatrists and neurologists. The study also included test results ordered for patients under care at pain management clinics and hospitals. We did not include results of patients tested by drug rehabilitation clinics, given the unusually high rates of drug inconsistency expected of this clinical segment.

All specimens were screened by immunoassay-based methods and all positive results were confirmed by mass spectrometry, the most sensitive drug testing method. The specific mass spectrometry methods employed were liquid chromatography-mass spectrometry (LC-MS/MS) and gas chromatography-mass spectrometry (GC-MS), performed in our clinical laboratories.

Our study's strengths include its size and geographic scope, and its use of validated test results by the highly reliable mass spectrometry method.

Its limitations include geographic disparities (only 25 states had more than 1,000 specimens tested in 2011), and the inability to validate or contextualize test results with medical records. Like any lab test, a clinical determination of drug misuse requires consideration of several factors, including test results, patient history and symptoms, made in context of a full medical exam. (Refer to the "Interpreting a Test Result" section on page 4).

Moreover, it is possible that in some cases patients in our study were tested because their physicians suspected a high possibility of misuse, while others were randomly selected for testing. In addition, some physicians may have neglected to indicate all prescription drugs a patient was taking on a patient's report.

Our analysis assesses patterns of prescription drug misuse for the population served by physicians ordering tests from Quest Diagnostics. Quest Diagnostics provides testing services to approximately half of all physicians and hospitals in the United States. However, Quest Diagnostics does not serve all physicians, and these insights may not be reflective of the general population.

Our analysis of prescription drug use and income is based on U.S. Census data of median income by ZIP code, not by the known annual income of individual patients.

Contributors

This report was developed by a team of Quest Diagnostics medical, informatics and communications experts, including F. Leland McClure, Ph.D., Harvey W. Kaufman, M.D., Mouneer Odeh, Xiaohua Huang, and Wendy Bost.

We also wish to acknowledge the contributions of certain Quest Diagnostics colleagues, most notably Ozgur Sensoy, Nancy Lavon and Roberta George.

For more information on our prescription drug monitoring services, visit:

QuestDiagnostics.com

For other Quest Diagnostics Health Trends™ Reports, visit:

QuestDiagnostics.com/HealthTrends

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FIGURE 1.

In 2008, there were **14,800** prescription painkiller deaths.

For every 1 death there are...



