Department of Health and Human Services (HHS)

Substance Abuse and Mental Health Services Administration (SAMHSA)

Center for Substance Abuse Prevention (CSAP)

Drug Testing Advisory Board (DTAB) Meeting

June 10, 2014

Open Session

One Choke Cherry Road
Rockville, MD

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Morning Open Session

Welcome, Introductions, and Opening Remarks

DR. COOK: Good morning. I am Janine Cook, the Designated Federal Official (DFO) of the Drug Testing Advisory Board or DTAB. As the DFO of DTAB, I officially call this meeting to order. A copy of the agenda is posted on the DTAB website. There are several changes to this posted agenda. First, Mirtha Beadle will be speaking on behalf of Fran Harding. Secondly, Dave Mineta of the White House Office of National Drug Control Policy (ONDCP) is unable to extend his welcome because of a scheduling conflict. He does send his apologies and his warmest regards to all. Lastly, the order of the presentations for the afternoon speakers was changed because two presenters had time constraints. The copy of the revised agenda was emailed to you this morning and reflects these changes.

DTAB has its own website located at the link shown here on the slide. Please note that this is a new, temporary web address. Posted on the DTAB website are the DTAB charter, roster of board members, and meeting information, including past, present, and future meetings. The minutes, proceedings, and presentations from the open session will be posted on the DTAB website sometime in the future.

If you have any questions or comments concerning the material presented during the open session, please submit your questions and comments by pressing *1 to contact the operator. Submitted questions and comments will be considered by the Board during the closed session. The public comment period is scheduled to begin at 4:15 p.m. today, although, the exact time will be dependent on our progression through the agenda. Currently, there are two attendees who have registered to give public comment. If anyone else wishes to give public comment and has not registered, notify the operator by pressing *1. The public comment period is restricted to the time allotted. Time will be equally distributed among the commenters. Public comments will be included in the meeting minutes, as well as in the transcript. If possible, please provide either a hard or electronic copy of your comments to be shared with the transcriptionist to ensure that your comments are recorded accurately. The Board will not be responding to any public comments at this time but will take them under consideration in the closed session.

For those of you in unmuted mode, which are the Board members, please silence your electronic devices because they will interfere with both the audiovisual as well as the transcription equipment. The public is participating in listen-only mode. If you need to contact the web conference operator, please do so by pressing *1.

I want to welcome and introduce our DTAB board members: Bobby Bonds, Larry Brown, Phyllis Chandler, Tony Costantino, Laurel Farrell, Greg Grinstead, Marilyn Huestis, Denise Johnson-Lyles, Patrice Kelly, Susie Mills, Jasbir Singh, Donna Smith, and Steve Wong. I want to thank Dr. Courtney Lias of the Food and Drug Administration (FDA) for her service to the DTAB for the last five and a half years. I extend a warm welcome to her replacement, Dr. Denise Johnson-Lyles. I also want to welcome Patrice Kelly, Department of Transportation (DOT)'s ex officio representative to the Board.

I want to recognize our Division of Workplace Programs (DWP) staff, Ron Flegel, Sean Belouin, Jennifer Fan, Deborah Galvin, Giselle Hersch, Charlie LoDico, Brain Makela, Coleen Sanderson and Hyden Shen. Welcome back to Anna Donovan, our summer intern.

There are several other distinguished guests I want to recognize: Mirtha Beadle, the Deputy Director of CSAP, Paul Harris and Will Smith from the Nuclear Regulatory Commission (NRC), Tom Martin from the Department of Defense (DoD), Patrice Kelly and Cindy Ingrao from DOT, and Connie Foster and Ian Rucker from the HHS Office of General Counsel (OGC).

The proposed dates for the remaining fiscal year 2014 DTAB meeting are September 3rd and 4th. Currently, this meeting is scheduled to convene onsite at SAMHSA, as well as by web conference. Whether this meeting will convene in open or closed session will be decided at a later date.

Finally, I would like to introduce Ron Flegel, the Director of the DWP, who will be extending his warm welcome. Thank you.

Previously Announced DTAB Recommendations

MR. FLEGEL: Thank you, Janine, and good morning everyone. I also want to thank everyone for attending today's DTAB meeting here, both onsite and by web conference. In addition, I apologize for cancelling the March 17th DTAB open session due to the wintery conditions, which were unforeseen at that time. Next, I want to acknowledge the DWP staff for all of their hard work in preparing for these council meetings and also their day to day operations in guiding the decision made for the Federal Drug-Free Workplace programs.

I hope everyone finds today's updates presented later this afternoon enlightening. It will be clear from today's presentations that we support SAMHSA's mission of reducing the effects of substance abuse in America through our workplace drug-testing programs.

Regarding the DWP status update, the proposed revisions to the Mandatory Guidelines for Federal Workplace Drug-Testing Programs (MG) are currently under review with the Office of Management and Budget (OMB). The slide shown on screen illustrates the routing process that the MG will go through. These proposed revisions for both oral fluid and urine will serve to enhance this regulatory program, which is designed to deter illicit drug use in federal agencies and the regulated industries. While the focus of these proposed oral fluid guidelines are to develop the federal standards for workplace drug testing, these guidelines will also be important to private companies and other public sectors as well.

DWP staff is currently updating the Medical Review Officer (MRO) Manual to include the interpretation of workplace prescription drug results. Later this morning, there will be an update on the progress DWP has made on this manual. As you know, opioid pain killers are responsible for thousands of prescription drug overdose deaths each year. Workplace drug testing may be one of the keys to early intervention and prevention.

We are also happy to announce that DWP received the final notices from OMB for the electronic chain of custody forms (CCF). These final notices are posted on the OMB website. The National Laboratory Certification Program (NLCP) will initiate actions as described in the guidance that is posted to improve the electronic transmission of results.

Now, I would like to touch on numerous special research projects that have been undertaken in conjunction with the NLCP. Among these special projects are two dosing studies that were completed, one for poppy seed and one for over-the-counter nasal inhalers containing L-methamphetamine. Oral fluid and urine specimens were collected at selected intervals following these dosing studies. These results will be published as peer-reviewed journal articles. The next special study was a hydrocodone/oxycodone dosing study, in which oral fluid, urine, and blood specimens were collected at selected intervals following dosing. The results of this study will be published as peer-reviewed journal articles and were presented at the 2013 Society of Forensic Toxicologists (SOFT) meeting. These results will also be presented today. Another study was a hydromorphone/oxymorphone dosing study, with the same study design as the hydrocodone/oxycodone study. The next study examined the effects of passive exposure to marijuana smoke in a confined space. In this confined room, with and without ventilation, marijuana cigarettes with different levels of THC were smoked. Oral fluid, urine, blood, and hair specimens were collected from the non-smokers at selected intervals following exposure and also from the smokers. Results of this study will be published as peer-reviewed journal articles. In this study, we also performed cognitive studies to impairment from the passive inhalation. Other special oral fluid projects have included tooth whiteners and their effect on drug analytes, analyte stability in neat and buffered oral fluid, and the effect of oral fluid collection device on analyte stability and recovery. The characteristics of current immunoassays for all four synthetic opiates and their confirmation methods were evaluated. We will continue to design and conduct future studies to clarify and resolve issues with other specimen types, which may allow their use in federally regulated workplace programs.

I would also like to mention DWP's Prevention of Prescription Drugs in the Workplace Initiative, which has several technical assistant products, including a series of one-page fact sheets designed for various industries. We also compile a

weekly update to a literature bibliography from reputable journals, books, and news articles; this bibliography is archived online and available to an audience of close to 1,500 specialists and professionals in the field. We have developed specialized early prevention screeners for flight attendants, which is also in the developmental stage for nurses. The link to these products will be addressed in my updates later in this meeting.

Now, I have the pleasure to introduce Mirtha Beadle, who serves as CSAP's Deputy Director. I am very happy to have Mirtha here to welcome you. I want to thank you again for attending. Now, I will turn it over to Mirtha.

MS. BEADLE: Thank you, Ron. Good morning everyone. On behalf of Director Fran Harding, welcome to the third meeting of SAMHSA's DTAB for fiscal year 2014. I want to recognize and welcome our DTAB members, our federal partners, and the staff from CSAP's DWP. I especially extend a warm welcome to you, the general public, who are participating remotely.

DTAB is a scientific panel that advises SAMHSA's Administrator on the Federal Drug-Free Workplace Programs, which is designed to deter illicit drug use in federal agencies. The standards for drug testing administered by SAMHSA affect 50 million people who are tested as a condition of employment, including 400,000 federal employees in 119 different federal agencies, as well as 12 million workers in the federally-regulated industries. Workplace drug-testing is one of the largest public health prevention programs in the United States and the largest universally preventive program within SAMHSA. The Federal Drug-Free Workplace Programs support SAMHSA's mission and its number one strategic initiative to prevent substance abuse and mental illness. This strategic initiative has four goals. The first calls for a range of responses to address substance abuse and mental health conditions. The second addresses underage drinking and adult problem drinking. The third focuses on preventing suicide and suicide attempts among several populations that are at high risk. The fourth goal focuses on preventing the misuse and abuse of prescription drugs. Through our join efforts, we can improve our nation's behavioral health.

Today's meeting is the annual DTAB State of the Union Address, whereby the status of drug testing in 2013 is presented by the DOT, the DoD, the NRC, the federal agencies, and the Drug Testing Index®.

Since this program's creation in 1988, historical data show a continuing decline in illicit drug use among the targeted populations. In addition, evidence demonstrates that the universal protection derived from workplace drug testing programs effectively decreases injury and death among the general population. Hopefully, when the lab data are revealed later today, that downward trend continued in 2013. Workplace drug testing is one key example to demonstrate that prevention really does work.

Again, I thank all of you and our federal partners for your continued guidance and expertise. I can't stay with you today, but I know that the meeting with be informative and productive. Thank you, again.

DR. COOK: Thank you, Mirtha. Next are presentations on the various initiatives that are underway at the DWP. We will begin with Commander Jennifer Fan, who will give you an update on the MRO initiative.

DWP Initiatives

Medical Review Officer (MRO)

CDR. FAN: Good morning. This is Commander Jennifer Fan. Today I present a very brief overview of the MRO entities and updates.

Who can serve as a MRO? A MRO must be a licensed physician, with either an MD or a DO degree, who has knowledge regarding the pharmacology and toxicology of illicit drugs, has completed training necessary to serve as an MRO, and has satisfactorily passed an examination administered by a nationally recognized entity that certifies MROs or a subspecialty board for physicians performing a review of federal employee drug test results, which has been approved by the HHS Secretary.

