Drug Testing in the Transportation Industry to Determine Impairment

by

Shelia A. Dowd

A Master’s Paper submitted to the faculty of the University of North Carolina at Chapel Hill in partial fulfillment of the requirements for the degree of Master of Public Health in the Public Health Leadership Program.

December 2012

Approved by:

_______________
Susan A. Randolph, Advisor

_______________
Kathleen Buckheit, Reader
ABSTRACT

The purpose of the U.S. Department of Transportation’s (DOT) drug and alcohol program is to protect the safety of employees, co-workers, and the traveling public. However, drug testing for transportation employees does not determine impairment for over-the-counter and prescribed medications. A covered employee under the influence of over-the-counter and prescription medications poses the same threat to safety as one who is under the influence of illicit drugs; therefore, measures should be taken to deter any impairing substance – regardless of whether or not the substance is legally obtained. Some over-the-counter and prescription medications have the potential to cause impairment; however, it is difficult to determine the dosage levels at which one will become impaired. Urine collection is the means of collection and is susceptible to subversion attempts. More research is needed to determine the method of collection and the dose at which one becomes impaired.

The Occupational and Environmental Health Nurse (OHN) is uniquely qualified to manage drug and alcohol programs due to experience in clinical nurse training and comprehensive workplace knowledge. The OHN recognizes the physical and psychological symptoms of drug impairment and can assist with employee assistance program referrals as needed.

Key words: Occupational Health Nursing, Drug Impairment, Department of Transportation Drug Testing
ACKNOWLEDGEMENTS

This paper would not have been possible without the love, support, and encouragement I received from my beloved, sweet husband Jeff and my precious children, Olivia and Adam. You have sacrificed so much in these past few years and I love you dearly for your loving support and patience. To my beloved sister, Wendy, and brothers, Lance and Shannon, I see the light at the end of the tunnel – hold on! I would not have dreamed of going back to school if it were not for Gerald Richerson and Dr. Rob Harshman. Thanks for believing in me and giving me the courage to succeed. To Paul Bizjak, you gave me my very first job in occupational health nursing! You and Billie have always been so patient with my questioning attitude and I appreciate the time you spent instilling in me a tremendous desire to learn and excel in my career. To Pam Remson, thank you for your kind words of wisdom – you have a beautiful soul and make me want to become a better person. To Dr. Rogers, thank you for taking a chance and accepting me into your esteemed program. I still remember the very first class you taught me. I sat on the front row but heard very little words because I was in such disbelief that I was sitting just a few feet away from one that I have always known without question to be the leading expert in occupational health nursing. To my advisor, Susan Randolph, thank you for your patience and efforts throughout this process – you deserve a gold star for putting up with me these few years. To Kathleen Buckheit, thank you for saving me and agreeing to be my second reader. Your positive attitude is like a breath of fresh air! I wish to thank my dear colleague, Kim Dennison. It is with absolute certainty that can I say I would not have made it through this program without your supportive attitude, confidence, and true friendship. Most importantly, dearest Mother, this is for you!
# TABLE OF CONTENTS

<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Abstract</td>
<td>ii</td>
</tr>
<tr>
<td>Acknowledgements</td>
<td>iii</td>
</tr>
<tr>
<td>Table of Contents</td>
<td>iv</td>
</tr>
<tr>
<td>List of Tables</td>
<td>viii</td>
</tr>
<tr>
<td>Chapters:</td>
<td></td>
</tr>
<tr>
<td>I. INTRODUCTION</td>
<td>1</td>
</tr>
<tr>
<td>Purpose of Drug Testing</td>
<td>3</td>
</tr>
<tr>
<td>Department of Transportation Drug Panel Tests</td>
<td>5</td>
</tr>
<tr>
<td>Limitations of Drug Testing</td>
<td>6</td>
</tr>
<tr>
<td>Definitions</td>
<td>7</td>
</tr>
<tr>
<td>Illicit Drugs</td>
<td>7</td>
</tr>
<tr>
<td>Safety-Sensitive</td>
<td>8</td>
</tr>
<tr>
<td>Drug-Impaired Driving</td>
<td>8</td>
</tr>
<tr>
<td>II. HISTORY OF DRUG TESTING FOR THE DEPARTMENT OF TRANSPORTATION</td>
<td>10</td>
</tr>
<tr>
<td>The Omnibus Transportation Employee Testing Act of 1991</td>
<td>11</td>
</tr>
<tr>
<td>Alcohol Testing</td>
<td>12</td>
</tr>
<tr>
<td>Covered Agencies</td>
<td>12</td>
</tr>
<tr>
<td>Federal Motor Carrier Safety Administration</td>
<td>12</td>
</tr>
<tr>
<td>Federal Aviation Administration</td>
<td>13</td>
</tr>
</tbody>
</table>
Federal Railroad Administration ................................................................. 13
Federal Transit Administration ................................................................. 13
Pipeline and Hazardous Material Safety Administration .......................... 14
United States Coast Guard ........................................................................ 15
Regulations ................................................................................................. 16
The Five Panel Drug Screen ....................................................................... 17
Methods of Testing ...................................................................................... 17
Urine Specimens ......................................................................................... 17
Blood Specimens ....................................................................................... 21
Hair Specimens .......................................................................................... 21
Sweat Specimens ....................................................................................... 22
Oral Fluid Specimens ................................................................................ 22
Medical Review Officer ............................................................................. 23
Non-Negative Specimens .......................................................................... 25
Positive Drug Tests .................................................................................... 25
Implications of Positive Tests .................................................................... 28
Substance Abuse Professional ................................................................... 28

III. DRUG TESTING PROGRAMS ................................................................ 31
Federal Motor Carrier Safety Administration (49 CFR Part 382) ............. 31
Federal Transit Administration (49 CFR Part 655) .................................... 35
Federal Railway Administration (49 CFR Part 219) .................................. 36
Federal Aviation Administration (14 CFR Part 120) ................................ 38
Pipeline and Hazardous Material Safety Administration (49 CFR Part 199) 40
United States Coast Guard (46 CFR Parts 4, 5, and 16) .............................................41
Laboratory Testing ..............................................................................................................42
Certified Department of Health and Human Services Laboratory ....................................42
Cutoff Levels ....................................................................................................................43
Over-the-Counter and Prescription Medications ..............................................................46
Benzodiazepines ..............................................................................................................48
Narcotics ..........................................................................................................................49
Zolpidem ..........................................................................................................................50
Gamma-Hydroxybutyrate ...............................................................................................50
Antihistamines ................................................................................................................51
Muscle Relaxants ............................................................................................................51

IV. ROLE OF THE OCCUPATIONAL AND ENVIRONMENTAL HEALTH NURSE

Designated Employee Representative ..............................................................................53
Policy Development ........................................................................................................54
Education and Training ....................................................................................................54
Vendor Selection .............................................................................................................54
Legal and Regulatory Compliance ....................................................................................55
  Americans with Disabilities Act and Legal Considerations ............................................56
Budget Considerations ....................................................................................................56
Referrals and Counseling ...............................................................................................57
Return-to-Work ...............................................................................................................57
Recordkeeping .................................................................................................................59
Random and Follow-Up Pools ................................................................. 59
Program Evaluation .................................................................................. 59

V. RECOMMENDATIONS AND SOLUTIONS .............................................. 61
Expanded Panel .......................................................................................... 61
Prescription Drug Monitoring Programs .................................................... 61
Training ........................................................................................................ 62
Research ....................................................................................................... 63
References ................................................................................................... 64
LIST OF TABLES

<table>
<thead>
<tr>
<th>Table</th>
<th>Title</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.1</td>
<td>Overview of Safety-Sensitive Job Classes Per Agency</td>
<td>4</td>
</tr>
<tr>
<td>2.1</td>
<td>DOT Laboratory Drug Testing from 2005 to 2010</td>
<td>26</td>
</tr>
<tr>
<td>3.1</td>
<td>Types of Screening Tests for Drugs by Agency</td>
<td>32</td>
</tr>
<tr>
<td>3.2</td>
<td>Cutoff Concentrations for DOT Drug Tests</td>
<td>44</td>
</tr>
<tr>
<td>4.1</td>
<td>Withdrawal and Chronic Use Symptoms by Substance</td>
<td>58</td>
</tr>
</tbody>
</table>
CHAPTER I
INTRODUCTION

The United States (U.S.) Department of Transportation (DOT) oversees air, highway, railroad, transit, waterborne, and pipeline transportation agencies and ensures fast, safe, efficient, accessible, and convenient transportation (U.S. Department of Transportation [DOT], 2012a). The U.S. population is expected to increase from 307 million to 439 million over the next 40 years (U.S. DOT, 2012b). This will more than double the demand for both freight and passenger transportation by 2050 (U.S. DOT, 2012b). The transportation system plays a critical role in maintaining economic competitiveness which requires consideration of safety, the stewardship of transportation assets, livable communities, personal mobility, implementation of new technology, and environmental sustainability in addition to economic growth (U.S. DOT, 2012b).

The DOT outlines five strategic goals for America’s transportation system including safety, state of good repair, economic competitiveness, livable communities, and environmental sustainability; of these five goals, safety is the top priority (U.S. DOT, 2012b). The safety strategic goal is to “bring a department-wide focus on reducing transportation-related fatalities and injuries” (U.S. DOT, 2012b, p. 3). The safety strategic goal recognizes the need to effectively manage distracted driving and other dangerous behaviors as well as better utilize the Federal role in transit safety, including strategies to address the most serious safety risks in all transportation roles (U.S. DOT, 2012b). In 2009, large trucks and buses, also known as commercial motor vehicles (CMV), represented 4.7 percent (11.8 million) of all of the 252.4 million registered vehicles and accounted for 10.2 percent of the total Vehicle Miles Traveled
(VMT) in the Nation’s roadways (U.S. DOT, 2012b). In 2010, there were 3,944 fatalities involving a CMV, which was nine percent higher than 2009’s best ever performance (U.S. DOT, 2012b).

Substance abuse in the workplace costs the U.S. an estimated $276 billion per year. In 2007, approximately 12 million or 60% of adults with substance abuse illnesses were full time employees, and employers incurred a large share of costs from lost productivity and increased healthcare needs. The burden to the employer includes higher healthcare expenses; higher absentee rates, lost productivity and performance; higher workers’ compensation claims; and safety and other risks to employers (U.S. DOT, 2012b).

Aviation safety is at an all time low with a 25 percent decrease in fatalities in the past 10 years (U.S. DOT, 2012b). The last decade has also been the safest for the railroad industry with a 33 percent decline from 16,919 in 2000 to 11,317 in 2010 (U.S. DOT, 2012b). Transit (public transportation systems) provides nearly 33 million passenger trips each working day and is one of the safest modes of travel with 366 total fatalities in 2010 (U.S. DOT, 2012b). Hazardous material transportation (hazmat) fatalities average 13 fatalities per year over the past 10 years (2001-2010) with nearly all fatalities from 2005 to 2009 a result of derailment or transportation rollover (U.S. DOT, 2012b). While the probability of an event is low, the consequences of an accident are high due to the volatility of commodities transported such as gasoline, diesel fuel, fireworks, hydrochloric acid, sulfuric acid, and chlorine (Pipeline & Hazardous Materials Safety Administration, 2011). Pipelines have experienced a 50 percent decline in fatal injuries over the past two decades; this mode of transportation also presents high consequences to people and the environment in the event of an incident. Pipelines stretch more than 2.6 million miles across the U.S. with over 81 percent for gas distribution (Pipeline & Hazardous Materials Safety Administration, 2011).
administration, 2012). the consequences of incidents in allentown, pennsylvania; philadelphia, pennsylvania; san bruno, california; and marshall, michigan severely affected public safety due to natural gas pipeline ruptures (U.S. DOT, 2012b).

In a 2011 report, the U.S. coast guard (USCG) reported a downward trend in occupational injuries with zero fatalities and a 47 percent reduction in injuries from fiscal year 2003 (U.S. coast guard, n.d.a). The USCG attributes the decline in injuries to innovative safety programs, solid leadership, an emphasis on operational risk management practices, personnel outreach efforts, and safety training programs (U.S. coast guard, n.d.a). The USCG continues to be challenged by off-duty motor vehicle accidents involving active duty members. The office of shore safety and the health, safety and work life service center provided additional off-duty motor vehicle safety awareness training, leadership education, motorcycle training, and online motor vehicle training, in addition to other educational programs offered to employees. This initiative resulted in a 14 percent decrease in fatalities and a 16 percent decrease in all motor vehicle accidents from 2010 to 2011 (U.S. coast guard, n.d.a).