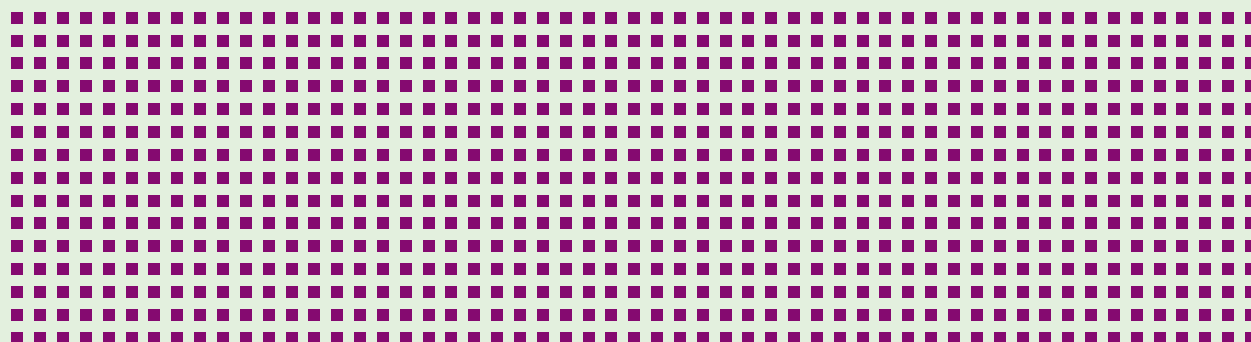
10 treatment admissions for abuse



32 emergency dept visits for misuse or abuse



130 people who abuse or are dependent

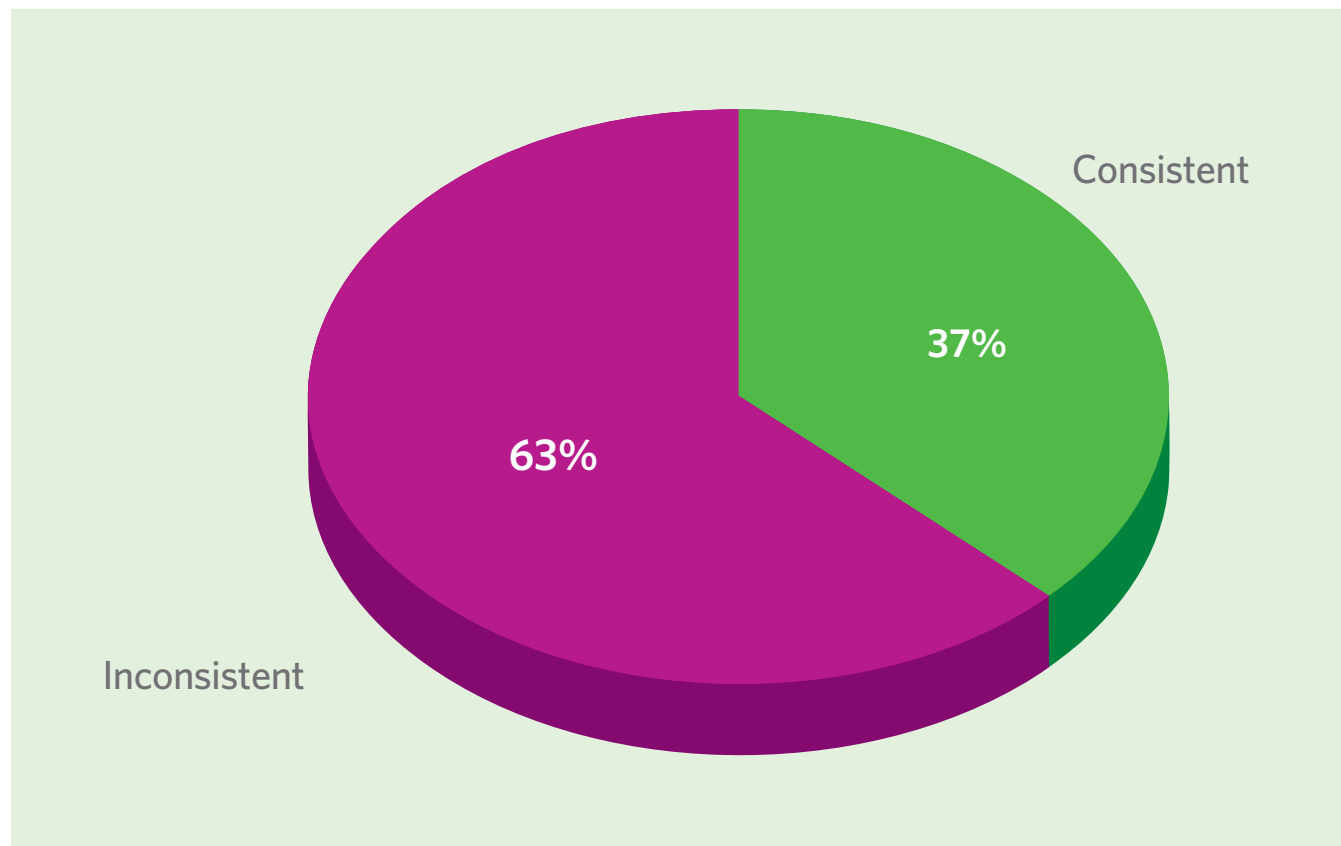


825 nonmedical users