Information, including responsibilities/requirements, on MROs as well as the MRO entities can be found in the MG, Section 13.1, Medical Review Officer. MRO certifying entities and subspecialty boards must be nationally recognized. To receive approval from the HHS Secretary, they must annually submit their qualifications and a sample MRO examination to us for our objective review. Afterwards, we submit our recommendations to the HHS Secretary for her approval. The latest list of approved MRO entities was published in the Federal Register on March 11, 2014. The entities that are approved for training and certification through examination are AAMRO and MROCC. We also listed those entities, ASAM and ACOEM, which offer training as a prerequisite for certification. For the next round of review, any MRO entity that is seeking approval from the HHS Secretary must have its information submitted to us by July 21st. Once SAMHSA has reviewed the request, we will forward our recommendation to the HHS Secretary. The HHS Secretary will also review the request. Once approved, the approved entities are published it in the Federal Register.

What is happening with the MRO workgroup? First, Sean Belouin has come back to SAMHSA and to DWP. He has graciously offered to take over and help me with the MRO workgroup. I am very appreciative of his help. Briefly, the mission of the MRO Workgroup is to aid SAMHSA in determining the steps in the MRO verification process, specifically, determining program objectives, developing specific workplace definitions, and reviewing the standards of practice. The group's second mission statement is to advise SAMHSA in drafting guidance for the consistent interpretation of donor drug test results. This objective will result in a more comprehensive MRO Manual that will deal with all illicit drug use, the newly added synthetic opiates, and oral fluid drug test results. Currently, we are revising the MRO Manual to include the DTAB recommendations as well as reorganizing the Manual to be more user friendly, easier to follow, and easier to update as the future progresses. Our next teleconference meeting will be on June 30th from 2:00 to 3:00 p.m. Since it has been a while since the MRO workgroup has convened, this meeting will be a reorientation of where we are and our revisions to the Manual thus far. Someone has been reworking the Manual for us, and he will present his draft to the group for review. Our timeframe for the completion of the revised MRO Manual is by the end of the year. After the June meeting, we hope to have regularly scheduled teleconferences throughout the remainder of the year so that we can review and address any issues necessary to complete the Manual.

Listed here are some references to our program, including the list of the approved MRO entities.

MR. HARRIS: Can you briefly summarize the major areas of the Manual that are being updated?

CDR. FAN: We are addressing the prescription drug add-ons, the oxycodone, oxymorphone, hydrocodone, and hydromorphone. We have also created placeholders into which oral fluids will eventually be inserted.

MR. HARRIS: Is there an effort to update the MRO guidance on subversions and adulterations?

MR. FLEGEL: As Jen mentioned, we are reorganizing the MRO Manual in a different way. All illicit and prescription drugs are addressed in the front of the Manual. Other guidance currently not in the Manual, for instance, the electronic CCF, must be inserted. The Manual will be refocused around methodology, the illicit drugs and that interpretation, and then the synthetic opiates and their interpretation.

MR. HARRIS: My question for Jennifer was whether or not the subversion/adulteration guidance was going to be enhanced.

MR. FLEGEL: Dependent on the proposed guidelines that are currently at OMB, that will be addressed in the MRO Manual.

CDR. FAN: Plus, bring any issues or any questions that you may have to the group meeting for review.

DR. COOK: Do any members of the Board have any questions for CDR Fan? If so, please state your name and your question. Thank you, Jen.

Our next presentation is from Charles LoDico on the CCF.

Custody and Control Form (CCF)

MR. LODICO: Thank you, Janine. Good morning, everybody. Today I will discuss the update for the eCCF. This project has been long overdue. We have some good news to share with everybody today.

Shown here is the 2013 Federal CCF. It is a five part form that contains all the fields necessary to capture the information at a collection site for urine specimen. The good news is that the content of this form has not changed. Also, the only change that has occurred to the form is the manner in which it can be used. It has gone beyond a paper form. Using a computer program coding for the appropriate fields, the CCF has become electronic.

The reason why we proceeded in this direction was because the last time the CCF was up for renewal at OMB, OMB directed that the next iteration of the form, which has a three year expiration date, must meet specific conditions. According to the Government Paper Elimination Act (GPEA), OMB set the terms for the clearance of the CCF, which is that SAMHSA shall provide a progress update on adoption of an electronic form in an effort to reduce the paper burden. That was accomplished by convening a working group with our federal partners to established standards for the eCCF. We researched electronic signatures, non-repudiation agreements, provision signatures, third party software for managing the CCF, and specific, unique identifier numbers. The group also examined the legally binding equivalent of traditional hand written signatures in the forensic arena. This was very troubling to many of us since we didn't know if there was a precedent which addressed this particular issue. Our JAG officer searched LexisNexis, a law review service, and discovered only two cases. In each case, the courts deemed them to be acceptable as traditional sampling of identifying who the person was who signed off the specimen. The other area that is very critical to this electronic form and was a concern to OMB was the security of data transmission over telecommunication systems and networks. As part of the supporting documentation, we had to submit a Privacy Impact Assessment (PIA) form, which I will discuss later on in this presentation.

On May 28, 2014, OMB provided Notice of Approval of the eCCF. This notice lists the collection information and to whom the department is entrusted as part of the GPEA. The other information that is important is that the OMB numbers still remain the same. This form has a three year expiration until May 21, 2017. OMB requires HHS to update and post to its website the documents, specifically the PIA. Listed here are tracking numbers. This is the web address for this information. I have asked Janine to post this link to our DWP website. There will be about a 24 hour lag time before the link is posted. On our website at this particular location, you will find this information.

Members of this working group are listed here. It is a very diverse group of individuals representing the labs, MROs, manufacturers, and our federal partners. This yielded a nice cross-section of individuals, all expressing their particular needs and viewpoints. Most of the working group meetings occurred around 2012. Lastly, the working group focused on what are our outcomes. We looked at three areas of discussion, including the risks/benefits of the eCCF, standardization of term definitions, and the eCCF operational considerations, such as the manner in which the eCCF is handled at the lab level so as to tailor our review of the eCCF during the inspection process.

Another aspect that is very critical in this process is any documents related to the eCCF. Earlier this morning, Jennifer discussed the update of the MRO Manual. The Manual has been updated to include the eCCF and only those discussions around the CCF. This revision of the MRO Manual will have a 2014 date on it. The old MRO Manual has information only about the paper CCF. The 2014 Manual provides information on how to use an eCCF. The same applies to the Collection Handbook and also the NLCP checklist, which is used by NLCP inspectors to assess the laboratory's laboratory information management system (LIMS) or any related reporting processes that the laboratory conducts.

The most important part of this whole document update is the guidance for using the 2014 CCF. It is much more specific than the previous guidance for using the paper form. In it, there is information about relating to how use the paper CCF and how to begin to use the eCCF. For the laboratories, it is a change in their standard operating procedures (SOP) and a change to personnel training. More importantly, the eCCF inspection is viewed as a validation of the new process. Therefore, similar to an instrumentation update from a GC-MS to an LC-MS/MS, the lab must submit its eCCF validation

study, including the parallel studies relating performance of the paper CCF to the electronic version. That validation packet is submitted to RTI, the contractor who oversees the NLCP program. RTI staff will review the data and provide a recommendation whether it is acceptable or not. That is the kind of information found in the guidance document. I am not prepared at this time to further discuss this. There is still more that needs to be developed. Meetings will be scheduled between RTI and DWP staff to develop appropriate guidance for the labs on how to start using the CCF as an electronic document.

The eCCF is currently available for the federal programs. We cannot comment on its status for DOT; they will have an opportunity to make that comment for themselves.

There were two Federal Register documents that were completed as part of this process. The first one, to establish the estimated burden hours, was published on April 30th, 2013; no comments were received from the public. The second and most recent is a summary of the status of the eCCF, including what some of the conditions will be. Lastly, we announced in the Federal Register that the eCCF will be used in the federal programs.

Lastly, the PIA form caused the big delay. It was a very grueling and very time-consuming process, but we satisfied all of OMB's concerns. The PIA form was completed and reviewed at HHS and was then approved.

DR. COOK: Do any members of the Board have questions for Charlie? If so, state your name and your question.

MR. HARRIS: Charles, I was wondering if you remember the exact number or the estimated number of the hours necessary to complete the eCCF on your burden assessment? Do you happen to have that memorized?

MR. LODICO: On an individual unit, we estimated it to be about five minutes for the collectors.

MR. HARRIS: Did that include the evaluations being conducted by any of the MROs?

MR. LODICO: No. The burden hours are broken down by individual task and individual person. It is estimated it would take the collector five minutes to fill out the form. Whatever review process for the certified scientist --

MR. HARRIS: Those are counted elsewhere.

MR. LODICO: Right. Costs are broken down on a unit basis of time and dollar amount attributed to labor hours. We had the review of an MRO, how much time the review required, and then the costs associated with their hourly rates. The estimated annual cost was about $76 million for the whole program, including federal, NRC, and DOT.

MR. HARRIS: Okay. To make sure I understand, the cost was for filling out the form. Other costs associated with the MROs and anyone else reviewing the form is captured under different regulations associated with your guidelines.

MR. LODICO: Right. Absolutely.

MR. HARRIS: Thank you.

DR. COOK: Are there any other questions on the CCF or comments by the Board? Hyden?

Introduction to the Federal Drug-Free Workplace Programs

MR. SHEN: Thank you, Janine, and good morning. This morning I will provide you with a broad overview of the Federal Drug-Free Workplace Programs. This program has been in existence for the past 25 plus years. It is well-established and well-known within the drug testing field, of course, and federal agencies.

Currently, there are five key documents that serve as the basic foundation for the Drug-Free Workplace Programs. There are three governing authorities and two guidance documents. The three governing authorities are Executive Order 12564, Public Law 100-71, and the MG. The two guidance documents that I will be discussing today are the Model Plan for a Comprehensive Drug-Free Workplace, which serves as a template for all agencies' drug-free workplace plans, and the 2013 Guidance for the Selection of Testing Designated Positions (TDP).

The Executive Order was signed on September 15, 1986 by then-President Reagan. It set the basic foundation for a Drug-Free Workplace Program within the executive branch. The federal government, as one of the largest employers, would set the example for a drug-free workplace. The Drug-Free Workplace Program is one of the largest prevention programs that impacts every single individual on a daily basis. What the Executive Order did was direct agency heads to develop a plan that included specific policies and procedures for a drug-free workplace program, an employee assistance program to allow individual employees to help themselves and their families, and specific training for supervisors and employees, so they have an understanding of what the expectations were for a drug-free workplace program. The Executive Order also put into place an opportunity for self-referral to treatment. The last component is a drug-testing program that tested individuals in sensitive or voluntary positions.