Purpose of Drug Testing

The Secretary of the office of transportation, ray lahood, states that safety is the number one priority and that ensuring those in safety sensitive positions are 100 percent drug and alcohol-free is the cornerstone of the safety program (U.S. DOT, 2012b). Workers assigned to safety sensitive positions can include those working on pipelines, driving a truck, operating a ferry, steering a train, or repairing an airplane (Juffras, 2003). Table 1.1 provides a summary of the job classifications which are considered safety-sensitive for each agency (U.S. DOT, 2009a). The DOT is a world leader in regulated drug and alcohol testing and is the largest testing program in the world.
# TABLE 1.1

**OVERVIEW OF SAFETY-SENSITIVE JOB CLASSES PER AGENCY**

<table>
<thead>
<tr>
<th>Agency</th>
<th>Jobs Defined as Safety-Sensitive</th>
</tr>
</thead>
<tbody>
<tr>
<td>Federal Aviation Administration (FAA)</td>
<td>Flight crews, flight attendants, flight instructors, air traffic controllers at facilities not operated by the FAA or under contract to the U.S. military, aircraft dispatchers, aircraft maintenance or preventative maintenance personnel, ground security coordinators and aviation screeners. Direct or contract employees of 14 CFR Part 121 or 135 certificate holders, Section 91.147 operators and air traffic control facilities not operated by the FAA or under contract to the U.S. Military</td>
</tr>
<tr>
<td>Federal Motor Carrier Safety Administration (FMCSA)</td>
<td>Commercial Drivers License (CDL) holders who operate Commercial Motor Vehicles, 26,001 lbs. gross vehicle weight rating or greater, or operate a vehicle that carries 16 passengers or more including the driver, or required to display a DOT placard in the transportation of hazardous materials</td>
</tr>
<tr>
<td>United States Coast Guard (USCG)</td>
<td>Crewmembers operating a commercial vessel</td>
</tr>
<tr>
<td>Pipeline and Hazardous Materials Safety Administration</td>
<td>Operations, maintenance, and emergency response</td>
</tr>
<tr>
<td>PHMSA</td>
<td></td>
</tr>
<tr>
<td>Federal Railroad Administration (FRA)</td>
<td>Hours of Service Act personnel, engine &amp; train, signal service, or train dispatchers</td>
</tr>
<tr>
<td>Federal Transit Administration (FTA)</td>
<td>Vehicle operators, controllers, mechanics, and armed security</td>
</tr>
</tbody>
</table>

*Source:* U.S. DOT, 2009b
The purpose of the DOT drug and alcohol testing program is to protect the safety of employees, co-workers, and the traveling public (U.S. DOT, 2009b). The DOT regulation 49 CFR Part 40 (hereafter also referred to as the Rule) provides guidance on conducting drug and alcohol testing, who is authorized to participate in the drug and alcohol testing program, and what is required for employees, prior to return-to-work, following a drug or alcohol violation. The Rule covers anyone designated in the DOT regulations as a safety-sensitive employee and includes over 12.1 million individuals. The Office of Drug and Alcohol Policy and Compliance (ODAPC) publishes the Rule and provides authoritative interpretation. Each agency’s regulations must adhere to DOT’s testing procedures found at 49 CFR Part 40; therefore, the testing and reporting requirements are the same for those who work in the motor carrier industry as those, for instance, in the aviation industry (U.S. DOT, 2012b).

**Department of Transportation Drug Panel Tests**

DOT drug tests are analyzed for the following five drugs or drug metabolites: marijuana metabolites, cocaine metabolites, amphetamines (includes methamphetamines), opiates (includes codeine, heroine, and morphine), and phencyclidine, which is also known as PCP (U.S. DOT, Drug and Alcohol Policy and Compliance Office, 2012). The drug panel, commonly known as the Five Panel drug screen, is limited to testing for illicit drug use. The Rule does not allow additional tests of the DOT urine specimen; in other words, no additional drug tests other than the Five Panel drug screen can be tested and the urine cannot be used for DNA testing. The Rule does allow the urine specimen to be tested as part of a physical exam required by DOT agency regulations (e.g., for glucose). If additional non-DOT tests are requested, a second urine specimen must be collected (U.S. DOT, Drug and Alcohol Policy and Compliance Office, 2012).
Limitations of Drug Testing

Since the DOT tests for illicit drug use only, abuse of over-the-counter and most prescription drugs is not detected. Many of them can cause impairment and are as much of a threat to safety as those tested per the Rule. Walsh, Verstraete, Huestis, and Morland (2008) reviewed the literature from the last 10 years and found that six classes of drugs are most frequently identified in driving under the influence (DUI) arrests and motor vehicle crash victims: cannabis, benzodiazepines and other tranquilizing agents, opioids, stimulants [amphetamine, cocaine, methamphetamine, methylenedioxymethylamphetamine (MDMA)], antidepressants, and antihistamines. Walsh et al. (2008) also recommended that studies be conducted on synthetic drugs such as oxycodone, hydromorphone, fentanyl, methylphenidate, and modafinil. Over-the-counter diphenhydramine, a first generation antihistamine often used for allergies and as a sleep aid, severely impairs tracking and reaction time during on-the-road driving tests and may cause more impairment than alcohol (National Highway Traffic Safety Administration [NHTSA], n.d.c).

Compton, Vegega, and Smither (2009) reported that the behavioral effects of drugs are not understood as well as alcohol and, therefore, the ability to predict an individual’s performance at a specific dosage is limited. Ethyl alcohol is a simple molecule that is absorbed through the stomach and large intestine and passes through the blood-brain barrier rapidly. The relationship between the level of alcohol consumed and the behavior associated with the increasing concentrations are predictable and easily measured (Compton et al., 2009). The behavioral effects of other drugs are not as predictable as the chemical complexity of associated molecules make it difficult to determine absorption, action, and elimination from the body. The following factors further complicate the ability to determine level of impairment.
• Drugs have not been tested as extensively as alcohol due to the extensive list of drugs on the market.
• There is a poor correlation between the ability to detect the drug in the blood and actual behavioral impairment.
• The individual may or may not be impaired due to repeated exposures. Some individuals become more tolerant with repeated exposures while others may become less tolerant and show behavioral signs of increased impairment over time.
• Individuals have differing rates of absorption, distribution, action, and metabolism. Some individuals will appear impaired at drug concentrations that are not associated with impairment of others.
• Blood levels of some drugs may accumulate with repeated administrations.
• A much larger impairment may be observed during acute administration as opposed to chronic administration (Compton et al., 2009).

Therefore, specific drug concentration levels cannot be cited as a level at which one would be determined to be impaired from driving or performing other safety sensitive functions unlike the way in which alcohol impairment is measured. It can be concluded that high doses have a larger effect than small doses, well-learned tasks are less affected than novel tasks, and prior exposure to a drug may reduce or accentuate expected effects (Compton et al., 2009).

Definitions

**Illicit Drugs**

NHTSA defines illicit drugs as substances listed in Title 21 USC Controlled Substances Act Section 812 Schedule of Controlled Substances Schedule I through V sections, which are not obtained by a legal and valid prescription (Compton et al., 2009). Schedule I drugs have no
currently accepted medical use in the U.S. and have the most potential for abuse. Schedule V drugs have an accepted medical use in the U.S. and have the least potential for abuse (Compton et al., 2009).

**Safety-Sensitive**

The DOT Rule does not define the term “safety-sensitive.” However, the FMCSA defines the following as safety-sensitive functions:

- An employee at an employer or shipper plant, terminal, facility, or other property, waiting to be dispatched, unless the driver has been relieved from duty by the employer,
- Those who inspect equipment as required by the Rule or otherwise inspecting, servicing, or conditioning any commercial motor vehicle at any time,
- Those at driving controls of a commercial motor vehicle in operation,
- All time in or upon a CMV except time spent resting in a sleeper berth,
- Those who load or unload a vehicle to include those who assist or supervise and remain ready to do so, and
- Those who repair, obtain assistance, or remain in attendance with a disabled vehicle (U.S. DOT, Federal Motor Safety Carrier Administration, 2012).

**Drug-Impaired Driving**

Most state laws define a drug-impaired driver with little variation: presence of drugs rendering a driver incapable of safe driving; driver is under influence or affected by an intoxicating drug; or a statue that makes it a criminal offense for a driver to have a drug or metabolite in his/her body while operating a motor vehicle (Compton et al., 2009).
This paper reviews the regulatory requirements for drug and alcohol testing as well as current literature on the impairing components of common drugs of abuse. The role of the OHN as a drug and alcohol program manager is also discussed.
CHAPTER II
HISTORY OF DRUG TESTING FOR THE DEPARTMENT OF TRANSPORTATION

Congress authorized the creation of the U.S. Department of Transportation (DOT) in 1966 after President Lyndon B. Johnson expressed concern about the lack of a coordinated transportation system. He felt that a single department would be beneficial to carry out comprehensive transportation policies across all transportation agencies (Federal Aviation Administration, 2010). The primary mission of the DOT is to develop and coordinate policies that will provide an efficient and economical national transportation system, which considers the environment and the national defense. The DOT is the primary agency in the federal government responsible for creating and administering policies and programs for safety, adequacy, and efficiency of the transportation system and services (U.S. DOT, Office of the Historian, 2009). The DOT assumed full operations on April 1, 1967.

The National Transportation Safety Board (NTSB) was also formed on the same day to promote a higher level of safety in the transportation system. The NTSB investigates accidents related to transportation of hazardous materials, as well as accidents in the aviation, highway, marine, pipeline, and railroad modes. The NTSB has investigated more than 132,000 accident investigations and made approximately 13,500 safety recommendations (National Transportation Safety Board, n.d.). New drug testing methods will enhance the ability to determine if drivers are impaired as a result of over-the-counter and prescription medications as well as illicit drugs. The NTSB states that they are behind about twenty years in research as compared to what is known about alcohol impairment (Belka, 2012).
The Omnibus Transportation Employee Testing Act of 1991

The Omnibus Transportation Employee Testing Act of 1991, signed by President H. W. Bush, created a drug and alcohol testing program for employees of covered agencies who perform safety-sensitive duties. The act requires that covered transportation employees be subject to pre-employment, reasonable suspicion, random, and post-accident testing for alcohol and illicit drugs. The regulation declared it unlawful for covered transportation individuals to use alcohol or a controlled substance while performing safety-sensitive functions (U.S. DOT, 2009b).

The Act was created as a direct result of a highly publicized August 1991 New York subway train derailment, which killed five and injured 175 passengers (Byrnes, n.d.; Treadwell, 1991). It was the worst New York subway disaster in 63 years (Peele, 1991). The ten car train carrying 500 passengers was traveling southbound in Lower Manhattan when the operator passed out due to alcohol intoxication. The train hit the switch going four times the recommended speed and derailed, splitting the third car down the middle. The operator fled the scene of the accident but was tested thirteen hours after the incident and found to have a blood alcohol concentration of 0.21. The operator was found guilty of manslaughter and sentenced to a maximum of fifteen years in prison.

In January 1991, a Transit Authority doctor gave the train operator a medical evaluation at the direction of management following an incident in which the operator ran a red signal while operating a train. During the physical exam, the physician noted that the operator had a flushed face, red palms, and that “the smell of alcohol was present” (Finder, 1991, p. 1). However, the doctor did not feel there was enough evidence to obtain an alcohol test because the operator’s motor skills seemed normal. Furthermore, management was not notified that the odor of alcohol was detected nor that the operator should be monitored more closely. The operator was
suspended for three days without pay as a result of the incident and then returned to work. There were additional performance issues with tardiness and absences which the investigating Transit Board concluded demonstrated the need to train supervisors to spot symptoms of alcohol and substance abuse (Finder, 1991).

**Alcohol Testing**

In February 1994, the U.S. DOT issued final alcohol testing requirements, which provided additional testing procedures (Finder, 1991). The Rule required that evidential alcohol breath testing devices be used and did not authorize blood testing.

**Covered Agencies**

The Office of Drug and Alcohol Policy and Compliance (ODAPC) was established over 20 years ago to advise the Secretary of the DOT, the DOT Agencies, and the U.S. Coast Guard (USCG) on drug enforcement and drug testing issues. The responsibilities were expanded as a result of the Omnibus Transportation Employee Testing Act of 1991. Through 49 CFR Part 40, ODAPC states how to conduct testing and how to return employees to work following a DOT drug and alcohol regulation violation. Each DOT Agency-specific regulation determines who is subject to testing, when testing should be done, and in what situations testing is done for a particular transportation industry. The U.S. Department of Health and Human Services certifies laboratories and determines the testing procedures and which drugs will be tested. Each DOT Agency-specific regulation provides instruction on who is subject to testing and when the subject should be tested and under what circumstances (U.S. DOT, 2009b).