Source: Centers for Disease Control and Prevention¹

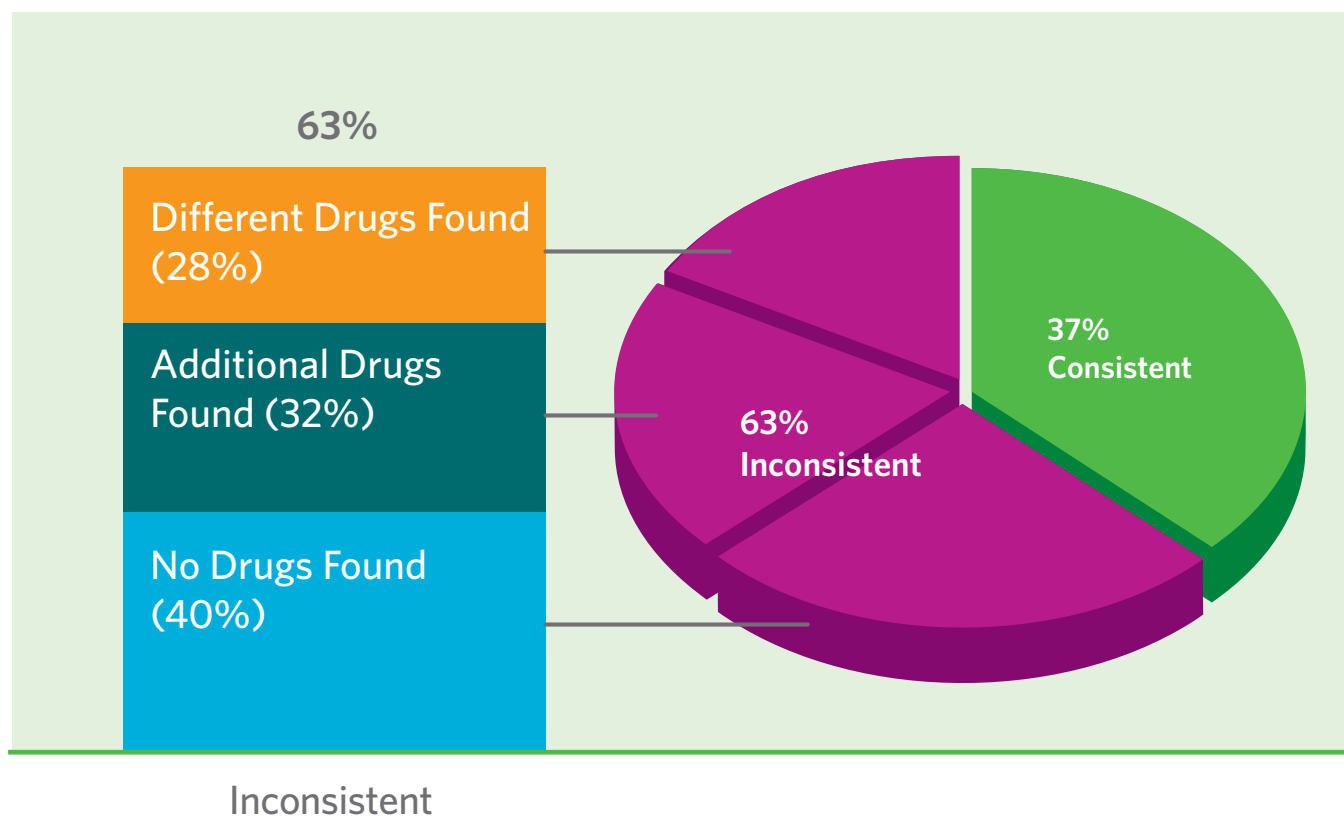
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FIGURE 2. DISTRIBUTION OF PRESCRIPTION DRUG MONITORING RESULTS