After 1986 and the implementation of the Executive Order, there was a flurry of different activities. Because Congress wanted to ensure consistency within the program, they passed Public Law 100-71. There are two key components of Public Law 100-71. The first one is that executive branch agencies cannot use appropriated funds for their Drug-Free Workplace Programs until they have an HHS-certified plan. The second key component of Public Law 100-71 was that HHS was required to publish the MG, which basically established the scientific and technical aspects of the drug-testing program.

There are two guidance documents. The Model Plan for a Comprehensive Drug-Free Workplace Program serves as the basic foundation for all certified plans within the agencies. We take into account when the plans are developed the agency-specific mission and structure. The second key guidance document is the Guidance for the Testing of Designated Positions. A TDP is a national security, public health, or public safety position, where a momentary lapse in judgment could result in a catastrophic consequence that cannot be remediated by the administrative process.

Within each agency, we have an individual(s) called the Drug Program Coordinator (DPC). These specific individuals are responsible for the implementation, direction, administration, and management of the agency drug program. The DPC serves as the principal point of contact with the laboratory and for the collection activities to ensure that the effective operation of the testing portion of the program is conducted.

There have been questions regarding clarification about recreational and medical marijuana. Several states have passed medical and recreational marijuana initiatives. We would like to emphasize and clarify that under the Controlled Substance Act marijuana continues to be a Schedule I drug. Under the Drug-Free Workplace Programs, marijuana still will be tested.

This page shows a listing of the different resources that I just gave you a broad overview of. These documents are also posted on our webpage, http://beta.samhsa.gov/workplace/workplace-programs.

DR. COOK: Do any members of the board have questions for Hyden? Thank you, Hyden. Next, Charlie LoDico will provide an update on the NLCP

Introduction to the National Laboratory Certification Program (NLCP)

MR. LODICO: Thank you, Janine. I was asked to give a brief introduction to the NLCP because not many of the public have a full understanding of what the NLCP is. This is a good opportunity to provide an oversight of the program and detail specifics of what the NLCP does as part of the MG.

The NLCP Director at RTI is Dr. John Mitchell, a long established director and employee of RTI who has been with this program for many, many years. He is assisted by two very capable individuals, each overseeing different sections of the program. His deputy director for inspection is Ms. Susan Crumpton. His deputy director for performance testing (PT) is Dr. Francis Esposito.

What is the role of the NLCP? Its primary role is to manage the MG for HHS-certified labs. The MG are very prescriptive and specific about what the laboratories must do in the performance of testing, training, and record keeping. The implementation of the MG has evolved into a process where RTI and its staff manage the MG.

One aspect of managing the NLCP involves the inspections of the certified laboratories. Currently, there are 31 labs in our program. Each laboratory is required to be inspected twice annually with a number of inspectors that is dependent on the size of that particular laboratory. For instance, a small lab would require only a few inspectors, whereas a much larger lab would need many more for auditing to determine whether their performance is in compliance with the MG and satisfactory.

All of the laboratories, regardless of their size, perform quarterly PT, which involves the satisfactory analysis of 25 samples. PT is shipped to all of the labs at the same time. The labs are directed how to analyze the samples, whether for a specific analyte or as an unknown. Analysis includes both screening and confirmation testing. The labs report their results back to RTI, who scores the data and determines whether the laboratories have satisfactorily performed,, both quantitatively and qualitatively, to meet the minimum standards for continuation in the program.

The NLCP publishes NLCP alerts, which are guidance to labs on specific issues. Either the labs, as part of their day-to-day processes, or an unexpected event uncover the need for clarification on a specific issue that is communicated as a general lab alert issued through RTI. DWP develops the language for that guidance to rectify that specific issue. We cite specific references and include how the lab should respond to the issues. The resultant email alert is transmitted to the labs, some of our federal partners, and certain interested personnel entities that would benefit from these NLCP alerts.

One of the other areas that RTI plays a pivotal role is the failed to reconfirm (FTR) lab investigations. In the program, urine specimens are collected as split-specimens, A and B bottles. If the laboratory produces a result that is positive for the A bottle and the donor challenges that specimen result, then the donor's B bottle is forwarded to another certified laboratory. When there is a discrepancy between the results for the A and B bottles, the lab alerts the MRO and directs them to contact DWP for federal program specimens. More often than not, these are federally-regulated specimens so the MRO alert about the discrepant results is sent to the Office of Drug and Alcohol Policy and Compliance (ODAPC) at DOT. A staff member at ODAPC either emails us or RTI of the discrepancy. An investigation is launched which involves both laboratories. We try to determine whether this is a lab-related error or whether it is a result of an adulterant that degrades the specimen and, therefore, produces a discrepant result. Typically, there are between seven and to ten FTR investigations annually. From these lab investigations, we gain a perspective and understanding. If we discover something worth sharing with the rest of the laboratory community, we send out an NLCP alert to ensure everybody is aware of the issue and can hopefully be preemptive in preventing this from happening again.

The last important aspect of the NLCP is the annual SOFT Workshop for lab responsible persons (RP) and inspectors. Here, the information from the past year is shared and discussed. We thoroughly review any concerns that the labs and the inspectors had during this time.

Earlier this morning, Ron mentioned some studies performed over the past year. There were four single-dose oxycodone, hydrocodone, oxymorphone, and hydromorphone studies, with oral fluid, urine, and blood specimens collected. The oxycodone and hydrocodone studies have been published in the Journal of Analytical Toxicology (JAT) volume 37. The oxymorphone and hydromorphone studies, although completed, the specimen analysis has not been performed yet. The study specimens are stored under proper storage conditions. The biggest study performed last year was the passive cannabis exposure study which included three exposure sessions involving six active and six passive smokers. The exposures were categorized as high, moderate, and high depending on THC concentration and air circulation. Oral fluid, urine, and blood specimens were collected as well as before and after exposure hair specimens.

This publication is currently in draft form with an expected publication date at the end of this year. Other studies included an oral fluid stability study, the ingestion of poppy seed study, and the effects of Vicks inhaler study. Articles are currently being drafted for the ingestion of poppy seed and the Vicks inhaler studies.

Lastly, one valuable aspect of the NLCP is its ability to share information. This helps the labs to succeed, and all have the same level of performance, and maintain the same baseline. To continue that level of performance, we provide them as much information as possible to maintain our certified labs. We monitor each laboratory's performance on testing additional Schedule I and II drugs and adulterants. Last year we sent out 14 NLCP alerts. Some of those notices included information about Schedule I and II drugs. There was even information about how the labs were to perform during last year's government shut down. Another NLCP initiative is the Drug Testing Matters Newsletter, which has featured articles on amphetamines/methamphetamine isomers and the opiate series.

DR. COOK: Do any of the Board members have a question for Charlie regarding the NLCP?

MR. HARRIS: Yes. If you can return to the slide on inspections, PT, and NLCP alerts. Are the NLCP alerts publicly available?

MR. LODICO: The NLCP alerts are issued via a listserv, which includes the laboratories, inspectors, federal partners, and MRO entities. These alerts are on very specific issues that the laboratories need to remediate.

MR. HARRIS: For example, if I have a nuclear power plant that audits a HHS-certified lab per the regulations that NRC implements, does that entity who is auditing the lab have access to NLCP inspections, PT, and alerts?

MR. LODICO: Well, you are mixing many things into one. The auditor can have access to the alerts, but they will not have blanket approval to access inspection reports unless it is under your authority.

MR. HARRIS: Okay. Are the Drug Testing Matters Newsletters publicly available?

MR. LODICO: Yes. These newsletters provide information about a particular analyte.

MR. HARRIS: I am interested in obtaining some of this information. As far as the NLCP inspections and audits go, you said they are not publicly available. Is there a law or a regulation that identifies these as not being publicly available?

MR. LODICO: Can I give you that information at a later time since I do not have that available right now? This is not the right time to discuss that.

MR. HARRIS: Okay. Thank you.

DR. SMITH: I am curious. Are we currently on distribution list for these alerts?

MR. LODICO: I will contact RTI to determine if you are on that list. If not, please send me an email, and I will add you to the listserv.

DR. SMITH: Thank you.

DR. COOK: Are there any other questions for Charlie? Next, we will receive updates on four recent research studies that were done by DWP in conjunction with RTI. First, Charlie will profile hydrocodone and metabolites in urine.

Research Studies

MR. LODICO: Thank you, again, Janine. As mentioned in earlier presentations, we had a full list of studies that were completed on last year's fiscal budget. Now I will present the findings from the single dose study profiling hydrocodone

and its metabolites in urine. This presentation was previously given as a poster at the fall SOFT meeting. In addition, it was published in JAT, volume 37, as a peer-reviewed article.

Prescription hydrocodone and other synthetic opiates are being misused in the U.S. Hydrocodone is the most frequently prescribed opiate drug in the U.S. with more than 136 million prescriptions dispensed in 2011. Currently, hydrocodone is not tested in the U.S. federal workplace program, but there is considerable interest in adding it, along with other synthetic opiates, such as hydromorphone, oxycodone, and oxymorphone, because of the widespread abuse and impairing effects.

The objective of this study was to delineate the time course of hydrocodone and its metabolites in human urine following controlled administration of a single 20 mg oral dose of hydrocodone bitartrate. This schematic illustrates the metabolism of hydrocodone, which is metabolized to norhydrocodone, to hydromorphone, and then to dihydrocodeine. This metabolic scheme is important in interpreting the analytes measured in the urine.

Subjects were 12 healthy adult volunteers who met the three month pre-study criteria listed here, including not using opioids in the previous three months and not ingesting food products containing poppy seeds over the last week. Dosing was a 20 mg dose of hydrocodone bitartrate administered as two Norco® tablets with 240 ml of room temperature water. Urine specimens were collected before dosing as a baseline and as pooled collections from each subject on three separate days post-dosing. Collection times were 0, 4, 8, 12, 16, up to 24, 28, 32, 36, to 48 and then 52 hours. A total of 141 urine specimens were collected, with 52 percent being single voids. Analysis of the urine specimens was performed using liquid chromatography (LC) tandem mass spectrometry (MS). We analyzed the free unconjugated analytes and total analytes following hydrolysis. The limit of detection (LOD) was 50 ng/mL. The analytes examined were hydrocodone, hydromorphone, norhydrocodone, dihydrocodeine, oxycodone, oxymorphone, noroxycodone, noroxymorphone, codeine, morphine, norcodeine, and normorphine.