**Federal Motor Carrier Safety Administration**

The Federal Motor Carrier Safety Administration (FMCSA) was established January 1, 2000 as a result of the “Motor Carrier Safety Improvement act of 1999” (Wikipedia, 2012, para. 2). The primary mission of the FMCSA is improving the safety of commercial motor vehicles
(CMV) and truck drivers through enactment of safety regulations. 49 CFR Part 382 mandates the drug and alcohol testing for the FMCSA (U.S. DOT, 2009b).

**Federal Aviation Administration**

The Federal Aviation Administration (FAA) was created by the passage of the Federal Aviation Act of 1958. It was originally called the Federal Aviation Agency but changed its name when it joined the Department of Transportation in 1967 (Tyson, n.d.). The mission of the FAA is to “provide the safest, most efficient aerospace system in the world” (Tyson, n.d., para. 1). The FAA drug and alcohol regulation, 14 CFR Part 120, establishes a program designed to deter drug and alcohol misuse by employees who perform safety-sensitive functions in aviation (Tyson, n.d.).

**Federal Railroad Administration**

The Federal Railroad Administration (FRA) was created by the Department of Transportation Act of 1966 for the purposes of enforcing rail safety regulations; administering railroad assistance program; conducting research and development in support of improved railroad safety and national rail transportation policy; providing for the rehabilitation of Northeast Corridor rail passenger service; and establishing government consolidation for support of rail transportation (U.S. DOT, Federal Railroad Administration, n.d.). The FRA drug and alcohol regulation, 49 CFR Part 219, establishes a program designed to prevent accidents and casualties in railroad operations that result from drug and alcohol impairment (U.S. Government Printing Office, 2012).

**Federal Transit Administration**

With resources from the Public Works Administration, urban mass transportation
programs began during the administration of President Franklin D. Roosevelt to combat the Great Depression by investing heavily in a variety of public works. Funds were granted to Chicago and New York for subway infrastructure.

In 1962, President John F. Kennedy sent a program to Congress for approval which called for the establishment of a program of federal assistance for mass transportation, stating:

To conserve and enhance values in existing urban areas is essential. But at least as important are steps to promote economic efficiency and livability in areas of future development. Our national welfare therefore requires the provision of good urban transportation, with the properly balanced use of private vehicles and modern mass transport to help shape as well as serve urban growth. (Federal Transit Administration. n.d.a., para. 8)

President Lyndon Johnson signed the Urban Mass Transportation Act into law on July 9, 1964 with responsibilities assigned to the Department of Housing and Urban Development (Federal Transit Administration, n.d.a). The functions were transferred to the Department of Transportation under the Reorganization Plan No. 2 of 1968 (Waite, n.d.). The Federal Transit Administration (FTA) drug and alcohol regulation, 49 CFR Part 655, establishes a program for employees and contractors of the FTA and to help prevent accidents, injuries, and fatalities which may occur as a result of misuse of alcohol and the use of prohibited drugs (Federal Transit Administration, n.d.b).

**Pipeline and Hazardous Material Safety Administration**

The Pipeline and Hazardous Material Safety Administration (PHMSA) was created under the Norman Y. Mineta Research and Special Programs Improvement Act of 2004 to focus on pipeline and hazardous materials transportation policies and procedures. This was previously
addressed by the DOT’s Research and Special Programs Administration (AllGov, n.d.). The new agency develops and enforces regulations for the 2.3 million mile pipelines transportation system, aims to eliminate deaths, injuries, incidents, and environmental and property damage when hazardous materials are shipped, works to reduce harmful consequences as a result of pipeline failures, and sponsors research projects for the latest technological advances in safety procedure upgrades (AllGov, n.d.). The PHMSA 49 CFR Part 199 regulation requires that drug and alcohol testing be conducted on those who perform operation, maintenance, or emergency-response functions (Pipeline & Hazardous Materials Safety Administration, n.d.).

**United States Coast Guard**

United States Coast Guard (USCG) is one of the Nation’s oldest organizations which dates back to when President George Washington signed the Tariff Act on August 4, 1790. The act authorized the construction of vessels to enforce federal tariff and trade laws to prevent smuggling. During times of peace, the USCG operates as part of the Department of Homeland Security and enforces the nation’s laws at sea. In times of war, the USCG serves as part of the U.S. Navy Department (U.S. Coast Guard, 2012a). The USCG moved from the Department of Treasury to the Department of Transportation in 1967 until being placed under the Department of Homeland Security on March 1, 2003 following the 2001 terrorist attacks (U.S. Coast Guard, 2012b). The USCG drug and alcohol testing program is covered under 46 CFR Parts 4 and 16. Part 4 discusses the chemical testing requirements for all persons who are directly involved in a serious marine incident while serving onboard any commercial vessel upon the navigable waters of the U.S territories or possessions, and Part 16 is applicable to those who serve on U.S. Flag commercial vessels. Random testing must be conducted at a minimum annual rate of not less than 50 percent (U.S. Coast Guard, 2010). The regulations were first developed in 1988 as part
of the DOT program to address drug and alcohol use in the U.S. transportation system (U.S. Coast Guard, 2010).

**Regulations**

The DOT Rule, 49 CFR Part 40, describes requirements for conducting workplace drug and alcohol testing for the transportation industry (Office of Drug & Alcohol Policy & Compliance [ODAPC], 2012d). Together with the DOT Office of General Counsel, ODAPC provides interpretations on how to conduct tests and the evaluation and treatment procedures necessary for returning employees to work following substance use testing violations. The Part 40 interpretations issued after August 1, 2001 are considered valid and any interpretations prior to this date are not to be considered (ODAPC, 2012d).

ODAPC is also actively involved with the annual President’s National Drug Control Strategy. Through this strategy, the Administration plans to address prescription drug abuse and drugged driving. Director R. Gil Kerlikowske identified strategies to address these issues to include reducing the prevalence of drugged driving by ten percent by 2015, stating that drugged driving is a serious threat to public safety. The strategies include:

- Encourage states to adopt per se drug impairment laws,
- Collect further data on drugged driving,
- Enhance prevention of drugged driving by educating communities and professionals,
- Provide increased training to law enforcement on identifying drugged drivers, and
- Develop standard screening methodologies for drug-testing labs to use in detecting the presence of drugs (Executive Office of the President of the United States, 2012).

The 101 page Rule contains Subpart A through R. It describes employee responsibilities, information for alcohol and urine collection personnel, collection sites, urine collection
specimens, drug testing laboratories, medical review officers and the verification process, split specimen tests, problems in alcohol and drug testing, substance abuse professionals and the return to work process, confidentiality and release of information, roles and responsibilities of service agents, and public interest exclusions (ODAPC, 2012d).

The Five Panel Drug Screen

Subpart F 40.85 of the Rule instructs the laboratory to test for marijuana metabolites, cocaine metabolites, amphetamines, opiate metabolites, and phencyclidine (PCP) and prohibits testing for any other drugs. The Rule specifically prohibits testing DOT specimens for other substances (ODAPC, 2012c).

Methods of Testing

There are multiple biological methods of specimen testing for drugs to include urine, blood, hair, saliva, and spray (sweat) tests; however, in most instances urine is the only DOT approved body fluid for specimen testing (Harris, n.d.). These modes may show the presence of both parent drugs and their metabolites. Drug metabolites are detected longer than parent drugs because they stay in the body longer. Parent drugs are detected better in blood and oral fluids while urine is better suited for detecting the drug’s metabolites. Metabolites result as enzyme-catalyzed reactions occur within the cells as the drug is being broken down. As the process occurs, it closely resembles the parent drug until the carbon stricter blends into larger structures or is reduced to smaller structures (Harris, n.d.).

Urine Specimens

The most commonly used matrix for drug testing is urine. It is a cost-effective method of testing for illicit drug use, has a slightly longer window of detection than oral fluid, has higher concentrations of parent drugs and/or metabolites than in blood, and has been studied more
extensively (Substance Abuse and Mental Health Services Administration, 2012). Detection times vary from less than a day after ingestion to several weeks due to the following factors: whether or not the donor is a chronic or acute user, the amount taken, the rate at which the substance is metabolized, the cut-off concentration of the test, the patient’s physical condition to include amount of body fat and state of hydration, and certain body system pathologies such as hepatic, renal, and endocrine (Substance Abuse and Mental Health Services Administration, 2012). Because most illicit drugs are detectable for two to four days, donors who stop use for several days prior to specimen submission may not test as positive. Chronic use of marijuana may be detectable for up to 30 days after the last use. Heavy cocaine use may be detected for a longer period of time than the average three to five days for recreational users (Substance Abuse and Mental Health Services Administration, 2012).

Urine collection is less invasive than collecting blood samples, and under normal circumstances, the sample is available in sufficient quantity. Unless the collector suspects tampering, adulterating, or dilution of the specimen, direct observation is not indicated. Some tests for illicit drugs have low cross-reactivity such as benzoylecgonine (a metabolite of cocaine), while others have high cross-reactivity such as amphetamines, which require further laboratory testing methods for confirmation (Substance Abuse and Mental Health Services Administration, 2012).

The window of detection for amphetamines in urine for an acute use is approximately 24 hours while urine detection for chronic users is approximately two to four days. Because immunoassay tests for amphetamines are highly reactive, drug tests for the presence of amphetamine are among the hardest to interpret. A confirmed test for methamphetamine can either be d-methamphetamine or over-the-counter nasal spray. The DOT requires that labs run a
separate test to distinguish d-methamphetamine from l-methamphetamine, which is nasal spray. Cross-reactivity with Methyleneoxymethamphetamine (MDMA), methylenedioxymphetamine (MDA), and or methylenedioxyethylamphetamine (MDEA) may uncover an unsuspected substance abuse problem. The Medical Review Officer (MRO) will play an important role in determining if the test is positive or if the donor has a valid prescription such as Adderall (Substance Abuse and Mental Health Services Administration, 2012).

The parent drug in the benzodiazepines is usually undetectable in urine drug tests; therefore, immunoassay tests usually check for specific metabolites. Benzodiazepines are classified by their elimination half-lives and interpretation of urine drug test results may be challenging. False-negative results can occur if only tested for one benzodiazepine or its primary metabolite (Substance Abuse and Mental Health Services Administration, 2012).

Cocaine’s primary metabolite is benzoylcegonine. Urine tests for cocaine are easily detected because immunoassay tests do not cross-react with other substances; however, detection times are short because neither cocaine nor benzoylcegonine is stored in the body. Tea made from coca leaves contain cocaine and will produce positive urine test for benzoylcegonine (Substance Abuse and Mental Health Services Administration, 2012).

Marijuana’s principle metabolite is tetrahydrocannabinol (THC) which is readily detected by immunoassay. THC is highly lipid soluble and is stored in fatty tissues, gradually entering the bloodstream at low levels. Urine detection levels depend on the quality of marijuana, the donor’s body fat content and metabolism, acute versus chronic use, and the donor’s state of hydration upon collection. Although concentrations are usually too low to produce positive results, THC metabolites have been detected in urine drug screens following ingestion of food products containing hemp seeds such as hemp seed oil, flour, liquor, and ale. Passive exposure to
marijuana may lead to reported positive results with low cutoff levels of 20 ng/mL under extreme conditions, such as riding in a closed car with people smoking marijuana.

Opioid urine test includes both opiates and opioids. Opiates are derived from naturally occurring alkaloids as well as semi-synthetic alkaloids. Opioids are compounds similar to morphine (a metabolite of heroin) and include synthetic compounds that are structurally unlike morphine such as fentanyl, meperidine, methadone, and tramadol. These synthetics are not detected in standard opioid urine immunoassay tests. DOT tests for opioids include morphine, codeine, and 6-acetylmorphine (6-AM). 6-AM is a metabolite from heroin which is quickly eliminated from the body; therefore, if a donor’s urine sample is positive for 6-AM, it is conclusive for illicit use. Unless an expanded panel is requested by the collection site, drug tests for opioids will only include morphine and codeine; therefore, hydrocodone, hydromorphone, oxycodone, and oxymorphone will not produce positive results. Ingestion of poppy seeds once resulted in positive urine test results until the cutoff level for morphine and codeine was increased to 2,000 ng/mL. Methadone and its major metabolite, 2-ethylidene-1, 5-dimethyl-3, 3-diphenylpyrrolidine (EDDP), are tested using a specific immunoassay which has little cross-reactivity with other opioids; therefore, a positive opioid drug test suggests opioids other than methadone (Substance Abuse and Mental Health Services Administration, 2012).