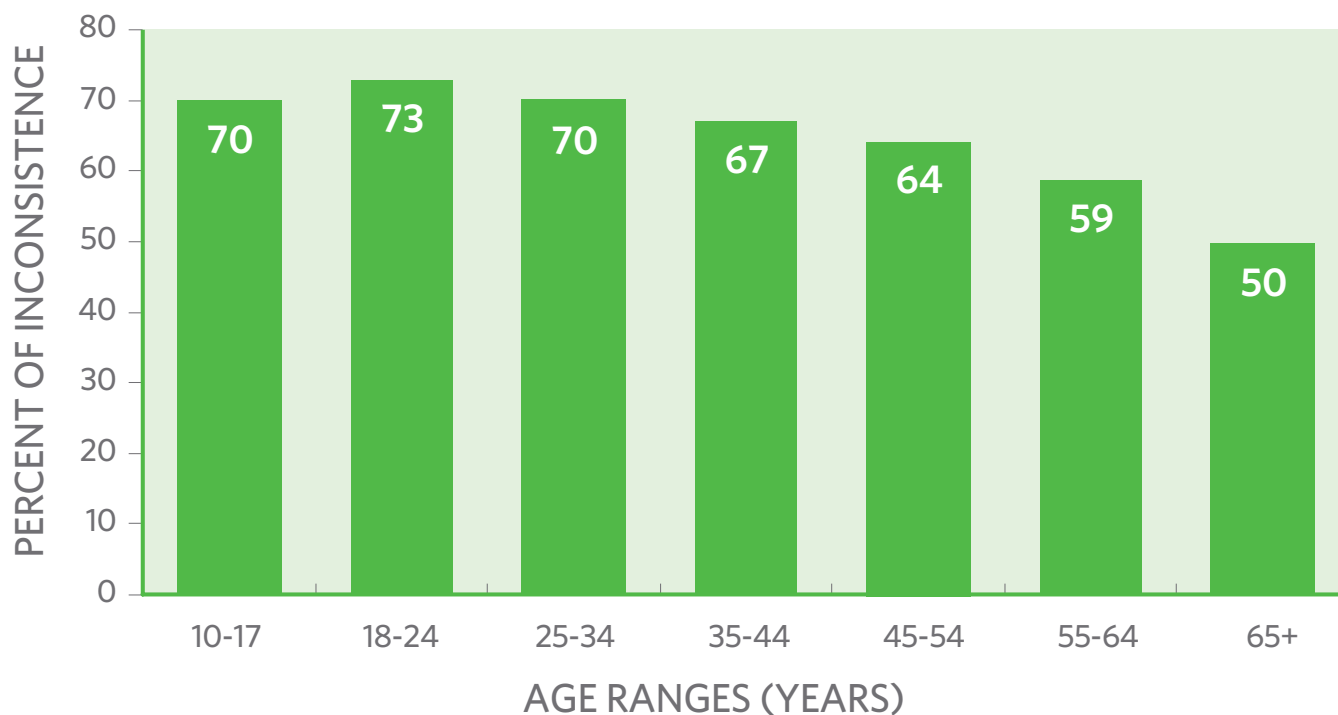
Source: Quest Diagnostics, January – December 2011

FIGURE 3. DISTRIBUTION OF INCONSISTENT RESULTS



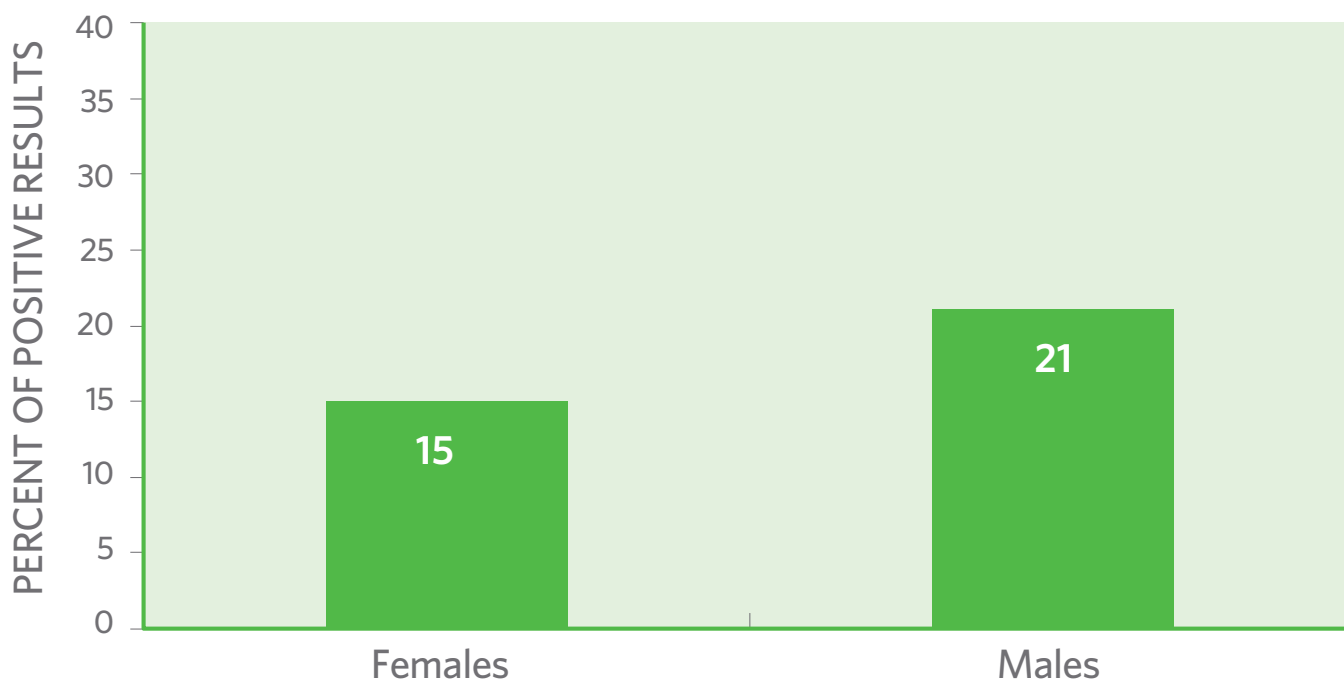
Source: Quest Diagnostics, January – December 2011