The hydrocodone and norhydrocodone were initially detected in the majority of subject specimens within two hours of drug administration. Hydrocodone was most frequently detected in combination with norhydrocodone. Norhydrocodone was the most abundant metabolite and was often present at higher concentrations than hydrocodone. It also has a longer detection window as well. Both hydromorphone and dihydrocodone generally became detectable in the two to four hour collection period. Hydrocodone and metabolite concentrations peaked within three to nine hours post-dosing and then declined. In this graph, the green bar represents norhydrocodone. Notice the spike in the first three hours post dose. At the 30th hour, concentrations are above 300 ng/mL. If 300 were the cutoff, 30 hours is the detection window for a single dose. The next bar graph displays results by hours versus cutoff. At the 300, cutoff, the window of detection for norhydrocodone is 23-24 hours. For hydrocodone, the window is about 12 hours. At 2,000 cutoff, the window of detection for codeine/morphine in urine after a single dose is about five hours. This next slide is even more indicative of the analyte tested and at what cutoff it will be positive. On the left hand side is the number of specimens greater than the cutoff. Using the 300 ng/mL cutoff, about 80 specimens were positive for norhydrocodone, whereas about 50-55 specimens were positive for hydrocodone; that is a huge difference. Norhydrocodone, even though we have not considered it as an analyte to be tested, has better potential. This information should be taken under consideration when making proposals. This norhydrocodone result is why this study yielded such good, valuable information.

In conclusion, hydrolyzed versus non-hydrolyzed results indicate that hydrocodone, norhydrocodone, and dihydrocodeine are excreted nearly completely in the unconjugated form. Hydromorphone was excreted primarily in the conjugated form. Detection times for hydrocodone and metabolites were less than five hours using a 2000 ng/mL cutoff concentration. Using a 50 ng/mL cutoff concentration, the standard detection window for hydrocodone was approximately 28 hours. Overall, the data suggest that drug testing requirements for hydrocodone should include tests for hydrocodone/hydromorphone in hydrolyzed urine. Some consideration should also be given to allowing testing for norhydrocodone as a routine confirmatory test analyte or, alternatively, as a specimen test for system interpretation.

DR. COOK: Do any Board members have a question for Charlie? As a reminder, these studies were undertaken because there are the four synthetic opiates that we are proposing to include in the revised urine MG. Next, Ron Flegel will be providing the update on the following three research studies. Ron?

MR. FLEGEL: Thanks, Janine and Charlie. I also want to thank the earlier presenters. Hopefully, everybody found those enlightening. Today's agenda is from the cancelled March 17th DTAB meeting. Unfortunately, we are playing catch up with some of the information.

Today I will present study results on some of the synthetic opiates in more detail. Beginning with oxycodone and hydrocodone detection in urine, oral fluid, and blood, shown are the four research studies that we are currently completed. These data have now been, or soon will be, published as peer-reviewed journal articles.

The outline of what I will present include the study details, the review of oxycodone and hydrocodone controlled clinical study results, the examination of a close relationship between oral fluid and blood, and the summary of the detection of their metabolites in urine. These study results will be important as we update the MRO Manual on synthetic opiate single dose studies.

Illicit prescription opioid use is now more prevalent in the U.S. than the combined use of heroin, cocaine, and methamphetamine. The U.S. is the world's largest consumer of oxycodone per capita. The combination product of hydrocodone with acetaminophen is the most frequently prescribed opioid drug in the U.S. Oxycodone, hydrocodone, and other semi-synthetic opiates have become the most commonly misused prescription drugs in the U.S. Currently, oxycodone and hydrocodone are not tested in the U.S. Federal Workplace Programs, but there is considerable interest in adding them and other semi-synthetic opiate analgesics to the test panel because of their widespread abuse and impairing effects.

We conducted this dosing study under Institutional Review Board (IRB) approval and informed consent with healthy, drug-free volunteers. We characterized the time course of appearance and disappearance of oxycodone and hydrocodone using oral fluid, blood, and urine. One study goal for oxycodone and hydrocodone was to determine the kinetic relationship of whole blood to oral fluid. This was done to establish the core information on the distribution pattern of oxycodone and hydrocodone in blood and the oral fluid. The next goal was to evaluate the kinetics and disposition of oxycodone and hydrocodone in oral fluid to determine the strength of correlation between oral fluid and blood. For our first paper on prescription opioids, we profiled oxycodone and its metabolites in urine to delineate the time course of oxycodone and the metabolites in human urine following controlled administration with a single 20 mg dose of oxycodone hydrochloride. For the second paper on prescription opioids, we profiled hydrocodone and its metabolites in urine to again delineate the time course of hydrocodone and its metabolites in urine following a controlled administration with a single 20 mg oral dose of hydrochloride bitartrate.

Shown here are pictures of the prescriptions we used. For oxycodone, a single 20 mg tablet of OxyContin® tablet, which is equivalent to 17.9 mg of oxycodone, was administered. For hydrocodone, a single dose of two Norco® tablets, each containing 10 mg of hydrocodone and 325 mg of acetaminophen, which is equivalent to 12.1 mg of hydrocodone, was administered.

The study design included a single center, randomized, parallel group with open labeled, single-dose study. There were 12 healthy adult drug-free volunteer subjects per drug group. Timed oral fluid and blood specimens were collected, and urine specimens were pooed at the appropriate times. Subjects spent two nights on the controlled clinical ward for monitoring. The oxycodone subjects included seven males and five females. The mean age was 31.5 years old while the mean weight was about 76.7 kg. Subject ethnicity was eight black, two white, one hispanic, and one multi. For the hydrocodone group, we tried to reassemble similar subject demographics. There were seven male and five females. The mean age was 33.9 and the mean weight 76.8 kg. Ethnicity was ten black, one white, and one Multi-origin.

Shown here is the study timeline for specimen collection. Oral fluid was collected one hour prior to the dose, followed by every 15 minutes up to four hours, and then every hour. The same collections times were done with blood. With

urine, specimens collected between zero to two hours. Subsequent collections were at 2-4, 4-6, etc., to 48-52 hours. To summarize, during the two weeks prior to the study, subjects were drug screened and received informed consent. The day prior to the study, subjects were admitted and again drug tested. On day one, the single drug dose was administered at zero hour. Specimen collection began and continued for 52 hours when the subjected were discarded. Oral fluid specimens were expectorated for up to five minutes into 15 mL plastic centrifuge tube and stored frozen. Whole blood was collected by venipuncture into 10 mL grey top Vacutainer® tubes and the plasma was stored frozen in two cryotubes. For urine, each subject emptied his/her bladder at specified time intervals, the total volume measured, and two 30 mL aliquots were stored frozen.

For the validated analytical methods, an ABSciex Model 3200 LC-MS/MS was used. Specimens were analyzed for the 12 opioid analytes listed here. The limit of detection (LOD) for blood was 5 ng/mL, for oral fluid was 1 ng/mL, and for urine was 50 ng/mL, except for noroxymorphone, which was 100 ng/mL. In oral fluid, we also looked at normorphine and noroxymorphone. For urine, both total (hydrolyzed) and free (non-hydrolyzed) analytes were measured. Creatinine and specific gravity were measured in all the urine specimens.

Shown here are the oxycodone metabolism pathways. Oxycodone is converted to oxymorphone through the CYP2D6 enzyme and to noroxycodone through the CYP3A4 enzyme. Noroxycodone and oxymorphone are further metabolized to noroxymorphone. Hydrocodone is converted to hydromorphone through the CYP2D6 enzyme, to norhydrocodone through the CYP3A4 enzyme, and to dihydrocodeine through the 6-ketoreductase.

During this dosing study, there were no adverse effects. Reported effects were mild to moderate, including slight nausea, vomiting, light headedness, and itching. Oxycodone had eight and hydrocodone had six mild and moderate reported effects. Other minor reports included antecubital soreness, irritability, shakiness, and feeling high. For this dosing study, 20 mg was deemed a safe dosage.

The blood and oral fluid mean concentration results for oxycodone and hydrocodone are shown in blue and red, respectively. Oral fluid oxycodone reached almost 120 ng/mL and required around 25-30 hours to reach the LOD. Hydrocodone in blood reached about 180 ng/mL and required about 25 hours to reach the LOD.

The noroxycodone and norhydrocodone comparisons of oral fluid to blood were relatively the same for the noroxycodone blood and oral fluid specimens, implying the metabolism was similar in both. Also, for norhydrocodone in oral fluid and blood, the same representation is followed as they are metabolized.

This table of Cmax lists the oral fluid Cmax for oxycodone as 132.7, for noroxycodone as 18.7, for oxymorphone as 1.6, and none detected for noroxymorphone. The blood Cmaxs are also given in units of hours. The oral fluid/blood ratio remained about the same. The correlation coefficient of oral fluid to blood was 0.719 for oxycodone and 0.651 for noroxycodone. The data for hydrocodone is also provided, including the time course of the Cmax for oral fluid, blood, the oral fluid/blood ratio, and then the oral fluid/blood correlation.

Shown here is a graphic representation of the oxycodone correlation in oral fluid versus blood. This is a good representation with an R^2 value of 0 .9. The next figure is the correlation of oxycodone in blood versus oral fluid. This is not such a good representation with a R^2 value of 0.14.

The hydrocodone correlation for oral fluid versus blood, there is a pretty good representation or straight line of 0.8. Conversely, the next graph of hydrocodone in oral fluid versus blood has a R^2 value of 0.17.

For blood and oral fluid kinetic parameters, the half-life for oral fluid for oxycodone is about 4.6, noroxycodone is 8.3, hydrocodone is 4.4, and norhydrocodone is 6.2. The blood half-life is about 5.6 for oxycodone, 11.8 for noroxycodone, 4.5 for hydrocodone, and 7.7 for norhydrocodone.

In summary, oxycodone and hydrocodone appear in oral fluid and blood within 15-30 minutes after oral administration. Because the oxycodone was an extended release preparation, entry into the oral fluid was slower and concentrations

remained elevated longer relative to the hydrocodone. The profile of appearance and disappearance was similar, but these analytes were detected for longer times in the oral fluid. Oral fluid concentrations were considerably higher for parent drugs as compared to urine. The normetabolite concentrations were similar in both oral fluid and blood as were the kinetic parameters. The correlations were high but not predictive for the metabolites. Notably, the demethylated metabolites of the oxymorphone/hydromorphone were found in low to non-detectable concentrations. The demethylated metabolites were present at similar times as the parent drug but were generally in lower concentrations. Not shown is a pilot study of the blood hydrolysis revealing higher concentrations of the oxymorphone.