PCP is a required DOT urine drug test but is otherwise not routinely tested unless its use is prevalent in the community. A false positive can result if the donor is taking dextromethorphan (an antitussive). Up to 19 percent of PCP is excreted in the urine unchanged and can be detected in urine for several days to weeks (Substance Abuse and Mental Health Services Administration, 2012).
Gamma-hydroxybutyrate (GHB) has a limited window of time for detection – 12 hours or less – and is not an approved drug for DOT testing. GHB is rapidly absorbed into the bloodstream because of its small molecular makeup and being highly soluble. GHB has a very short half-life of 30 to 40 minutes which means that specimens suspect of GHB use should be analyzed without delay (Jones, Holmgren, & Kugelberg, 2008).

**Blood Specimens**

Blood specimen testing is not the preferred method of collection for drug testing. Blood testing is more expensive than urine. Drugs are cleared from the blood rapidly; therefore, detection of drugs in blood is limited. The donor may be at risk for infection due to the invasive blood collection technique. Specific training is required to collect a venous sample. Finally, collecting a blood sample for an individual in poor health may not be an option (Substance Abuse and Mental Health Services Administration, 2012).

**Hair Specimens**

Hair drug testing provides a retrospective look at drug use instead of the point-of-time, which can be determined by urine, blood, saliva, and breath. The presence of drugs in hair is based on the theory that drugs or their metabolites circulate in the bloodstream and are absorbed by hair follicles which absorb the drug or metabolite from the bloodstream or secretions of the sebaceous and sweat glands of the scalp. These metabolites can be detected in the hair shaft for seven to ten days following ingestion. Determining positive results may be difficult because metabolites may be present due to environmental drug exposure. While a hair sample is usually taken from the back of the head, it can be collected from other locations such as the face or armpit. Hair testing is not indicated for the detection of very recent use; however, it can be used to distinguish between heroin and morphine use, which can be difficult to distinguish with blood
Hair testing is useful to detect chronic drug use and can serve as an indication of periods of abstinence (Substance Abuse and Mental Health Services Administration, 2012).

Disadvantages of hair testing include: cannabinoids are less readily deposited in hair, the cost of testing is high, the results require a longer period of time when compared to other testing methods, passive contamination is possible, and the physiologic structure of individual hair samples may alter results. Variations in the hair structure such as growth rate, melanin content, hygiene, and cosmetic treatments can impact drug test results. Concentrations of drugs such as codeine, cocaine, and amphetamines are higher in dark-haired donors as opposed to those found in blond or red hair. Hair treatments such as bleaching have also been found to alter the results in that it may either reduce drug content or increase binding of the drugs to hair (Substance Abuse and Mental Health Services Administration, 2012).

**Sweat Specimens**

Sweat tests can detect drug use within fewer than 24 hours, or if worn as a sweat patch, allows for cumulative testing of the parent drug or drug metabolites. It is noninvasive, resistant to adulteration, economical, and requires little collection training. Disadvantages include risk of removal, multiple analyses cannot be performed, may be susceptible to passive contamination, and requires visits for both placement and removal. The sweat patch should be worn at least three days but not longer than seven days to ensure enough sweat has been collected for testing. The skin should be thoroughly cleansed prior to application (Substance Abuse and Mental Health Services Association, 2012).

**Oral Fluid Specimens**

Oral fluid includes saliva, gingival crevicular fluid, cellular debris, and other components. Drugs may appear in oral fluid by secretion of blood into the saliva and/or direct
deposition in the oral cavity during oral, intranasal, and smoked administration (Niedbala et al., 2001). THC, the main isomer of chemicals found in marijuana, appears to be the direct sequestration of THC in shallow tissues of the oral mucosa during drug use and very little oral fluid from blood is detected when testing for THC (Substance Abuse and Mental Health Services Association, 2012).

The advantages of oral fluid specimen testing are that the collection method is relatively quick and easy, a small sample is needed, the collection method is non-invasive, and an observed collection reduces the chance of possible adulteration or substitution (Hummer, 2006). Additional advantages of testing oral fluids are that there is a shorter window of drug detection than urine which shows a better relationship with duration of impairment, and there is greater detection of 6-acetylmorphine (6-AM), a marker of heroin use.

Limitations of oral fluid collection include: inability to test for multiple drugs, insufficient sample quantity for testing, and higher testing costs than that of urine. In addition, testing for pre-employment will not screen out recreational users. Finally, resolution of technical issues need to be addressed such as inconsistent oral fluid, variable drug recoveries, inadequate oral fluid immunoassay sensitivity and specificity, and lack of homogeneous immunoassays for automated analyzers (Huestis et al., 2011).

**Medical Review Officer**

The Rule requires that specially trained Medical Review Officer (MRO) review and interpret positive results and interview the donor to determine whether there is an explanation as to why a specimen is positive for illicit drugs (Huestis et al., 2011). The MRO serves as an independent advocate for the accuracy and integrity of the drug testing process. The MRO provides quality assurance of the DOT drug testing process by determining if there is a medical
explanation for positive results, if the specimens are adulterated, substituted or invalid, or if the donor is abusing over-the-counter or prescription drugs. The MRO reports the donor results to the employers and must protect the confidentiality of the drug testing information (ODAPC, 2012c).

According to Subpart G 40.121, a MRO must be a licensed physician in the U.S., Canada, or Mexico and have basic knowledge in the following areas: controlled substances abuse disorders including detailed knowledge of alternative medical explanations for laboratory confirmed drug test results, adulterated and substituted specimens as well as possible medical explanations for invalid test results, and DOT MRO Guidelines/DOT agency regulations applicable to drug test result evaluations. The MRO must receive qualification training in the following areas:

- collection procedures for urine specimens,
- chain of custody,
- reporting and recordkeeping,
- interpretation of drug/validity test results,
- roles and responsibilities of the MRO,
- interfacing with other participants such as SAPs, and
- provisions of the drug and alcohol program as it applies to employers affecting the MRO functions (ODAPC, 2012a).

The MRO must pass a comprehensive examination administered by a nationally recognized MRO certification board such as American Association of Medical Review Officers (AAMRO) or the Medical Review Officer Certification Council (MROCC). Requalification training and
subsequent examinations are due every five year period from the date of the initial certification and the MRO must maintain documentation of such certification (ODAPC, 2012b).

Non-Negative Specimens

A urine specimen that is reported by the laboratory as negative can be reported to the Designated Employer Representative (DER) as negative. A urine specimen that is reported by the laboratory as adulterated, substituted, invalid, or positive for drugs or drug metabolites is considered a non-negative specimen pending further review by the MRO. Part 40.129 requires that the MRO review the chain of custody form (CCF) for errors such as missing collector’s name or signature, mismatched specimen ID number on the specimen bottle and CCF, broken specimen bottle seal of other evidence of tampering, insufficient urine due to leakage, or other causes. If no errors are found, the MRO must conduct a verification interview with the donor in person or by telephone (ODAPC, 2012a).

The MRO informs the donor that the purpose of the interview is to discuss the test results and that a decision will be made based on the interview. The MRO notifies the donor that the employer must be notified of medications affecting the performance of safety-sensitive duties that the donor reports using, and that the prescribing provider must contact the MRO within five business days to determine if the medications can be changed to one that does not make the employee medically unqualified to perform safety-sensitive functions. If such information is received from the prescribing provider, the MRO will notify the employer (ODAPC, 2012b).

Positive Drug Tests

The positive drug testing percentage rate for DOT drug tests had been in decline but rose slightly in 2010 by 0.03 percent (Swart, 2011). Table 2.1 compares the number of positive drug tests to the number of actual drug tests from 2005 through 2010.
### TABLE 2.1

DOT LABORATORY DRUG TESTING FROM 2005 TO 2010

<table>
<thead>
<tr>
<th>Drug Test Results</th>
<th>Year</th>
<th>2005</th>
<th>2006</th>
<th>2007</th>
<th>2008*</th>
<th>2009</th>
<th>2010</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total</td>
<td></td>
<td>7,145,907</td>
<td>7,542,360</td>
<td>6,568,447</td>
<td>2,850,106</td>
<td>5,153,165</td>
<td>5,463,833</td>
</tr>
<tr>
<td>Positives</td>
<td></td>
<td>143,993</td>
<td>136,724</td>
<td>136,908</td>
<td>46,858</td>
<td>77,865</td>
<td>84,211</td>
</tr>
<tr>
<td>Percent</td>
<td></td>
<td>2.0%</td>
<td>1.8%</td>
<td>2.1%</td>
<td>1.6%</td>
<td>1.5%</td>
<td>1.5%</td>
</tr>
</tbody>
</table>

*2008 results are July to December

**Source:** Swart (2011)
Any urine specimens reported by the laboratory as positive for marijuana, cocaine, amphetamines, and/or PCP, the MRO must verify a confirmed positive test after providing the donor an opportunity to give a legitimate medical explanation. The donor must provide an explanation for a substance that has a legitimate medical use. If a legitimate medical explanation is provided, the MRO will report the test result as negative. The MRO has the responsibility to raise fitness-for-duty considerations with the employer even though the test has been ruled negative. If a legitimate medical explanation is not provided, the test will be reported as positive.

The MRO must take special actions when the laboratory sends confirmed positive morphine or codeine results. If the results are confirmed as 6-AM and if any quantity of morphine is present, the MRO must determine the result to be positive. For a laboratory confirmed positive morphine or codeine other than 6-AM, the MRO determines if the quantitative amount is at or above 15,000 ng/mL. The test is ruled positive unless the donor presents a medical reason for the drug or metabolite in the urine specimen (ODAPC, 2012b).

The consumption of poppy seeds or other food is not considered a legitimate medical explanation. For all other opiate positive results, the MRO must report the test as positive only if there is evidence of unauthorized use of any opium, opiate, or opium derivative. This requires a face-to-face evaluation of the donor for a direct observation to identify recent needle tracks, behavioral signs of acute opiate intoxication or withdrawal, or use of medication from a foreign country. If the donor admits to unauthorized use of hydrocodone but the test was positive for codeine, the test cannot be ruled as positive for opiates. For opiate positives, the burden of proof is upon the MRO and not the donor as with other positive drug test results (ODAPC, 2012b).

Upon verification of a positive drug test, the donor has seventy-two hours to request that the split sample be sent to another certified laboratory for analysis. The request may be verbal or
written; however, there is no split specimen testing for an invalid result. Upon request for a split specimen test, the MRO must immediately provide written notice to the laboratory and direct the laboratory to send the specimen to a second HHS-certified lab (ODAPC, 2012b)

**Implications of Positive Tests**

If the employee tests positive for illicit drug use, the employer is not obligated to return the employee to work. Some employers offer a second chance program while others terminate after the first violation, based on the company policy and union agreements. The employer is required to provide a list of Substance Abuse Providers’ (SAP) contact information to the employee free of charge regardless of work status. The DOT does not mandate that the employer pay for the SAP evaluation which is also at the discretion of employer policy and union/labor agreements. If treatment is required, this is often covered by health care benefits (ODAPC, 2009).

**Substance Abuse Professional**

The Substance Abuse Professional (SAP) must be a licensed physician; licensed or certified social worker; licensed or certified psychologist; licensed or certified social worker; licensed or certified employee assistance professional; state-licensed or certified marriage and family therapist; or certified alcohol and drug abuse counselor with clinical experience in diagnosis and treatment of substance abuse disorders. The SAP must receive qualification training and successfully complete a nationally recognized professional organization. The SAP must also successfully complete and fulfill requirements for continuing education courses (ODAPC, 2009).

The SAP plays a critical role in protecting the public interest in safety and is the decision maker as to whether or not the employee can safely return to safety-sensitive duties (ODAPC,
If a donor tests positive for a DOT urine drug screening test, the DOT requires that the employee be removed from any DOT-regulated safety-sensitive functions until an evaluation by a SAP has been conducted. As a protector of the public interest in safety, the SAP is not an advocate of the employee or employer, but instead to the greatest extent possible to the traveling public who are riding on the decisions of the SAP (ODAPC, 2009).