FIGURE 4. RATE OF INCONSISTENT RESULTS BY AGE RANGE



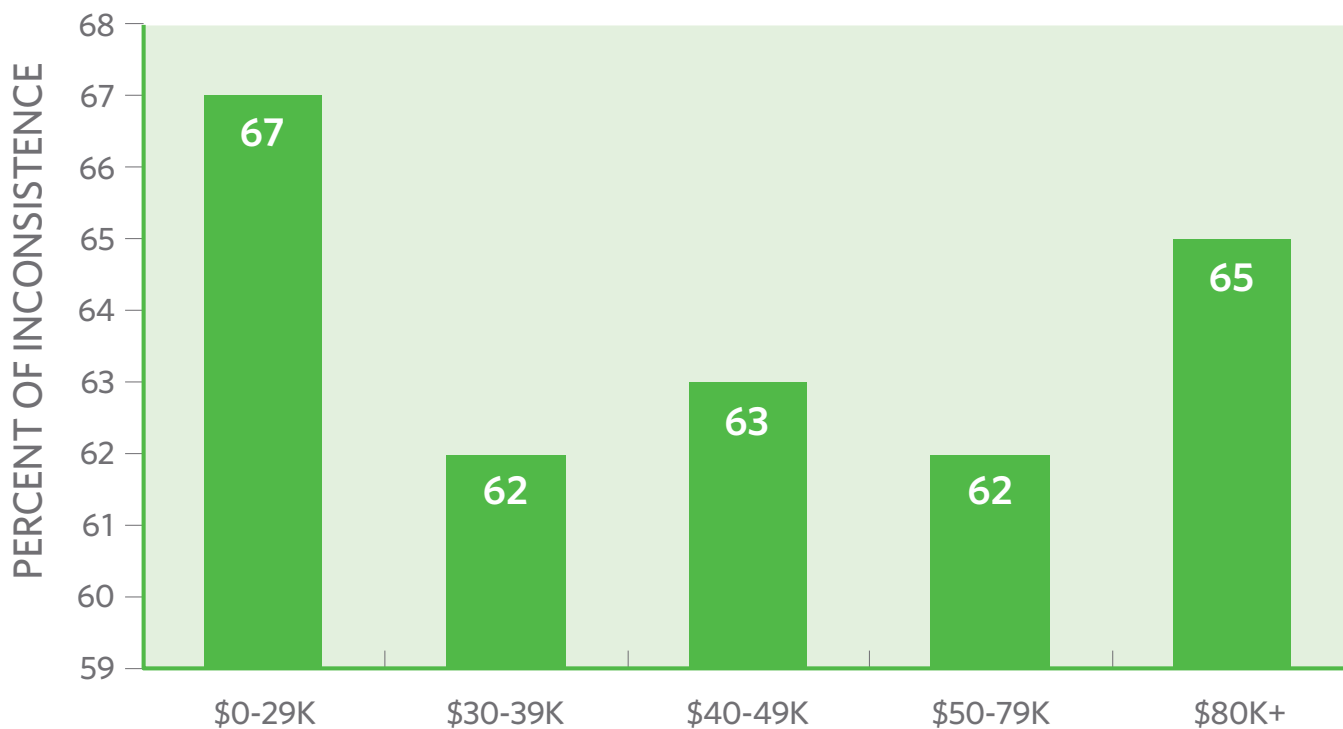
Source: Quest Diagnostics, January - December 2011