Now, I will present the urine results for these studies.

DR. COOK: Ron, if there are questions, do you want us to wait until the end of your presentation?

MR. FLEGEL: Yes, I think probably that would be better.

Next, we evaluated the urine concentrations of oxycodone metabolites by cutoff. Shown here are the percentages of specimens containing analytes at or above the cutoff. Analytes examined included the confirmatory analytes of oxycodone, oxymorphone, noroxycodone, oxycodone/oxymorphone combined, oxymorphone/norcodone combined, and all three of the analytes or metabolites. At a cutoff of 50 ng/mL, the oxycodone was positive in 81 percent of the specimens, oxymorphone in 87 percent, and noroxycodone in 97 percent. When analytes are combined, the percentages increased to 98 percent for the oxymorphone/noroxycodone and 100 percent for all three. As the cutoff is increased from 100, 150, 300, 500, 1,000, to 2,000 ng/mL, which is the current cutoff in the Drug-Free Workplace Programs for opiates, the percentages of positives decrease as expected. From 100-150 to around 300, the percent positives are relatively the same. At a cutoff of 500 or greater, the percent positives start to significantly decrease. If oxycodone and oxymorphone are monitored, about 98 percent of the specimens are identified at a cutoff of 50, 97 percent at 100, 96 at 150, and 92 at 300 ng/mL. At 500 ng/mL, the percentage significantly reduces to 60. The percentage of specimens that were identified by monitoring noroxycodone, oxycodone, and oxymorphone at cutoffs greater than 300 ng/mL did significantly increase. Combining all three - oxycodone, oxymorphone, and noroxycodeine - about a 100 percent recovery rate is found at those cutoffs up to 2,000 ng/mL.

For hydrocodone and its metabolites, a similar pattern is seen. Hydrocodone and hydromorphone together identified about 86 percent of the specimens at a cutoff of 50 and 81 percent at 100 ng/mL. Whereas, higher percentages of the specimens were identified by monitoring the norhydrocodone alone or in addition to the hydrocodone and hydromorphone at all cutoffs. At the 2,000 ng/mL cutoff, the detection rate for hydromorphone or dihydrocodeine is basically zero. Whereas, when combined, the percentages increase to about 50 percent, depending on the cutoff.

The number of specimens positive for oxycodone or oxycodone and its metabolites at or above 50 ng/mL by collection period, given in hours, is shown in this table. In the zero to two hours collection period, of the 12 specimens collected, 11 were positive for oxycodone, 11 for oxycodone and oxymorphone, 9 for oxymorphone and noroxycodeine, and 11 were positive for all three greater than 50 ng/mL. Across the board, after 24 hours, additional specimens were identified by monitoring oxymorphone in addition to the oxycodone. After 24 hours, two additional specimens were identified by monitoring noroxycodone in addition to the oxycodone and oxymorphone. Oxycodone alone was detected in two specimens from the zero to two hour mark. Thereafter, monitoring noroxycodone and oxymorphone was effective in detecting oxycodone use. By monitoring all three - oxycodone, noroxycodone, and oxymorphone - 127 of the 137 specimens collected were positive at the cutoff of 50 ng/mL.

On this slide are the number of specimens with hydrocodone and/or hydrocodone and metabolites detected at or above the 50 ng/nL cutoff. The same positivity rates are seen mostly across the board for the hydrocodone and hydromorphone. To summarize, after 28 hours, there were 8 additional specimens identified by monitoring the hydromorphone in addition to hydrocodone. There were 18 additional specimens that were identified by monitoring norhydrocodone in addition to hydrocodone and hydromorphone. 17 of these additional specimens were identified after 24 hours.

This table provides data on the mean maximum urine concentration, the time to maximum concentration, and the percentage dose excreted in urine over a 36 hour window for total and free hydrocodone. The Cmax is not significantly greater for total hydrocodone compared to free hydrocodone. The time maximum and the percent dose excreted are relatively similar for total and free hydrocodone. For total versus free hydromorphone, though there is a difference in the Cmax, the time maximum stays relatively the same using a cutoff of 50 ng/mL, whereas, the percent dose excreted is lower for free hydromorphone. Notice the rest of the results for norhydrocodone and the dihydrocodone.

Approximately 30 percent of the oral dose was excreted in urine as hydrocodone, hydromorphone, norhydrocodone, and dihydrocodone during the 52 hours of observation. Approximately two-thirds of the dose was excreted as norhydrocodone.

The results overview for the oxycodone and hydrocodone included that all blood specimens immediately before the oxycodone dosing were negative or less than LOQ for all analytes. Oxycodone was detected in specimens from the first collection period at zero to two hours for 11 of the 12 subjects. The initial appearance of oxycodone was frequently accompanied by noroxycodone in the same specimen. Noroxycodone was generally the most abundant metabolite and was frequently present in concentrations than oxycodone.

Hydrocodone and norhydrocodone were initially detected in the majority of subject specimens within two hours of drug administration. Hydrocodone was the most frequently detected analyte in combination with norhydrocodone. Norhydrocodone was the most abundant metabolite and was often present in higher concentrations than the hydrocodone.

In summary, for oxycodone in urine, there were 12 subjects who exhibited considerable variability in the excretion of hydrocodone and its metabolites. Oxycodone and norhydrocodone were initially detected in a majority of the specimens within two hours. The 50, 100, or 150 ng/mL cutoffs gave detection times for the oxycodone, oxymorphone, noroxycodone, and noroxymorphone of 24 hours or greater in this is a single dose study.

The hydrolyzed versus unhydrolyzed study results show that oxycodone and noroxycodone were excreted nearly completely in the unconjugated form, while the oxymorphone was excreted mostly in the conjugate form. Overall, these data suggest that monitoring both oxycodone and oxymorphone would be effective at cutoffs up to 300 ng/mL. Some consideration should be given to the inclusion of noroxycodone as a routine confirmatory test analyte or as a special test to assist in results or interpretation of results for oxycodone versus the oxymorphone use.

To summarize, for hydrolyzed versus non-hydrolyzed hydrocodone, the results indicate that hydrocodone, norhydrocodone, and dihydrocodone were excreted nearly completely in the unconjugated form. Hydromorphone was excreted primarily in the conjugated form. Detection times for hydrocodone and metabolites were less than five hours at the 2,000 ng/mL cutoff, but detection times for hydrocodone to approximately extended to 28 hours using the 50 ng/mL cutoff.

Overall, these data suggest that the drug testing requirements for hydrocodone should include tests for hydrocodone and hydromorphone in hydrolyzed urine. Considerations should also be given to allow testing for the norhydrocodone metabolite as a routine confirmatory test analyte or, alternatively, as a special test to assist in result interpretation to distinguish hydrocodone from hydromorphone.

I want to thank all the people who worked on this, including Dr. Ed Cone and those who analyzed and reviewed the data. If Dr. Cone is online, could he answer questions from the Board? Thank you.

DR. COOK: If any Board members have questions for Ron at this time, please state your name and ask your question.

DR. HUESTIS: I have a question about why expectoration was used rather than the devices that will be primarily used? What do we know about the stability of all these analytes in expectorant? I have some other additional questions as well.

MR. FLEGEL: For these types of studies, we collected expectorated specimens and froze them in silanized glass. Our goal was to keep the conditions these essentially the same. In the future, we will look at these collection devices to assess analyte recovery, stability, etc. For these current studies, we wanted to store these specimens frozen because the timetable, shipping, etc. Specifically for oral fluid, we decided to collect the specimens in silanized glass.

DR. HUESTIS: Every drug is different and has to be examined individually. Why was expectoration used rather than the devices that will be used in the field, especially if you know the stability of drugs found in expectorated oral fluid, including loss or degradation. Are those mean data that are plotted?

MR. FLEGEL: Correct.

DR. HUESTIS: For every drug we studied, the individual data are all over the place. I worry that this is this false impression of a correlation that would allow the prediction of blood levels from oral fluid concentrations or vice versa. I would expect the individual data points are widely scattered, and you would not be able to predict that. Have you looked at the individual data?

MR. FLEGEL: We have. You are correct about the individual data being very variable. Presented here are mean values for these single dose studies. We wanted if a correlation existed between blood and oral fluid, but not with urine. For the MRO Manual, we wanted a baseline for a single dose and not data on long term prescription opioid use, which should look different. There are several peer-reviewed articles, but none were single dose studies of all of the analytes and all of the matrices in which we were interested, including oral fluid, blood, and urine. We have some information from the other studies, but we didn't have a good correlation for single dose. You are right. We may want to assess that variability in the future. In the interpretation, the MRO needs to be very aware of that variability.

DR. HUESTIS: Right. This is a danger, because in some countries, mean data with a correlation of 0.9 imply that you can convert from one to the other. The individual data clearly show that you cannot do that at all. This is very important. It is better to show the individual data, so people don't get the wrong impression that the data can be used in that way.

MR. FLEGEL: I do agree. In our program, we do not use blood. In the proposed revisions, of course, oral fluid is proposed. I think everyone agrees that the blood has the more stable part of looking at it. In the correlation part with oral fluid, I think that was important. Not that we will use blood in the program but just to correlate it. Now, that might be another presentation based on your comments. We may want to show the variability of individuals.

DR. HUESTIS: Okay. For the urine data, I understood the data of the actual numbers of specimens that were collected and the numbers that were positive for each analyte. In the figure depicting the oxycodone cutoff evaluation by analyte confirmatory, are the percentages listed of those specimens that were positive at the 50 ng/mL cutoff for each analyte or are the percentages of those specimens that were positive?

MR. FLEGEL: We evaluated the immunoassay cutoffs that are currently out there, whether for oxycodone, morphine, codeine, etc., in urine. For a cutoff of 50, when the instrument is calibrated at 50 using an immunoassay, 81 percent of those specimens were positive for oxycodone, oxymorphone, and noroxycodone. As the cutoff concentration increases, the positivity rate decreases. If, for instance, a cutoff concentration of 2,000 is established, which is the current morphine/codeine cutoff concentration in the Drug-Free Workplace Programs, about 60 some percent of all specimens in that timeframe would be missed.

DR. HUESTIS: I see that with oxycodone and oxymorphone; they do what we expect. Norcodone is increasing up to 300, with 97 percent positive at 50 and 100 percent at 300. That doesn't make sense.