The SAP conducts a face-to-face assessment and clinical evaluation of employees who have violated DOT drug and alcohol rules and makes a determination about the type of treatment the employee requires (National Association of Alcoholism and Drug Abuse Counselors, n.d.). The evaluation may include MMPI-2 testing and a review of employee information such as previous violations, absentee records, discussion with family members, and work performance records. Recommendations will then be made for appropriate education, treatment, follow-up tests, and aftercare. The SAP makes the determination whether the employee needs inpatient treatment for a substance abuse problem that requires close monitoring of withdrawal symptoms. Other types of treatment include partial in-patient treatment, out-patient treatment, educational programs, and aftercare. Educational recommendations include drug and alcohol education courses, self-help groups, and community lectures (ODAPC, 2009). The SAP’s decision regarding treatment is final and cannot be made more or less rigorous by third parties. The SAP may revise his/her decision based on new or additional information (ODAPC, 2009).

Upon completion of the recommended SAP treatment and/or education program prior to return to work, the employee must meet with the SAP in a face-to-face follow-up evaluation for assurance that the individual has demonstrated compliance with the initial SAP recommendations. If the employee is believed to be fit for duty, the SAP notifies the employer that the employee may return to safety-sensitive duties. The SAP will continue to monitor the
case and develops and directs a follow-up testing plan for the employee returning to work. The frequency of unannounced follow-up tests must consist of at least six tests in the first year after return to safety-sensitive duties (ODAPC, 2009). These follow-up tests can be a maximum of 60 months and can be terminated after the first year at the discretion of the SAP; however, all recommended tests must be conducted to include a directly observed test which is completed during the return-to-duty test when the employee first returns to work.

While a determination is made about what treatment is indicated, the SAP is not allowed to treat the employee or refer the employee to an organization in which the SAP has financial interest as this is a conflict of interest. The employee is allowed to select the treating provider; however, the provider must be a SAP approved provider while considering if the provider is within network if the employee is covered by insurance (ODAPC, 2009). The SAP will transmit the treatment plan to the referred treating provider and maintain contact with the provider until the treatment has been successfully completed. The SAP must provide written notice to the employer upon successful treatment to include specific recommendations such as abstinence from drug use, continued treatment, aftercare, education, or support groups. The employer may require the employee to participate as a condition of employment although the employer is not required to return the employee to safety-sensitive duties (ODAPC, 2009)
CHAPTER III
DRUG TESTING PROGRAMS

Employees report for drug tests at designated drug collection facilities or they may give urine samples to a qualified collector at the work site (mobile collectors). The donor must provide a minimum of 45 mL of urine. The donor enters the urinal alone and is provided privacy, except in cases in which a direct observation is mandated. If the collector notes any suspicious tampering of the specimen, such as a temperature outside of the normal range of 90 to 100 degrees Fahrenheit, blue dye in the specimen, or the smell of bleach in the specimen, an immediate recollection of urine with direct observation is required. Direct observation must be performed by a collector who is the same gender as the donor. The observer must request that the employee raise clothing such as shirt, blouse, or dress/skirt above the waist and lower clothing and pants to demonstrate absence of a prosthetic device. The observer must watch the urine go from the employee’s body into the collection container (ODAPC, 2012a). Employers are required by law to maintain drug testing records and provide drug and alcohol testing history to new employers (ODAPC, 2009).

Each Agency has specific drug and alcohol testing regulations. Table 3.1 describes the types of testing per Agency. The regulations are reviewed below.

Federal Motor Carrier Safety Administration (49 CFR Part 382)

Pre-employment drug testing is performed to deter and detect controlled substance abuse and is required for all applicants who fall under the DOT testing requirements. The results of the employee’s test must be verified as negative by the MRO prior to performing safety-sensitive duties. Pre-employment tests must be conducted each time a driver returns to work following a
# TABLE 3.1

TYPES OF SCREENING TESTS FOR DRUGS BY AGENCY

<table>
<thead>
<tr>
<th>Agency</th>
<th>Pre-Employment</th>
<th>Random</th>
<th>Periodic</th>
<th>Reasonable Suspicion</th>
<th>Reasonable Cause</th>
<th>Post-Accident</th>
<th>Return-to-Duty</th>
<th>Follow-up</th>
</tr>
</thead>
<tbody>
<tr>
<td>FMCSA</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td></td>
<td></td>
<td>x</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>FTA</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td></td>
<td></td>
<td>x</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>FRA</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td></td>
<td>x</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>FAA</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td></td>
<td>x</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>PHMSA</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td></td>
<td></td>
<td>x</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>USCG</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td></td>
<td></td>
<td>x</td>
<td>x</td>
<td>x</td>
</tr>
</tbody>
</table>

Note: Return to duty and follow-up testing must be collected under direct observation.

FMCSA = Federal Motor Carrier Safety Administration  
FTA = Federal Transit Administration  
FRA = Federal Railway Administration  
FAA = Federal Aviation Administration  
PHMSA = Pipeline and Hazardous Material Safety Administration  
USCG = United States Coast Guard
layoff period when the employee has not been subjected to random drug testing for a period of greater than thirty days. A pre-employment test is not required if, within the past thirty days, the applicant has participated in a DOT controlled substance testing program and was tested within the past six months, or participated in a random testing program for the previous twelve months and the employer has verified that no prior DOT drug or alcohol violations within the previous six months (Federal Motor Carrier Safety Administration, n.d.).

Random drug testing is an effective way to discourage employees to abstain from substances of abuse before and during working hours. An employee selected for a random drug test does not receive prior notification and must report immediately to the testing facility for testing. The DOT random selection pool must only consist of employees who perform safety-sensitive functions; therefore, those who are not in a safety-sensitive position must be in a separate random pool. Random testing rates are 50 percent for controlled substances. The test dates must be reasonably spread throughout the year absent of a predictable pattern (Federal Motor Carrier Safety Administration, n.d.).

Return-to-duty testing is a DOT mandated drug test which must be conducted prior to returning an employee to safety-sensitive duties following a violation of the drug and alcohol policy, such as a verified positive or a refusal to submit to a test. The test must be conducted under direct observation. The test is conducted to provide assurance that the employee is free of controlled substances (Federal Motor Carrier Safety Administration, n.d.).

Reasonable suspicion drug testing is conducted in the event that the employee exhibits signs of abuse such as appearance, behavior, speech, or body odor. The DOT requires that supervisors be trained to know valid objective signs and symptoms of controlled substance
misuse as well as the proper procedures and documentation for referral for testing (Federal Motor Carrier Safety Administration, n.d.).

Post-accident drug testing is required following an accident involving a fatality, bodily injury which requires immediate medical treatment away from the scene of the accident and issuance of a citation, or one or more damaged vehicles that results in towing and the issuance of a citation. The employee must be performing safety-sensitive functions at the time of the accident. Post-accident tests must be performed as soon as possible and within 32 hours following the accident. In all cases, necessary medical treatment should not be delayed in order to obtain the drug test (Federal Motor Carrier Safety Administration, n.d.).

Follow-up drug testing is an unannounced test as recommended by the SAP after previously testing positive for drugs or alcohol. The minimum frequency and duration of follow-up testing is six tests in a twelve month period with a maximum duration of sixty months. All follow-up drug tests are observed and are separate from and in addition to regular random drug testing (Federal Motor Carrier Safety Administration, n.d.).

Proficiency testing by use of blind specimen is a quality assurance measure for the testing laboratory that conducts controlled substances testing. Employers with 2,000 or more DOT covered employees must send blind specimens to the designated laboratory. Blind specimens are fictitious sample specimens with known drug content and may be negative, positive, or adulterated. This is not a requirement for employers who have fewer than 2,000 DOT covered employees. Approximately 75 percent of the samples must be blank (negative) and 15 percent must be positive for one or more controlled substances. The remaining 10 percent must be adulterated. The DOT requires the number of blind specimens to be one percent of the specimens
that are sent to the laboratory up to a maximum of fifty blind specimens per quarter (Federal Motor Carrier Safety Administration, n.d.).

**Federal Transit Administration (49 CFR Part 655)**

The FTA mandates that pre-employment drug tests and verified negative results are completed prior to performing safety-sensitive functions for the first time. When a covered employee or applicant has not performed a safety-sensitive function for 90 consecutive calendar days and has not been in the employer’s random pool, a verified negative result must be received prior to performing safety-sensitive work (Federal Transit Administration, n.d.b).

Reasonable suspicion testing must be conducted when the employer has reasonable suspicion. Post-accident drug testing is required within 32 hours for FTA covered employees in the following instances: fatal accidents and nonfatal accidents not involving loss of human life in which a mass transit vehicle is involved if the employee contributed to the accident. Necessary medical treatment is a priority and should not be delayed for drug testing purposes.

Random testing shall be performed at a minimum rate of 50 percent of covered employees. The rate may be lowered to 25 percent of all covered employees if the employer has a reported positive rate of less than one percent for the two preceding consecutive calendar years. Random testing must be spread throughout the calendar year and at all times of day when safety-sensitive duties are performed (Federal Transit Administration, n.d.b).

Return to duty testing is performed when an employee is returned to work following a verified positive drug test result or refusal to submit to a test. The test must be directly observed and verified by the MRO as negative prior to the employee’s return to safety-sensitive duties. Follow-up testing shall be conducted per CFR Part 40, subpart O and is a directly observed
collection for a frequency and duration of at least 6 tests in a 12 month period for a maximum period of 60 months (Federal Transit Administration, n.d.b).

**Federal Railway Administration (49 CFR Part 219)**

A covered service employee submitting a pre-employment drug test under FRA regulations is never required to submit to a second pre-employment drug test. The pre-employment test must be verified as negative results prior to performing covered safety-sensitive duties (Federal Railroad Administration & Allan, 2002).

Random testing is required for every FRA employer with 16 or more covered employees who perform safety-sensitive duties. Collections shall be performed randomly during all hours of operation and equally distributed on Saturdays and Sunday. This ensures that employees have an equal chance of selection during holidays, weekends, or after hours. The random testing rate for FRA covered employees is 25 percent (Federal Railroad Administration & Allan, 2002).

The cornerstone of FRA’s drug testing program is mandatory post-accident testing. It helps determine whether the use of drugs or alcohol by employees may contribute to the accident. Both blood and urine specimens must be collected for post-accident testing. Field supervisors responsible for determining if a post-accident test is warranted must be trained in all aspects; documentation of training is required (Federal Railroad Administration & Allan, 2002).

The supervisor must consider the following FRA post-accident testing requirements to decide whether testing must be conducted, based on the following conditions:

- A major train accident, impact accident, or passenger train accident requiring a minimum damage threshold.
• Damage that is counted towards the minimum Federal damage threshold established by the Rule and the damage categories found in either a $1,000,000 major train accident or a $150,000 impact accident.

• The criteria for a major train accident reaches the minimum Federal damage threshold and a fatality occurred; a release of hazardous material lading accompanied by an evacuation or a reportable injury due to the release, or railroad damage greater than or equal to $1,000,000.

• The criteria for an impact accident reaches the $150,000 or more Federal damage threshold along with a reportable injury or damage to railroad property equal to or greater than $150,000 and that no testing is authorized in certain kinds of impacts.

• The criteria for a fatal train incident are met by involving a fatality to any on-duty railroad employee as a consequence of the movement of on-track equipment.

• The criteria for a passenger train accident meet the minimum Federal damage threshold and there has been a reportable injury to a passenger or employee.

• The event fell within one of the testing exclusions (highway/rail grade crossing, due to natural causes or vandalism) (Federal Railroad Administration & Allan, 2002).

An injury reportable to the FRA is an injury to a railroad employee resulting in medical treatment, a day away from work, restricted work duty or job transfer, or loss of consciousness. The death or injury resulting in medical treatment of any person is included in the definition of a reportable injury (Federal Railroad Administration & Allan, 2002).

Reasonable suspicion drug collections must be based on the individual employee behavior, speech, or body odors observed by two trained supervisors. Reasonable cause is requested after an event in which the employee contributed to the cause or severity. FRA
recommends that the supervisor receive a minimum of two hours of training in reasonable suspicion and reasonable cause determinations (Federal Railroad Administration & Allan, 2002).

Return-to-duty drug collections are required for covered employees who have been evaluated by a SAP and cleared to return to work after failing a required FRA drug or alcohol test or refuse a required FRA drug or alcohol test. A verified negative drug test must be received prior to return to covered duties (Federal Railroad Administration & Allan, 2002).