FIGURE 5. PERCENT OF PATIENTS POSITIVE FOR ONE OR MORE OF THE ILLICIT DRUGS (COCAINE, MARIJUANA, PHENCYCLIDINE)



Source: Quest Diagnostics, January – December 2011

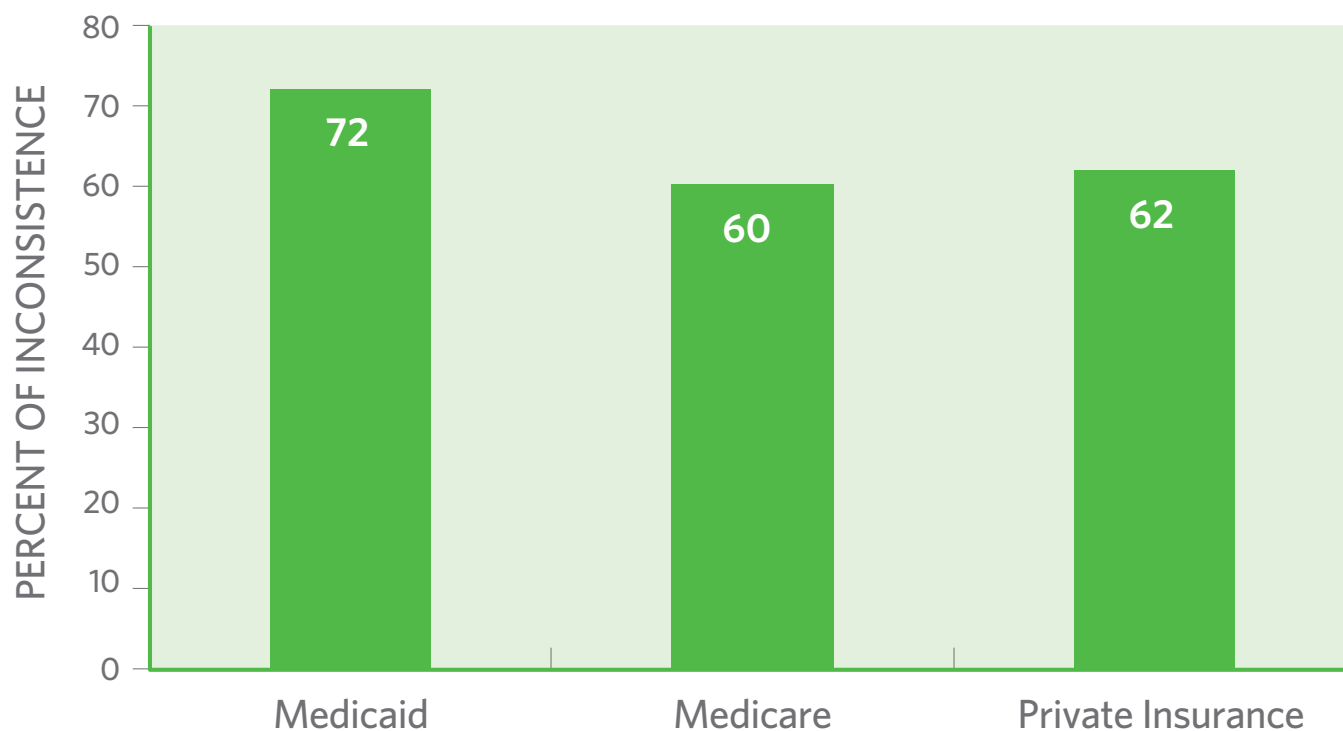
FIGURE 6. RATES OF INCONSISTENT RESULTS BY MEDIAN INCOME RANGE



Source: Quest Diagnostics, January - December 2011