MR. FLEGEL: Looking at noroxycodone alone at a cutoff of 300, all the specimens are positive. That immunoassay has variability in its cross-reactivity. For a longer window of detection, the noroxycodone is a good metabolite to monitor at 300 as a cutoff.

DR. HUESTIS: As the cutoff increases, the norcodone ought to go down, too. Maybe it is because their concentrations are so close to 100 or the normal variability of the immunoassay. The number positive should never increase when the cutoff increases

MR. FLEGEL: I would agree, Marilyn. At a 50 cutoff, there should be 100 percent because the cutoff is low, but the higher cutoffs are at 100 percent too.

DR. HUESTIS: The rest of the data are as expected.

MR. FLEGEL: What is not shown here are the actual concentrations of the noroxycodone in urine. Results may range from 80-90 to 10,000 during the time course. There may account for some variability, too.

DR. HUESTIS: Sure, but not if the same specimen is interpreted under the different cutoff concentrations. It should behave the same. I think there is variability because the concentrations are so close to 100. This doesn't have anything to do with time course, right?

MR. FLEGEL: No, it doesn't have anything to do with time course.

DR. HUESTIS: I think that is the explanation is variability around 100.

DR. CONE: I am sorry. For some reason, you couldn't hear me before. To clarify, the correlation slides are of individual subjects. Actually, they represent the best and the worst of the correlations between individual subjects. They aren't mean data. It is an illustration of how well some subjects correlated versus the worst subject that didn't correlate at all.

DR. HUESTIS: Ed, I am confused. These are not mean data, but rather data from a single subject – HC12 is one subject and HC13 is another subject?

DR. CONE: That is correct. It shows the best and the worst.

DR. HUESTIS: That was not how it was explained.

MR. FLEGEL: An earlier slide showed the mean data. This is the slide I thought we were talking about. Wh Ed said is correct - the correlations are of single individuals. Some of the data are from peer-reviewed journal articles. In the DTAB presentations, we will list those. These are informative data for the synthetic opiates.

DR. HUESTIS: I j have one more question. For those figures where the individual analytes are listed, those data do not represent both oxycodone and oxymorphone as positive, right?

MR. FLEGEL: Those, I believe, are in combination. Ed?

DR. CONE: I have not seen this specific chart before, so I can't speak to it.

DR. HUESTIS: It must be because the numbers are larger than those in your individual columns. This clarification is very important because, if monitor all three, any one at that cutoff would be positive. You are not adding them, are you? If all three were monitored, then 100 percent would represent a positive for one of those three analytes. I think is what this means.

MR. FLEGEL: I will have to check on that, Marilyn. You are correct in that if you were looking at noroxycodone alone, you would expect it to be 100 percent. I will verify, though, whether it is combined and/or individual data.

DR. HUESTIS: I think it is. From the numbers, it appears that a positive is either oxycodone or oxymorphone at 50.

DR. CONE: That is what it appears to me, too, Marilyn, but I have not seen this table before. I am not sure how it was constructed. Back to your original question about mode of collection, though, we have data on the stability of opioids in expectorated fluid. The opioids, fortunately, are very stable. We chose not to use a specific device because, as you well know, these are expensive studies and there are a number of devices available. Thus, we chose the expectorated fluid because we did have accompanying stability data that showed that they were stable throughout the period.

DR. COOK: Any other questions? At this time, we will take a short lunch break. We will reconvene at one o'clock. Thank you.

(Lunch)

Afternoon Open Session

Federal Drug Testing Updates

DR. COOK: Welcome, everyone, to our afternoon session. This is Janine Cook. I would like to introduce Barry Sample, who is the Director of Science and Technology for Employer Solutions at Quest Diagnostics. Barry will be presenting data from Quest Diagnostics Drug Testing Index® (DTI).

Drug Testing Index

DR. SAMPLE: Thank you, Janine. I would like to share with the Board and those participants that are viewing the presentation, data and insight from our workplace drug-testing results at Quest Diagnostics. We have been publishing the DTI as a resource of information for employers, government regulators, and others that are interested in trends in workplace drug testing. The topics I am will be presenting today will be overall positivity rates, some of our results for certain testing reasons, results for certain drug categories, results of specimen validity tests, followed by summary and questions from the Board.
This dataset encompasses results from more than 140 million urine workplace drug tests that were performed by our HHS-certified laboratories. Before I begin talking about the data, there are several key points I need to call out here. One is that these are routine specimens of workplace drug testing. Any time we can identify a customer who is sending us in rehabilitation or criminal justice-related results, those results are excluded. Anybody who is sending in specimens for confirmation only of point of collection test results where we wouldn't have any line of sight to what the denominator or the actual number of screens performed to generate those confirmations, those data are also excluded from this dataset. Also, another important point is that this is raw laboratory data prior to review by a MRO. It obviously doesn't indicate whether or not there may be an alternative medical explanation or if it is a laboratory positive, but a verified negative from the MRO. The database might also include employer or MRO blinds. Given the percentage of non-negative specimens and the total number of blinds, for most results, the fact that blinds may be included would not significantly impact the results, except maybe for some of the very low prevalence drug analytes.

Within the DTI dataset are two major groups we report on. The first is the federally-mandated safety-sensitive workforce. The majority of those workers are safety-sensitive transportation employees covered by the U.S. DOT rules. It would also include workers in the nuclear power industry, and, of course, drug tests on federal employees that are in the TDPs. We also report on the combined workforce, looking at the positivity rates for all of those groups combined. Another dataset that I will weave into this presentation is data from the National Survey of Drug Use and Health (NSDUH), formerly known as the NIDA Household Survey. It is an annual survey of the non-institutionalized civilian population that is 12 years old and older. The survey presents national estimates on patterns of drug use for a variety of licit and illicit drugs. All of this data are self-report. On an annual basis, there is between 67,000 and 68,000 individuals that are interviewed annually.

Three main specimen types are utilized in workplace drug tests: urine, oral fluid, and hair. Both urine and oral fluid detect relatively recent patterns of drug use. Depending upon the drug, the dosage, and frequency of use, generally the

window of detection is one to three days for urine and one to two days for oral fluid. Hair testing, on the other hand, detects a pattern of repetitive use. We typically talk about hair having a 90 day detection window. That 90 day window is based on the testing of head hair and the closest inch and a half proximal to the scalp for detecting this pattern of repetitive use.

A little trip down memory lane for many of us will remind us of some of the significant events in workplace drug testing. In 1986, President Reagan signed an Executive Order requiring federal drug-free workplace programs, although, there wasn't necessarily a whole lot of testing that was initiated as a result of that. In 1987, there was the horrific train accident involving an Amtrak train and a Conrail freight train that results in a number of fatalities. It was found that the operators of the freight train were positive for marijuana, had been smoking while on duty, and ignored some train warning signals. Following that, HHS published their initial MG in 1988 and the DOT published its rules. In 1989, DOT finalized those rules for the mandatory testing of the safety-sensitive workers. Things remained relatively constant for the next five years. In 1994, there was a change in cutoffs for marijuana; the screening cutoff was decreased from 100 to 50 ng/mL with confirmatory cutoff remaining the same. In 1998, four years later, there was a change in opiate cutoffs, increasing the cutoff from 300 to 2,000 and changing some of the interpretive rules regarding positive opiates in an attempt to try to minimize the number of positives due to the use of poppy seeds or other food-containing products. Between 2001 and 2004, both HHS and DOT made a number of modifications related to specimen validity testing in terms of requirements, both administratively and technically, for the laboratories. In 2008, DOT published their final rules on specimen validity testing in direct observation procedures. While there were some HHS proposed rules for different cutoffs in urine, as well as for alternative specimens in 2004, it was in October 2010 that the final rules became effective that changed the cutoffs for cocaine and amphetamines, essentially cutting those in half, and adding additional testing, including specific testing for the 6-acetylmorphine heroin metabolite as well as MDMA. There were also some changes related to the paper CCF. In January 2012, SAMHSA formally accepted the Board's recommendations to include the oral fluid specimen and testing for prescription Schedule II drugs as a part of the federal drug testing program.

Now that we have concluded our walk down memory lane, let's switch to the DTI data. This slide shows 25 years of positivity rates for 125 million urine drug tests for the combined U.S. workforce. There has been a 74 percent decline in positivity rates from 13.6 percent in 1988 to 3.5 percent in 2012. Most of the decline occurred relatively early in the program. While encouraging, these data don't necessarily mean that drug use in all workplaces is down as dramatically as we are seeing here. Remember, these data are reflective only of those employers who include drug testing as a part of their drug-free workplace programs. There are some data that I will discuss later that will point out some of the dramatic differences between workplaces that test for drugs and workplaces that don't perform any drug testing.

For the two testing categories, the federally-mandated safety-sensitive workers are shown in yellow and the general U.S. workforce in green. There was a 38 percent decline in positives in the federal group between 1992, when we first started categorizing workers separately, and 2012. It decreased from 2.6 percent in 1992 to 1.6 percent in 2012. For the U.S. general workforce, there was a 60 percent decline from 10.3 percent in 1992 to 4.1 percent in 2012.

Looking at the orange bar for 1994, there was an increase in positives in the federally-mandated safety-sensitive workforce. I don't think that was because of a sudden spike in usage rates. In 1994, the cutoff for America's favorite illegal drug, marijuana, was decreased from 100 to 50. Most likely, this increase in overall positivity rates was driven by that increased detection of marijuana positives. The opiate cutoff change in 1998 probably didn't have much of an impact on positivity rates. Looking at the 2011 federal workforce data, again, a slight uptick is evident. The new Guidelines became effective in October 2010 with the lower cutoffs for cocaine and amphetamines. These changes probably didn't impact the 2010 numbers very much, but an impact was seen in 2011. I will discuss this impact on the specific drugs later.

Comparing the overall positivity rates between urine and oral fluid, which are both indicators of recent drug use, from 2003 to 2012 there were slightly more positives for urine than for oral fluid. Between 2006/2007 to 2011, essentially the same positivity rates for urine and oral fluid were seen followed by a dramatic increase in oral fluid positives in 2012. That is not necessarily because oral fluid is suddenly different than urine. We believe this change is reflective of a

technology change in the collection device that we instituted which provided greater accuracy in determining the volume of oral fluid specimen collected. We will examine that data more as we go along.