Follow-up testing may be conducted for a minimum of 12 months and a maximum of 60 months. After the minimum 12 months, the SAP may assess follow-up testing for termination on an annual basis. The follow-up testing must be unannounced to act as a deterrent and must be collected independently of random testing and one cannot be substituted for the other (Federal Railroad Administration & Allan, 2002).

Federal Aviation Administration (14 CFR Part 120)

The results of a pre-employment drug testing are required by the FAA prior to performing covered safety-sensitive work. A second pre-employment test is required if more than 180 days has lapsed between the pre-employment test and performing covered safety-sensitive work (U.S. DOT, Drug and Alcohol Policy and Compliance Office, 2012).

Random drug testing for FAA covered employees shall be 50 percent of covered employees; however, the percentage rate of drug testing may be lowered to 25 percent if for two consecutive years, the reported rate of positives is less than one percent. This rate is dependent upon the reported positive rate for the entire aviation industry. If the rate of positives is one percent or greater, the random testing rate will increase to 50 percent. Random tests must be unannounced and spread throughout the calendar year (U.S. DOT, Drug and Alcohol Policy and Compliance Office, 2012).
Post-accident drug testing must be conducted as soon as possible but no later than 32 hours after the accident. The decision as to whether or not to test the covered employee should be based on the best information available at the time and whether or not the employee’s performance did not contribute to the accident (U.S. DOT, Drug and Alcohol Policy and Compliance Office, 2012).

Reasonable cause drug testing is performed on covered employees if a decision is made that the employee exhibits physical, behavioral, or performance indicators of probable drug use. At least two of the employee’s supervisors (one of which is trained) must substantiate and concur that drug use is suspected. In the event the employer has fewer than 50 employees, only one supervisor is required, but he or she must be trained in detection of symptoms of drug use (U.S. DOT, Drug and Alcohol Policy and Compliance Office, 2012).

Return-to-duty drug testing is required for covered employees prior to returning to work after a refusal to submit to a drug test or a verified positive drug test result. The employee shall not be returned to safety-sensitive duties until the results have been verified as negative (U.S. DOT, Drug and Alcohol Policy and Compliance Office, 2012).

Follow-up drug testing is required for employees returning to work following a refusal to submit to drug testing or a verified positive test. The employee must be randomly tested for a minimum of six tests for a minimum duration of twelve months and a maximum duration of 60 months following return to covered duty. The SAP may terminate the follow-up testing after the first six tests have been conducted (U.S. DOT, Drug and Alcohol Policy and Compliance Office, 2012).
Pipeline and Hazardous Material Safety Administration (49 CFR Part 199)

Pre-employment testing is required and must be completed for covered applicants. The results must be verified as negative prior to assuming safety-sensitive duties.

Random testing shall be at an annual percentage rate of 50 percent unless the entire industry reports an annual positive rate of less than one percent for two consecutive calendar years at such time the annual percentage rate will be 25 percent. If the percentage of positives is equal to or greater than one percent for the entire industry, the collection rate will be increased to 50 percent. The random collection shall be unannounced with the tests spread reasonably throughout the calendar year (U.S. Government Printing Office, 2012).

Reasonable cause testing can be done when an employer believes an employee exhibits physical, behavioral, or performance indicators of probable drug use. The decision to test must be made by at least two supervisors, of which one has been trained. The concurrence may be made by phone. An exception is made for employers of 50 or fewer employees in which only one supervisor trained in detecting symptoms of drug use symptoms may make the determination to test (U.S. Government Printing Office, 2012).

Post-accident testing should be performed as soon as possible but within 32 hours following an accident. Employees whose performance contributed to the accident shall be tested (U.S. Government Printing Office, 2012).

Return-to-duty testing is mandatory for a covered employee returning to work after refusal to submit to a drug test or following a verified positive drug test. The employee may not return to work until such time that the SAP has determined that the employee has met all applicable requirements (U.S. Government Printing Office, 2012).
Follow-up testing is unannounced and required after employees return to duty when they refuse a test or to verify a positive drug test. The number and frequency of testing consists of at least six tests in the first 12 months after return to duty. The employee shall remain in follow-up testing for no more than 60 months. The SAP may terminate the requirement for follow-up testing after the first six tests have been administered if a determination is made that such testing is no longer necessary (U.S. Government Printing Office, 2012).

**United States Coast Guard (46 CFR Parts 4, 5, and 16)**

USCG requires that pre-employment drug tests are completed for prospective crew members. Verified negative results must be confirmed prior to employment. A pre-employment drug test is not required if, within the previous six months, the candidate has passed a drug test or if the candidate has been subject to random testing during the previous 185 days for at least 60 days and did not fail a drug test or refuse to submit to testing (U.S. Government Printing Office, 2012).

Periodic tests are unique to the USCG and are the responsibility of the individual mariner for transactions involving licenses, Certificate of Registries (COR’s), or Merchant Mariner’s Documents (MMD’s), and negative results must be submitted to the CG Regional Exam Center at the time of license, COR, or MMD transaction. The MMD contains the mariner’s information regarding date of birth, location of issue, nationality, and shipboard duties for which the mariner is qualified (Wikipedia, 2011). The document, which is the size of a driver’s license, must be renewed every five years. The COR contains professional qualification information (Wikipedia, 2011).

An employee is required to undergo a reasonable cause drug test if an employer reasonably suspects the of use illicit drugs. The decision to test must be based on a direct
observation of specific physical, behavioral, or performance indicators of probable use. If possible the decision to test should be based on the observation made by two supervisors (U.S. Government Printing Office, 2012).

Random testing shall be performed at an annual percentage rate for 50 percent of covered crewmembers. The annual percentage rate may be decreased to 25 percent if the entire industry data indicates the positive rate is less than one percent for two consecutive years. If the positive rate is equal to or greater than one percent, the annual percentage rate will increase to 50 percent (U.S. Government Printing Office, 2012).

Drug testing is required when an employer determines that an individual is directly involved with a casualty or incident is or may become a serious marine incident (SMI). The individual must be tested within 32 hours of the SMI. USCG allows blood collections for SMI testing (U.S. Coast Guard, n.d.b).

**Laboratory Testing**

**Certified Department of Health and Human Services Laboratory**

Laboratories in the U.S. must receive written confirmation of certification by U.S. Department of Health and Human Services (HHS) under the National Laboratory Certification Program (NLCP) prior to performing DOT drug testing. Laboratories in Canada or Mexico must meet HHS standards and procedures and must receive a written recommendation from HHS prior to performing DOT drug testing (ODAPC, 2012c).

The laboratory must only test DOT specimens for five drugs or drug metabolites: marijuana metabolites, cocaine metabolites, amphetamines, opiate metabolites, and PCP.

Upon receipt of a specimen, the laboratory must verify the following:

- Only one copy of the custody and control form (CCF) was received;
• The specimen identification numbers on the bottle match the identification number on the CCF;
• The specimen bottle seal is intact and there is no evidence of tampering;
• The collector’s printed name and signature are on the CCF; and
• There is sufficient urine in the primary bottle for analysis (ODAPC, 2012c).

The laboratory tests the validity of the sample to ensure that it is consistent with normal human urine and to determine whether 1) adulterants were added to the urine, 2) if the urine was diluted, or 3) if the specimen was substituted. The creatinine is measured and if found to be less than 20 mg/dL, the specific gravity must be checked. The pH is tested and the specimen must be checked for oxidizing adulterants. The laboratory technician must look for physical characteristics, unidentified interfering substances, or adulterants which indicate tampering. If the specimen is invalid, the technician will contact the MRO to discuss testing the specimen at a separate laboratory. The specimen is considered dilute when the creatinine is between 2 mg/dL and 20 mg/dL and the specific gravity is between 1.0010 and 1.0030. The specimen is considered substituted if the creatinine is less than 2 mg/dL and the specific gravity is less than or equal to 1.0010 or greater than or equal to 1.0200 on both the initial and confirmatory creatinine tests and on both the initial and confirmatory specific gravity tests on two separate aliquots (ODAPC, 2012c).

**Cutoff Levels**

The laboratory technician uses the cutoff concentrations for the initial and confirmation adulterant testing using two separate aliquots. The results at or above the cutoffs are reported as adulterated and the numerical value is reported. Table 3.2 describes the cutoff levels for initial and confirmatory tests (ODAPC, 2012c). Subpart F 40.89 requires laboratories to perform
TABLE 3.2
CUTOFF CONCENTRATIONS FOR DOT DRUG TESTS

<table>
<thead>
<tr>
<th>Initial Test Analyte</th>
<th>Initial Test Cutoff Concentration</th>
<th>Confirmatory Test Analyte</th>
<th>Confirmatory Test Cutoff Concentration</th>
</tr>
</thead>
<tbody>
<tr>
<td>Marijuana metabolites</td>
<td>50 ng/mL</td>
<td>THCA&lt;sup&gt;1&lt;/sup&gt;</td>
<td>15 ng/mL</td>
</tr>
<tr>
<td>Cocaine metabolites</td>
<td>150 ng/mL</td>
<td>Benzoylecgonine</td>
<td>100 ng/mL</td>
</tr>
</tbody>
</table>

**Opiates**

<p>| | | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Codeine/Morphine&lt;sup&gt;2&lt;/sup&gt;</td>
<td>2000 ng/mL</td>
<td>Codeine</td>
<td>2000 ng/mL</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Morphine</td>
<td>2000 ng/mL</td>
</tr>
<tr>
<td>6-Acetylmorphine</td>
<td>10 ng/mL</td>
<td>6-Acetylmorphine</td>
<td>10 ng/mL</td>
</tr>
<tr>
<td>Phencyclidine</td>
<td>25 ng/mL</td>
<td>Phencyclidine</td>
<td>25 ng/mL</td>
</tr>
</tbody>
</table>

**Amphetamines<sup>3</sup>**

<p>| | | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>AMP/MAMP&lt;sup&gt;4&lt;/sup&gt;</td>
<td>500 ng/mL</td>
<td>Amphetamine</td>
<td>250 ng/mL</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Methamphetamine&lt;sup&gt;5&lt;/sup&gt;</td>
<td>250 ng/mL</td>
</tr>
<tr>
<td>MDMA&lt;sup&gt;6&lt;/sup&gt;</td>
<td>500 ng/mL</td>
<td>MDMA</td>
<td>250 ng/mL</td>
</tr>
<tr>
<td></td>
<td></td>
<td>MDA&lt;sup&gt;7&lt;/sup&gt;</td>
<td>250 ng/mL</td>
</tr>
<tr>
<td></td>
<td></td>
<td>MDEA&lt;sup&gt;8&lt;/sup&gt;</td>
<td>250 ng/mL</td>
</tr>
</tbody>
</table>

<sup>1</sup> Delta-9-tetrahydrocannabinol-9-carboxylic acid (THCA)

<sup>2</sup> Morphine is the target analyte for codeine/morphine testing.

<sup>3</sup> Either a single initial test kit or multiple initial test kits may be used provided the single test kit detects each target analyte independently at the specified cutoff.

<sup>4</sup> Methamphetamine is the target analyte for amphetamine/methamphetamine testing.

<sup>5</sup> To be reported positive for methamphetamine, a specimen must also contain amphetamine at a concentration equal to or greater than 100 ng/mL.

<sup>6</sup> Methyleneedioxyamphetamine (MDMA).

<sup>7</sup> Methyleneoxyamphetamine (MDA).

<sup>8</sup> Methyleneoxyethylamphetamine (MDEA).

**Source:** Office of Drug & Alcohol Policy & Compliance, 2012c
specimen validity testing. The laboratory is also required to verify that the specimen is not
diluted or substituted. Per Subpart F 40.93, the laboratory must consider the sample dilute when
the creatinine is greater than or equal to 2 mg/dL but less than 20 mg/dL, and the specific gravity
is greater than 1.0010 but less than 1.0030 (ODAPC, 2012c).

Specimen validity is accomplished by determining the creatinine concentration, the pH, and presence of oxidizing adulterants. If the creatinine concentration is less than 20 mg/dL, the specific gravity must be checked. The specimen is considered substituted (or not consistent with human urine) when the creatinine concentration is less than 2 mg/dL and the specific gravity is less than or equal to 1.0010; or greater than or equal to 1.0200 on both the initial and confirmatory creatinine tests and on both the initial and confirmatory specific gravity tests on two separate aliquots. The laboratory is also required to perform additional validity tests if the specimen has abnormal physical conditions, reactions or responses characteristic of an adulterant, or possible unidentified interfacing substances or adulterant. If the specimen is determined to be invalid, the MRO must be contacted to discuss further actions such as testing at another certified laboratory for confirmation of a positive or adulterated test (ODAPC, 2012c).