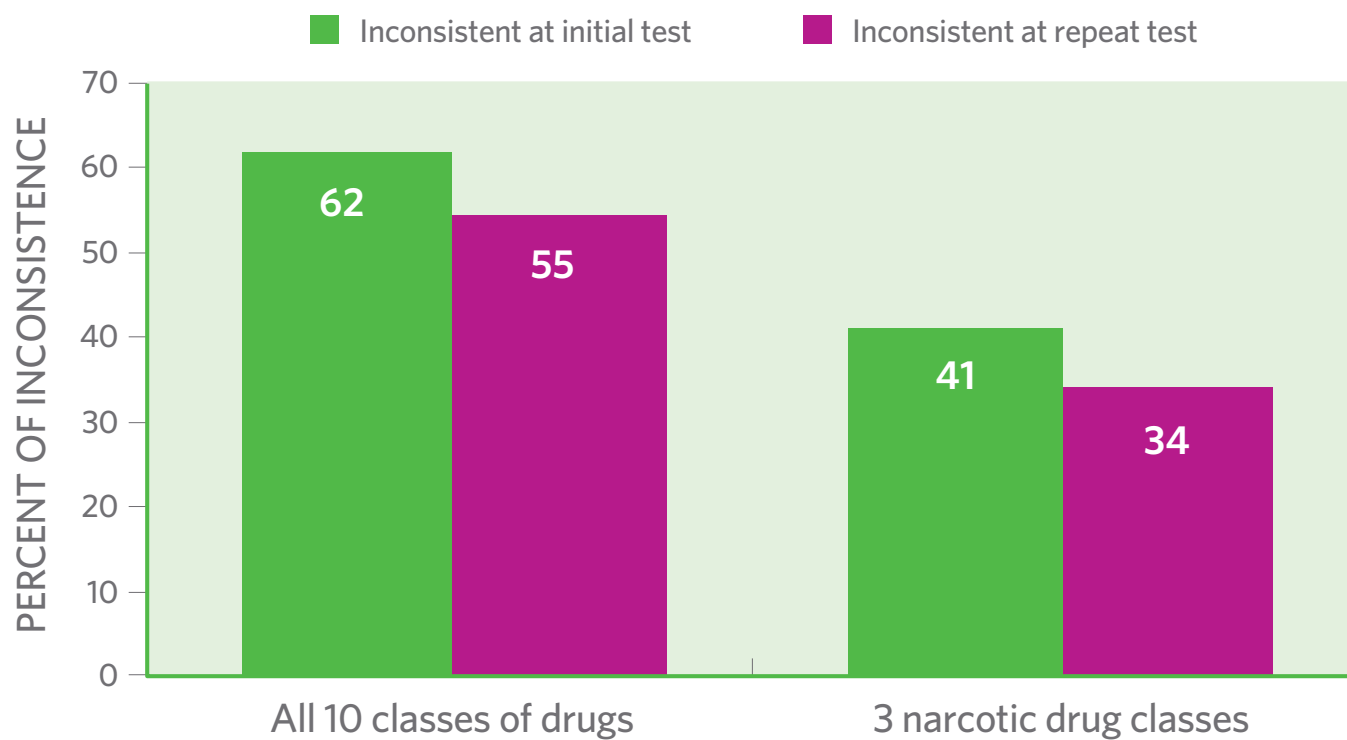
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FIGURE 7. DISTRIBUTION OF INCONSISTENT RESULTS BY HEALTH INSURANCE COVERAGE



Source: Quest Diagnostics, January – December 2011

FIGURE 8. REPEAT TESTING LOWERS INCONSISTENT RATE



Source: Quest Diagnostics, January – December 2011