For hair drug testing results, there has been a decline in hair positives from 2003 to 2012, from nearly 11 percent in 2003 to about 5.7 percent in 2012. I wouldn't make too much, necessarily, of the sharp drop in 2012 versus 2011 because one year does not a trend make, especially when examining these data and particularly if looking at just one specimen type. similar declines or increases across all specimen types should be seen before we consider that a trend might be reflective of something major happening in a one year period of time. These data aren't surprising. It doesn't mean that the hair testing isn't doing as good a job as before in detecting drug use. Considering the original combined U.S. workforce data between 1988 and 1992 or 1993 where dramatic declines in urine positives were seen, donor behavior will generally drive drug users to not apply for jobs or not work for employers that drug test.

These USDUH data are derived from querying the online data files for those respondents who are in the workforce. These respondents are further subdivided into those working for an employer without a drug testing program, which is shown in blue, and those who work for an employer with a drug testing program, which is shown in yellow. The self-reported use of an illicit drug in the previous 30 days is graphed. Currently, there is a 50 percent, and historically a 30 or 40 percent, higher self-reported use of an illicit drug in the previous 30 days among those respondents who work for an employer without a drug testing program as compared with those respondents who work for an employer with a drug testing program. Perhaps of interest is that the difference between those two groups seems to be widening. That delta is larger in 2010 and 2011 than it was in previous years. While not shown on this slide, the 2012 data are continuing this trend. Another point is that we are noticing an increase in self-reported use among those respondents who work for an employer with a drug testing program. We are still in the midst of analyzing that data. This slide clearly points out that a drug testing program serves to deter drug users from working in a specific workplace.

Examining the data by testing reasons, this first slide of the general workforce shows an increasing trend for private sector employers that aren't subject to federal regulations to perform random testing. In 1997, well less than 10 percent of all the drug tests performed in the general workforce were random and greater than 80 percent were pre-employment. In 2012, the percentage of random tests had increased to more than 15 percent while the number of pre-employment tests had declined to slightly less than 70.

For the relative trends of pre-employment versus random testing, declines are seen in 2001-2002 pre-employment rates, which could be related to economic conditions, and an increase in the relative amount of random rates is seen 2009, during the midst of the great recession. Pre-employment tests were down dramatically, and the random test percentages are up. Considering the economic recovery and excluding changes in the hiring and economic conditions, it does appear that private sector employers are performing more random tests than they had in previous years.

Looking at the positivity rates on the pre-employment tests, there are several items to point out. Not surprisingly, the positivity rates for pre-employment tests generally mirror the overall positivity rates that I reported on at the beginning of the presentation. During normal economic times, pre-employment tests represent about 45 percent of all of the federal tests and pre-employment tests represent around 70 percent of the non-federal tests. Of interest are the more dramatic declines in the federal population than in the general workforce population. In 1997, there was slightly less than one percent difference, 3.8 versus 4.7, in the positivity rates for federal and general workforces, respectively. In 2012/2011, there were more than twice as many positives on the non-federal tests as compared with the federal tests.

For results by drug category, in recent years amphetamines have shown dramatic increases. Between 1997 and 2012, there was 196 percent increase in positivity rates for amphetamines. Based on our discussions with MROs, these increases seem to be primarily driven by the increasing use of Adderall. Year over year, MROs are verifying positive lab results as negatives because donors have more and more prescriptions for Adderall or other amphetamine drugs used for attention deficit hyperactivity disorder. Of interest is the data spike between 2003 and 2005, which coincides with the outbreak of the clandestine methamphetamine laboratories. I will talk a little bit more about that on the next two slides.

Looking specifically at amphetamine alone and not methamphetamine, the amphetamine alone positivity rate very closely matches the amphetamines positivity shown on the last slide. There is more than 100 percent increase in the positivity rate for amphetamine.

Methamphetamine is a very different picture than amphetamine. Remember, the more recent data trends are driven primarily by amphetamine and not methamphetamine. Whereas, from 2003 to 2005, those increases were largely driven by methamphetamine. From 2003 to 2005, methamphetamine positives increased and then started decreasing. For amphetamine, similar up and down mirroring is seen, not surprising, since amphetamine is a metabolite. In the latter years, only amphetamine increased while methamphetamine remained relatively the same with the exception of methamphetamine in the federal category. Remember, the amphetamines cutoff changed in October 2010 for our regulated testing; this cutoff change wasn't widely adopted in our non-federal testing. The increase in amphetamine and methamphetamine positives in 2011 and 2012 appears to be primarily a result of the changes in the drug testing requirements. In fact, a 15 percent increase in positives for methamphetamine is seen as a result of those changes.

Switching to a comparison between urine and oral fluid, the urine data are shown in green while oral fluid data are shown in blue. Those two specimens seem to mirror each other from a pattern of detection perspective, with both exhibiting some increases. One difference in oral fluid as compared with urine testing, in oral fluid, we perform a specific test for amphetamine and a specific test for methamphetamine. We will look at both of those individually. The higher positivity rate in urine as compared with oral fluid is, to a large extent, driven by the cutoff that is used. By lowering the cutoff, as seen previously with marijuana or the amphetamines, more positives are detected. Also, in 2012, with the introduction of the new technology for oral fluid testing, the screening cutoff was lowered. Having the sample adequacy indicator can drive more positives. The lower cutoff for amphetamine could also help explain the large increase in oral fluid amphetamine positives between 2011 and 2012.

For methamphetamine, oral fluid and urine mirror each other, which is not surprising since they are both tests of recent drug use. What perhaps was interesting was the difference in the prevalence rates between urine and oral fluid, which was larger during the middle of the methamphetamine epidemic when its use was higher. That delta declined over time. We maybe are starting to see more methamphetamine positives in 2012. While the amphetamine screening cutoff in oral fluid changed, our screening cutoff for methamphetamine in oral fluid didn't change between 2011 and 2012.

This next slide shows our amphetamine positivity for hair testing. The data are for amphetamine, not amphetamines because that is the actual device name for the FDA-cleared assay that is being used. In reality, as with I believe all of the FDA-cleared hair amphetamine tests, they are testing primarily for methamphetamine. While there is some cross-reactivity with amphetamine, it is relatively small. Thus, a hair test for amphetamine is primarily a test for methamphetamine. Consequently, it is probably not surprising that we saw much higher positivity rates in 2003 versus through 2005 as compared with more recent data.

For cocaine, both the federal and the general workforce tend to mirror each other. The declines that we are seeing are consistent with what law enforcement tells us about a tighter supply and higher prices for cocaine, which is presumably is driving the lower prevalence rates. The DOT data on the laboratory positives for amphetamine and cocaine suggests that this pattern of more amphetamines positives than cocaine is also consistent with the data that I am showing you here. Cocaine positives are now lower than the rate of positives for amphetamine, which is a reversal from previous years. Looking the 2011 data in the federal workforce, there is a jump up as compared with 2010. That increase is reflective of the 33 percent increase in positives that we saw after the institution of the new cutoffs for screening federal specimens for cocaine. Comparing urine and oral fluid cocaine results, the data are very closely matched. Perhaps the one thing that is of interest is that the gap between oral fluid and urine positives has narrowed in recent years as compared with where it was eight or nine years ago. Cutoffs could play a role. If the majority of our general workforce urine tests for cocaine at the 150 rather than the 300 cutoff, we might have a different picture than what we see here. Cocaine hair testing is also consistent with urine and oral fluid, which is not surprising since it seems to be a societal change and not just a workforce change. The NSDUH self-reported use in the previous 30 days data for cocaine shows a at least a 50 percent higher self-reported use among those respondents who work for an employer without a drug testing program as compared with those who work for an employer with a drug testing program.

Switching to marijuana, our data, at least in urine, point to a decline in positivity rates. This doesn't necessarily fit with what people might expect, given the number of medical marijuana states. As of the last report, there are 22 states with medical marijuana statutes, and two states, Colorado and Washington, with recreational marijuana statutes. The majority of those regulations don't impact an employer's ability to continue to test for marijuana, but that may be changing.

We could spend an hour or two discussing medical marijuana and its impact. To date, we have not seen an impact in our urine data, at least through 2012. A more in-depth data analysis performed in 2011 of the positivity rates in the medical marijuana states to determine if there was positivity change showed no pattern. I will repeat that analysis with the 2013 data. We will let the Board know if we see any trends along those lines.

The comparison between urine and oral fluid marijuana positivity rates mirrors the overall urine and oral fluid drug positivity rates. It is really quite interesting that since 2008, we have been seeing significantly more positives in oral fluid for marijuana than in urine, which is a reversal of where it was in 2003 and 2004. This is even more surprising considering marijuana is thought to be detectable for a shorter period of time in oral fluid as compared with urine. One of the advantages of oral fluid as compared with urine is that is observed. The typical strategies that a donor may employ to beat or evade the drug test that might work in a urine collection that is performed in the privacy of a bathroom or where the opportunity exists to drink fluids that could impact the results are not, at least today, effective with oral fluid testing. That may, in part, explain why we are seeing more positives overall, along with the technology change in 2012 that is probably also contributing to the increase in 2012. For the hair data, I will not declare that there are any trend changes. The long-term view shows there are a lot of ups and downs. While 2012 was significantly lowered than 2011, it is really not much different than 2009 or 2005. An early peek at the 2013 data would suggest at least some of the 2012 decline was reversed in 2013. I would declare trends in hair positivity for marijuana to be relatively flat. This NSDUH graph depicts marijuana use in the previous 30 days. Consistently, there is a 50 percent or higher self-reported use of marijuana among those respondents who work for an employer without a drug testing program. Of interest is the increasing self-reported use among those respondents who work for an employer without a drug testing program in 2010 and 2011. Whereas, those with a drug testing program seem to be relatively consistent over that long-term view. An early look at the 2012 data would suggest, that while it continues to increase in the no employer drug testing program group, that we may be starting to see an impact in the employer drug testing group. This may be reflective of the increasing acceptance and increasing number of medical marijuana states. It will be interesting to follow this trend. I examine the 2013 data, at the state level, for any impact.