Gas chromatography and mass spectrometry (GC/MS) are the most methods of chemical analysis. GC separates the compounds of a mixture but it cannot identify them. Once the components are separated, MS identifies detailed structural information for an exact identification (Hites, 1997).

In GC, the sample is vaporized with each substance staying in the unique gas phase for a specific time called the retention time. This retention time is plotted to create a chromatogram. After the GC has separated the compounds, the separated sample is then picked up by the MS; it
is fragmented by ionization to form a pattern. The pattern for a given drug is a unique molecular fingerprint and is capable of identifying the drug (Norchem, n.d.).

Laboratories report the results for each specimen in three categories. Category 1 is a negative result or a negative-dilute, with values for creatinine and specific gravity. Category 2 is a non-negative result with the following values as appropriate: positive with drug or metabolite noted as well as the numerical values for the drug or metabolite; positive-dilute, with drug or drug metabolite noted as well as the numerical values for creatinine and specific gravity; adulterated with adulterant noted as well as applicable confirmatory test values and remarks; substituted with confirmatory test values for creatinine and specific gravity; or invalid with remarks. Actual pH values will be noted (normal pH values range from 4.6 to 8.0); Category 3 is a rejected for testing with remarks (ODAPC, 2012c).

**Over-the-Counter and Prescription Medications**

Over-the-counter and prescription medications can significantly affect performance and can cause drowsiness, dizziness, changes in vision or hearing, or initiate other physical conditions that can injure employees (Blakey, 2002). On August 15, 2000, an accident occurred when a light rail vehicle (LRV) en route from Baltimore to the BWI Airport struck a hydraulic bumping post and derailed at the BWI Airport Station. The bumping post became detached from the track and rested at an inverted position about four and one half feet up in the air causing the roof to become partially embedded into the ceiling structure of the terminal building. Seventeen of the twenty-one passengers were injured, causing an estimated $935,000 in damages. The operator had been on medical leave for extended periods shortly before the accident and had been prescribed medications that cause fatigue and drowsiness. The NTSB stated that while the MTA’s policy addressed use of alcohol and illicit drugs, the policy did not require that an
employee report over-the-counter or prescription medication use prior to performing safety
sensitive functions. In fact, the MTA’s medication policy allowed the employee to make the final
determination regarding fitness for duty while the MTA itself had no mechanism for review for
concurrence. The Safety Board found the MTA’s medication reporting policy lacking, and made
a recommendation to the FTA that employees be required to report over-the-counter and
prescription medication usage to employers. Qualified medical personnel should then determine
the medication’s potential effects on employee performance (Blakey, 2002).

The DOT tests for illicit drug use; however, many over-the-counter medications and
prescription medications have impairing abilities which can contribute to accidents and cause
bodily harm. The Five Panel drug screen may or may not produce positive results for some
prescription medications; if a valid prescription is verified, the specimen is ruled as negative.
Synthetic opiates are not identified in the Five Panel drug screen and are undetected unless an
expanded opiate panel is requested; however, the DOT prohibits testing beyond the Five Panel
drug screen. In a 2012 prescription drug monitoring report, Quest Diagnostics reports,
“potentially addictive medications are the most commonly abused prescription drugs” (Quest
Diagnostics Health Trends, 2012, p. 3). Examples of abused prescription drugs include opioids,
benzodiazepines, and stimulants. Opioid pain relievers are responsible for more overdose deaths
than cocaine and heroin combined (Centers for Disease Control and Prevention, 2011b).

Acclaimed movie actor, Heath Ledger, died at 28 years as a result of prescription drug abuse. An
autopsy revealed the cause of death to be an accidental overdose due to prescription narcotics:
oxycodone and hydrocodone; a sleep aid; two sedatives (diazepam and alprazolam); and an
antihistamine (doxylamine) – none of which would be identified by a DOT Five Panel drug
screen (Chan, 2008). Prescription pain narcotics are responsible for 475,000 emergency room
visits in 2009 and estimate that costs associated with illicit drug use – including prescription drug misuse – total more than $193 billion annually (Quest Diagnostics Health Trends, 2012).

Additional research is needed to determine the effects of impairing over-the-counter and prescription medications. When injuries or accidents occur, because the DOT limits drug testing to the Five Panel drug screen, little is known as to what medications the employee was taking at the time of the event and the role, if any, the medications may have played in contributing to the accident. Commonly abused medications include opioids such as hydrocodone, oxycodone, fentanyl, methadone, and codeine; benzodiazepines such as alprazolam, diazepam, and lorazepam; and amphetamines such as methylphenidate, and dextroamphetamine/amphetamine (National Center for Injury Prevention and Control, 2011).

**Benzodiazepines**

Diazepam, a benzodiazepine, is a Schedule IV Controlled Substance used in the medical management of multiple disorders such as anxiety, convulsions, and for sedation. Individuals under the influence of diazepam may appear to be under the influence of alcohol, exhibiting slurred speech, disorientation, and drunken behavior. The effects of diazepam at low doses include sleepiness, confusion, and the loss of ability to form new memories. High dose effects include excitement, loss of inhibition, severe sedation, and respiratory impairment (National Highway Traffic Safety Administration [NHTSA], n.d.b). Recreational users misuse diazepam as a sedative or to enhance effects of alcohol or opioids (e.g., use of diazepam after taking methadone or heroin to produce an augmented high; cocaine users take diazepam to increase threshold for seizure; and both cocaine and heroin users take it to reduce or alleviate withdrawal symptoms). The NHTSA indicates that blood concentrations may be several-fold higher after chronic use compared to single use and that blood concentrations will not provide an accurate
indication of behavioral effects. Urine test results indicate metabolites are detectable for several
days to weeks after last use (NHTSA, n.d.d).

NHTSA states that simulator and driving studies suggest that diazepam produces
significant driving impairment with multiple doses and that single doses reduces reaction times
and the ability to multitask; increases lateral deviation of lane control; and increases the effects
of fatigue. Per NHTSA, epidemiological studies show a relative risk compared to drug-free
drivers with increases twice to several times that of drug-free drivers (NHTSA, n.d.d).

Narcotics

More Americans suffer from chronic pain that the combined number of people who have
diabetes, heart disease, and cancer (Substance Abuse and Mental Health Services Association,
2010). Opiates are extracted from the opium poppy and are included in medications such as
morphine, codeine, or heroin. Opioids (classified as narcotics) reference synthetic opiates,
opiate-like drugs, in addition to naturally occurring opiates and dull the senses, relieve pain, and
induce sleep. The duration and extent of impairment is dependent upon the drug, dose, and
whether the use is acute or chronic. Synthetic or semi-synthetic narcotics do not metabolize as
codeine, morphine, or 6-AM and include medications such as alphaprodine, hydromorphone,
oxymorphone, hydrocodone, oxycodone, fentanyl, methadone, and tramadol (Substance Abuse
and Mental Health Services Association, 2010). Fishbain, Cutler, Rosomoff, and Rosomoff
(2003) conducted an evidence-based literature review of 209 references to opioid use and driving
and concluded that the stable use of opioids does not affect driving. Fishbain et al. (2003) made
the following recommendations:

- Do not drive for 4-5 days after beginning opioid treatment or after a dose increase,
- Do not drive if the individual has feelings of sedation,
- Immediately report sedation, unsteadiness, cognitive decline to the physician for dosage reduction,
- Do not ingest alcohol or other illicit drugs and drive,
- Avoid over-the-counter antihistamines, and
- Take medications as prescribed by the physician.

In the event a treating provider is asked to complete paperwork in regards to the employee’s ability to drive, the providers should state that the employee’s driving ability is unknown and refer the employee for on-road/off-road driving test (Fishbain et al., 2003).

**Zolpidem**

Zolpidem, also known as Ambien, is a Schedule IV controlled substance used as a sleep aid. A single 5 mg dose resulted in average peak concentrations in blood of 0.06 mg/L at 1.6 hours. Effects of the medication include sleep induction, drowsiness, lightheadedness, amnesia, confusion, difficulty concentrating, memory impairment, slow and slurred speech, and difficulty with coordination. Symptoms and observed behavior while driving include erratic driving, slow and slurred speech, slow reflexes, dazed appearance, disorientation, confusion, loss of balance and coordination, double vision, poor performance on field sobriety tests, and poor attention (NHTSA, n.d.e).

**Gamma-Hydroxybutyrate**

Gamma-hydroxybutyrate (GHB), medically known as sodium oxybate or Xyrem, is an approved Schedule III controlled substance that acts as a CNS depressant with multiple medicinal purposes to include an anesthetic adjunct, hypnotic agent, and treatment of narcolepsy and cataplexy. Recreational users find GHB appealing for euphoria, reduced inhibitions, and sedation (NHTSA, n.d.c). Jones et al. (2008) evaluated the occurrences of GHB in blood samples
from 548 people arrested in Sweden for driving under the influence of drugs between 1998 and 2007. The arresting police officers noted behavioral effects such as unsteady gait, slurred speech, sedation, jerky movements, and irrational behavior (Jones et al., 2008).

**Antihistamines**

Antihistamines are the primary active ingredient in multiple cold and flu preparations. They are used to combat motion sickness, insomnia, seasonal allergies, nausea, cough, anxiety, vertigo, vascular headaches, and tremors associated with Parkinson’s disease.

Based on a 1996 study of 3,394 work-related injuries, Moskowitz and Wilkinson (2004) found a statistically significant increased risk (OR= 1.5) of injury among users of first generation H₁-antagonists antihistamines. The NHTSA states that the effects of diphenhydramine may cause a driver more impairment than the effects of alcohol (NHTSA, n.d.c). Moskowitz and Wilkinson (2004) reviewed scientific literature on the effects of antihistamines on driving-related skills at the request of the DOT. The researchers concluded that there is overwhelming evidence that first generation antihistamines produce objective signs of impairment as well as symptoms of sedation. They were unable to conclude whether second generation antihistamines caused sedation although it appeared that at least some individuals evidenced impairment.

**Muscle Relaxants**

Carisoprodol is a prescription medication which acts as a skeletal muscle relaxant prescribed for muscle tension problems to include low back pain. Carisoprodol’s major metabolite, meprobamate, is a CNS depressant used for anxiety symptoms. Carisoprodol and meprobamate are excreted into the urine and are detectable for up to several days following discontinuation. The characteristics of carisoprodol intoxication include dizziness, drowsiness, confusion, drunken behavior, and a positive Romberg’s test (NHTSA, n.d.a). The effects could
support impairment due to ingestion of carisoprodol and the metabolite meprobamate (Bramness, Skurtveit, & Morland, 2004).

Logan, Case, and Gordon (2000) studied 104 impaired driving cases submitted to Washington State Toxicology Laboratory between January 1996 and July 1998, which tested positive for meprobamate and/or carisoprodol. Logan et al. (2000) illustrated a case in which a 38 year-old male hit two parked cars and a motorcycle. He appeared dazed and demonstrated problems with coordination and balance although his speech was fair. His toxicology results indicated carisoprodol concentration of 4.8 mg/L and meprobamate 35.6 mg/L. Additional drug tests were negative to include alcohol (Logan et al., 2000). Per the NHTSA, a 700 mg dose of carisoprodol has produced peak plasma concentrations of 4.8 mg/L carisoprodol (NHTSA, n.d.a). Logan et al. (2000) concluded that blood drug concentrations cannot reliably predict to which degree an individual will become impaired and recommend that physicians should warn their patients about the potential impairing effects of this medication.
CHAPTER IV
ROLE OF THE OCCUPATIONAL AND ENVIRONMENTAL HEALTH NURSE

The Occupational and Environmental Health Nurse (OHN) is uniquely qualified to manage drug and alcohol programs due to experience in clinical nurse training and comprehensive workplace knowledge. The OHN recognizes that an individual who is addicted becomes psychologically or physically dependent on a substance which causes cognitive, emotional, and social dysfunctional behavior. Substance abuse results in disability claims for work injuries to include motor vehicle accidents and family and workplace violence. Employees with abuse issues are three and half times more likely to be involved in a workplace accident and are five times more likely to file a Workers’ Compensation claim (National Business Group on Health, 2009). The OHN can serve as the Designated Employee Representative (DER), develop policies and procedures, provide education and training to employees and management, secure vendors, assure legal and regulatory compliance, manage budgets, assist with referrals and counseling, facilitate return-to-work, maintain records and reports, maintain random and follow-up pools, conduct research, and evaluate programs.

Designated Employee Representative

The DOT requires that an employer have a DER who is authorized by the employer to immediately remove employees from safety-sensitive duties (ODAPC, 2012c) and make decisions to test or evaluate employees. The DER also receives the drug results and other communications for the employer. The OHN can serve in this role although a DER does not have to be a registered nurse.
Policy Development

The OHN can work with identified stakeholders such as human resources, labor relations, supervisors, employees, and attorneys to implement a workplace drug and alcohol program with written policies and procedures. The policies may include the purpose of the program, definition of substance abuse, identification of who is covered by the program, definition of the circumstances when one will be tested, an explanation of employee rights to confidentiality, EAP information, an explanation of consequences of a positive test or a refusal to test or other violations of the Rule, the role of the MRO, training requirements for both employees and supervisors, links to Rules and regulations (i.e., 49 CFR Part 40), and contact information for the medical department (National Business Group on Health, 2009).

Education and Training

The OHN can develop training and educational programs for employees and supervisors that will meet DOT regulatory requirements. The programs assist with awareness; provide training in identification of signs and symptoms of substance abuse; increase knowledge of the effects of substances of abuse on health, work and personal life; and inform employees and supervisors of the DOT requirements. The OHN promotes a drug and alcohol free workplace and acts as an employee advocate to ensure employees understand their rights related to the drug and alcohol testing program.

Vendor Selection

The OHN must contract with vendors for services such as collection facilities (depending on whether the samples will be collected at the site or outsourced to a vendor), Employee Assistance Program (EAP) providers for referrals, MROs, and certified HHS laboratories. If a decision is made to administer the program internally, the staff must be properly trained and
certified for urine and blood specimen collections (for FRA and USCG). In addition, the staff must be trained as breath alcohol technicians (BATs). Documentation of this training and certification must be maintained.

A list of EAP providers should be maintained for referral purposes. Most employers offer EAP services as a benefit. The OHN should negotiate and enter into a contract agreement with providers to ensure cost savings. The providers should be screened to assure that quality service is provided to employees; the success of the program is dependent upon employees being able to establish a trusting relationship with the provider.

The MRO must be DOT certified, and should also be a provider who is well respected and instills trust. Since the DOT requires face-to-face evaluations for all employees with positive laboratory drug tests, geographic location is an important factor for employee access. A back-up MRO is recommended to ensure prompt resolution of drug and alcohol issues. Finally, the OHN must enter into agreement with a HHS laboratory such as Quest Diagnostics, Alere Toxicology Services, or LabCorp. The OHN should negotiate prices and “bundle” services (e.g., use the same laboratory for wellness lab-work or mandatory lab-work such as those required for mandatory physicals).

**Legal and Regulatory Compliance**

The OHN is in a key position to interpret applicable drug testing regulations and implement strategies and interventions to assist with regulatory compliance. Knowledge of DOT and applicable agency rules as well regulation interpretations is essential. This will ensure that the program meets expectations in the event of an audit. The employer is responsible for the drug and alcohol program; therefore, the DOT can take action against the employer for errors made by vendors hired by the employer such as BATs, MROs, and SAPs.
**Americans with Disability Act and Legal Considerations**

The U.S. Equal Employment Opportunity Commission (EEOC) enforces federal laws that make it illegal for employers with at least 15 employees to discriminate against a job applicant or an employee due to race, color, religion, sex, national origin, age (40 and older), disability or genetic information (U.S. Equal Employment Opportunity Commission, n.d.). The Americans with Disability Act (ADA) considers addiction to be a disability and protects individuals who are disabled by substances provided they have successfully completed a rehabilitation program and are no longer engaging in substance abuse. Discipline for a positive drug test or for any violation of the DOT Rule is not covered by the ADA. The ADA requires that a pre-employment drug screen only be requested following a conditional offer of employment (O’Donnell, 2001). The OHN must be aware of the laws that prohibit discrimination and understand the rights of the employee as well as the employer.

The OHN who manages a drug and alcohol program must seek assurance that the testing is fair, accurate, and legally defensible (Center for Substance Abuse Treatment, 2010). A specimen must be collected per procedure and regulation. An individual who tests positive for substances of abuse is at risk to lose his income as well as future employment; therefore, employers, collection sites, laboratories, and the MRO must appreciate the risk of litigation. The employer is prudent to seek legal counsel to ensure the policies, procedures, and practices are in compliance with the law (O’Donnell, 2001).

**Budget Considerations**

The financial plan for the drug and alcohol testing program should address all costs associated with the program and should be related to company goals, objectives, and policies. The operating budget includes personnel costs (including compensation and benefits), training,
travel, certifications, and professional dues. Other operating expenses are outsourced services (SAP, EAP, and MRO), collection supplies, communications (computers, phones, and cell phones), travel expenses, and printed materials. A capital budget should be created for large expenditures such as remodeling, building, or a mobile collection vehicle (Rogers, 2003).

**Referrals and Counseling**

Employees who are going through withdrawal from substance of abuse or who are chronic abusers may display symptoms of depression. Table 4.1 identifies withdrawal symptoms as well as symptoms from chronic substance abuse (Substance Abuse and Mental Health Services Administration, 2012). If employees present to the medical clinic with signs and symptoms of drug or alcohol abuse or withdrawal, the OHN can begin conversations to facilitate an open dialogue. While employees may not share feelings or thoughts with co-workers or supervisors, they will discuss problems with a trusted OHN. The OHN should emphasize that conversations are kept in confidence and further assistance can be provided by the EAP or a trusted provider if desired.

**Return-to-Work**

When an employee returns to work following a positive test, refusal of a test, or violations of other provisions of DOT Agency testing regulations, the OHN can facilitate a timely return-to-work. However, the OHN must receive in writing from the SAP that the employee has successfully completed the recommended treatment and education before returning to safety-sensitive duties. The letter from the SAP should also include information regarding aftercare and the follow-up testing plan. The employee must have a witnessed return-to-work drug test, and the test must be verified as negative prior to returning to safety-sensitive duties. The employee will then be placed in the random follow-up pool for the amount of time
### TABLE 4.1
WITHDRAWAL AND CHRONIC USE SYMPTOMS BY SUBSTANCE

<table>
<thead>
<tr>
<th>Substance</th>
<th>Withdrawal Symptoms</th>
<th>Chronic Use Symptoms</th>
</tr>
</thead>
<tbody>
<tr>
<td>Opiods</td>
<td>Depressed mood, fatigue, low appetite, irritability, anxiety, insomnia, poor concentration</td>
<td>Depressed mood and other depressive symptoms</td>
</tr>
<tr>
<td>Cocaine and stimulants</td>
<td>Depressed mood, increased sleep, increased appetite,anhedonia, loss of interest, poor concentration, suicidal thoughts</td>
<td>Depressed mood and other depressive symptoms</td>
</tr>
<tr>
<td>Cannabis</td>
<td>Anxiety, irritability</td>
<td>Low motivation, apathy</td>
</tr>
<tr>
<td>Sedative hypnotics</td>
<td>Anxiety, low mood, restlessness, paranoia and psychosis</td>
<td>Depressed mood, poor memory</td>
</tr>
</tbody>
</table>

**Source:** Rosenthal, 2008
specified by the SAP, but for a minimum of six directly observed tests in the first 12 months. The employee must not be notified of the schedule for follow-up drug testing, and follow-up tests cannot be substituted for random testing or vice versa.

Most employers prepare a contract agreement or a written statement notifying the employee regarding management expectations. This information can be communicated to the employee via a meeting with the MRO, Human Resources, or the manager, with discussion facilitated by the OHN. The return-to-work process can be stressful for the employee and management. The OHN can counsel both the employee and the supervisor individually. The employee can be assured that the matter is strictly confidential. If aftercare treatment is required, the OHN can assist with filing for Family Medical Leave Act (FMLA) if the employee meets the requirements. The OHN can also assist with referrals to aftercare if needed.

**Recordkeeping**

Management Information System (MIS) reports (Form DOT F 1385) must be completed as established by the applicable DOT agency on an annual basis. The OHN can ensure that the form is accurate and that the information is appropriately stored for future reference. The OHN should review this data to evaluate program effectiveness.

**Random and Follow-Up Pools**

The OHN can manage the administration of the random and follow-up pool testing program, or it can be outsourced to third party administrators (TPAs). Employees not covered by DOT agency rules may not be included in the DOT random pool with covered employees.

**Program Evaluation**

The OHN should develop a program evaluation plan. The evaluation plan should include ways to measure the outcomes of the program and data analysis (Rogers, 2003). The OHN
should determine what needs to be changed based on the results of the measurements or objectives results. Expenditures should be analyzed to determine overages or deficits. Employee satisfaction surveys are also helpful to evaluate the occupational health service.
CHAPTER V
RECOMMENDATIONS AND SOLUTIONS

“Prescription drug abuse is a silent epidemic that is stealing thousands of lives and tearing apart communities and families across America,” said Gil Kerlikowske, Director of National Drug Control (CDC, 2011a, para. 4). In the 2012 forward in the National Drug Control Strategy, President Obama stated, “Prescription drug abuse continues to claim American lives, and those who take drugs and drive threaten safety on our Nation’s roadways” (Executive Office of the President of the United States, 2012, p. iii).

Expanded Panel

The Five Panel drug screen should be expanded to include medications which are known to cause impairment such as synthetic narcotics, benzodiazepines, muscle relaxants, sodium oxybate, and sedating over-the-counter antihistamines. Testing for these substances will identify employees who are impaired, act as a deterrent for abuse, and assist with gathering data to determine the scope of the problem. The cost associated with the expanded panel would increase; however, the cost is minimal when compared to the risk of the safety of employees, coworkers, and the public at large.

Prescription Drug Monitoring Programs

The strategies outlined in the 2012 National Drug Control Strategy focus on the Harold Rogers Prescription Drug Monitoring Programs (PDMP). The National Alliance for Model State Drug Laws (NAMSDL) is the technical assistance provider for PDMP and serves as a resource for governors, state legislators, attorneys general, drug and alcohol professionals, community leaders, the recovering community, and others with an interest in comprehensive and effective
state drug and alcohol laws, policies, and programs. PDMP provides grants to individual states that wish to enhance the monitoring of prescriptions and sales of controlled substances. PDMP impacts the probability of prescription drug abuse both directly and indirectly to reduce the likelihood of abuse. PDMP serves to affect prescription drug abuse directly by holding supplies constant and indirectly by operating through the supply of controlled substances (Simeone & Holland, 2006). States are eligible to receive the grant if they have a plan in place for a statute or regulation which requires submission of controlled substance prescription data into a central database. The state may select their scope of coverage, for example include Schedule II drugs, Schedule III drugs, Schedule IV drugs, or Schedule V drugs; however, the coverage is cumulative such that those states that select Schedule III drugs will also include Schedule II. Access to this database is controlled by the state but available to law officers, pharmacists and providers (Simeone & Holland, 2006).

MROs and SAPs should be required to verify prescriptions with the PDMP. They should discuss the prescribed medications with the treating provider to ensure that the employee is not performing safety-sensitive duties while taking over-the-counter or prescribed medications which may cause impairment.

**Training**

Employers, employees, MROs, and SAPs should be required to receive annual training regarding medications which may cause impairment and reporting requirements. Supervisors and employees should be trained in behavior observation so that any behaviors of impairment are reported and the employee in question is removed from safety-sensitive duty pending further review. Education should also be made available to ensure that employees understand the association between substance abuse and employee cost in medical premiums. Company policy
should enforce these requirements and should include consequences of failing to comply with the requirements.

**Research**

Research is needed to find ways to detect attempts to falsify drug test results. Additional research is needed to determine the efficacy of saliva specimen collection in lieu of urine collection. This collection modality can easily be obtained under direct observation and is non-invasive with no known side effects. Research is also needed to further evaluate medications known to cause impairment and determine the cut-off point for impairment.

The OHN should perform literature reviews to keep abreast of medications that cause impairment. The OHN should also be well-versed on methods of specimen substitution or subversion.

In conclusion, the purpose of the DOT’s drug and alcohol program is to protect the safety of employees, co-workers, and the traveling public. Measures should be taken to deter any impairing substance – regardless of whether or not the substance has been legally obtained. The OHN can manage the DOT drug and alcohol program to assure the employee is free from impairing substances, thereby reducing financial and human resources costs to the employer and society.
REFERENCES