The prescription opiates, though not yet formally a part of the federal program, have been tested by the non-regulated employers for a number of years. This figure depicts prescribing data. Hydrocodone is the number one prescribed drug based on the volume of prescriptions in the U.S. We have been seeing year over year increases in hydrocodone preparations. While oxycodone preparations in 2011 were also increasing, clearly, there are far more prescriptions for hydrocodone than there are for oxycodone. Within our non-regulated group, there is a large increase in the percentage of tests performed for the expanded prescription opiates. In 2002, only two percent of all of our tests for opiates would have included hydrocodone and hydromorphone as compared with 2012, where it is greater than 12 percent. Year over year increases, some dramatic, are seen. This slide shows our positivity rates for hydrocodone, hydromorphone, codeine, and morphine over the last ten years. Hydrocodone is up 172 percent which is not surprising given the increase in prescribing data. The prevalence rate for the last few years has been greater than one percent. Hydromorphone positivity rate is up 423 percent. Morphine, in contrast, is only up 34 percent. Perhaps some more disturbing data are the comparisons of positivity rates by testing reason. The pre-employment positivity rates, shown in green, have been increasing year over year, as have the positivity rates for random and post-accident tests. Looking at the prevalence rates, post accident positivity rates are three to four times higher as compared with pre-employment tests. That has been very consistent. There are probably roughly twice as many positives on post-accident as compared with random tests. MROs have told us the verified negative rate on pre-employment versus post-accident tests isn't any different. Roughly 80 percent of the opiate laboratory positives are verified negative, meaning only about 20 percent are verified positive. While our data can't prove cause and effect, these data suggest that the use of these drugs have played or may be playing a role in the incidents that occurred in the workplace. Hydromorphone shows a similar pattern to

hydrocodone. Oxycodone has shown a 71 percent increase in positivity rates between 2005 and 2012. There may be a slight downturn in 2012 as compared with 2011. We will look at the 2013 data to determine whether levels have started to level off or even decline a little bit. Similarly to the other prescription opiates, if we compare positivity rates by testing reason, we see three to four times more positives on post-accident tests as compared to pre-employment tests for oxycodone.

This figure shows the overall positivity rate for 6-acetylmorphine (6-AM). We didn't begin conducting a specific screening test up front for 6-AM until 2010. In the past, 6-AM testing was reflexively done for a morphine positive. Since the introduction of this specific screening, we have seen year over year increases. There are higher positivity rates in the general workforce as compared with federally-mandated. I would caution about the actual prevalence because there could be blind data in these positives, particularly for the federally-mandated safety-sensitive workforce. Blind samples could be contributing, particularly to the positivity rate of between 10- 15 and 10,000.

MDMA testing has been conducted previously in the general workforce, shown in magenta. The yellow bars are data from the federally-mandated safety-sensitive workforce. We have seen year over year declines in MDMA positives between 2005 and 2012. At this point, the incidence that we detect for this drug is low.

For specimen validity tests, this stacked bar format allows us to see on one slide the difference in the reason for the failed specimen validity test, whether it was because the specimen was too acidic, too basic, substituted, whether the presence of an oxidizing adulterant was identified, or whether the specimen was reported as invalid. The first slide shows federally-mandated tests, and the second slide shows the U.S. general workforce. Ignoring 1999 when we first began this testing and take the longer-term view, the overall rate for a failed specimen validity test is between 0.15 and 0.20, that is, 15 in 10,000 or 20 in 10,000 failed one of the tests for specimen validity. Of interest are the different reasons for failed specimen validity. The yellow bar representing oxidizing adulterants essentially disappeared in 2005 and has been imperceptible since that time. This is reflective of the regulatory changes in terms of technology used for reporting a specimen as adulterated due to an oxidizing adulterant. While that technology is available, it is not utilized in all of our laboratories. Typically, MROs generally order a recollection as opposed to ordering a specific adulterant identification, hence, the large increase in reporting of invalids. As the adulterated rate decreased, the invalid rate increased. A similar pattern is seen in the non-regulated workforce, with an overall rate of failed specimen validity tests between 0.15 and 0.20. The incidence of dilute specimens is shown on this slide. I don't have a good explanation for the decreasing incidence of reporting of dilute specimens, both from the general workforce and from the federally-mandated safety-sensitive workforce. The gap between the dilute rates in those two groups has remained very much the same; they have both trended down.

These data inform us that our workplace drug testing results mirror societal drug use. Though we have seen a 74 percent decline in workplace positives over the last 25 years, but I wouldn't get too confident about that. Data from the DTI and NSDUH point that out. The 74 percent decline is reflective of data from those employers who do drug testing. NSDUH data clearly indicates the value of having a drug testing program, deterring drug users from seeking employment in a workplace that does drug testing. Another reason not to get overly complacent in the face of the declining positivity rates is the increases the use of prescription drugs like the prescription opiates and the amphetamines. Employers need to remain vigilant and should be concerned about the increasing positives for the prescription drugs.

At this point, I will open it up to questions from the Board.

MR. BONDS: Thank you, Barry, for your presentation. Were able to extract out the positive post-accident tests and whether or not they were evaluated by the MRO to determine if they had a legitimate prescription?

DR. SAMPLE: Not on each and every one of them. I have had general discussions with MROs regarding the verified negative rate on post-accident versus pre-employment. What they have indicated verbally, on a grand scale, is that there is no difference in the reversal rates. The Board may want to query MRO groups or those with the datasets to perhaps look at that.

MR. BONDS: We don't know if those were verified positives for post-accident, correct?

DR. SAMPLE: As far as I know, the rates would be the same. So 20 percent would be verified positive and 80 percent would be verified negative. Again, that is anecDOTal information. It is not specific information on specific tests.

MR. BONDS: Thank you.

DR. COOK: Regarding slide 38, there was a report a couple of months ago in the Washington Post about how heroin use is increasing as we clamp down on prescription drugs.

DR. SAMPLE: And it is cheaper than oxycodone.

DR. COOK: Can relate that report to that slide?

DR. SAMPLE: I think it is too early to declare that there is an increasing trend. It is certainly something that we need to be aware of, but, remember, I said one year doesn't necessarily a trend make unless I am seeing it across all specimen types. It is too early to tell, but it is certainly and clearly a watch point, given what we are hearing about the increasing incidence of societal heroin use.

MR. HARRIS: Concerning the subversion slide with invalids, you provided some conclusions regarding the overall drug testing program and your assessment that it is effective. What is your assessment on the ability of HHS-certified labs to identify adulterated and substituted specimens based upon the data?

DR. SAMPLE: It depends on specific adulterants, quite frankly. Substituted items can be a problem. Adulterated due to acid/base is not a problem. RTI could probably answer this better than I can, but I don't believe that all of the 35 or so certified labs have the ability to do an oxidizing adulterant identification. Clearly, some have that ability, but it is uniform across all of the certified labs. The challenge for the labs and the program is the cocktails, the different approaches that the purveyors of these products are taking to try and avoid detection, either by using a mixture of different substances that wouldn't be reported as adulterated or a change in the formulation to something else. To me, that is one of the advantages of the alternative testing because of the relative detection windows of urine versus oral fluid, the observed collections with oral fluid and hair, and that those specimens are harder to adulterate, at least for today. There are alternate approaches, as well, that are not analytical in nature and are able to specifically identify any given adulterant.

MR. HARRIS: Thank you and I appreciate that. The federal drug testing program still tests for oxidizing adulterants. The labs can choose what oxidizing adulterants to test for. Your data indicate that we haven't identified them for maybe eight years.

DR. SAMPLE: We are not asked to do oxidizing adulterant identification. It is very rarely we are asked to perform that.

MR. HARRIS: But you still have to test for an oxidizing agent, right?

DR. SAMPLE: Yes. That is correct.

MR. HARRIS: The effectiveness of that doesn't exist anymore because it is not out there in the industry.

DR. SAMPLE: Well, I think it is still effective to test for oxidizing adulterants. Unfortunately, it allows the drug using donor, potentially, to buy some time. If they use the oxidizing adulterant, their specimen is reported as invalid. They will not have an alternative medical explanation. They might be willing to undergo a direct observation recollection because their results may now be negative since they have bought some time to clear the drug out of their system as compared with having an original positive drug test. That is why MROs try to turn that around the results so quickly. That may be why they are not asking for the adulterant identification laboratories are unable to identify the specific adulterant and the donors are given even more time to clear the drug out of their systems.

MR. HARRIS: Just one last question. Is Quest Diagnostics testing for synthetic urine? If so, can you describe that?

DR. SAMPLE: Our testing for synthetic urine is in alignment with the current federal requirements. Creatinine and specific gravity are the standard tests for specimen validity. If there are formulations of synthetic urine that would pass the current tests for specimen validity, some people have suggested testing for other constituents, such as uric acid. Providers of those products for synthetic urine can just as easily add uric acid. My understanding is they are already doing that. It becomes a never ending change in the requirements. At the end of the day, if a donor has the opportunity to smuggle in synthetic urine and warm it up to a regulatory-compliant temperature, I would expect they would have the same opportunity to smuggle in 100 percent negative human urine. I don't think we are going to solve this problem of substituted urine specimens analytically.

DR. WONG: In your presentation about oral fluid THC, what was the cutoff?

DR. SAMPLE: Our testing for THC in oral fluid is for the parent compound only. The cutoff in neat oral fluid is 3 ng/mL or 1 ng/ mL diluted for the screen. The confirmation is half of that or 1.5 ng/mL neat or 0.5 diluted.

DR. WONG: Do you have any additional data on that set of samples for THC?

DR. SAMPLE: It is on my to-do list. We have many samples stored away that we can look at. It is something that I would very much like to do.

DR. WONG: I would love to see that data.

DR. SAMPLE: I think we all would.

DR. COOK: This is Janine. Barry, I have to cut you off because Tom Martin, who is following you, is also on a time constraint.

DR. SAMPLE: Not a problem, Janine.

DR. COOK: Barry, thank you so much.

DR. SAMPLE: Thank you very much for inviting me to join you. If you ever have follow up questions, please let me know.

DR. COOK: Thanks, Barry. Next, I want to welcome Lieutenant Colonel Tom Martin, who is the Deputy Director of the Drug Testing and Program Policy in the Office of the Under Secretary of Defense for Personnel and Readiness with Operational Readiness and Safety in the Department of Defense. He will provide the update from DoD.

DoD Drug Testing Update

DR. MARTIN: I am Lieutenant Colonel Tom Martin. I run DoD's Drug Demand Reduction Program. Today I will briefly talk about the program, where we are now, and some of the trends we are seeing, especially in synthetic cannabinoids.

Our mission is three-pronged. Number one is to deter illicit and prescription drug abuse by military service members, as well as DoD civilian personnel in TDPs. Again, our mission relates to maintenance of our military readiness and safety. An additional part of our program involves providing prevention, education, and outreach services strictly to our military personnel and their families. This training includes pamphlets on drugs and explanations of the adverse consequences of drug use on service member' health; their career, such as discharge from the military; and the effects outside of the military when trying to obtain other employment. Finally, a third prong is to address new drugs as they enter the market or the drug culture, by either developing tests or capitalizing on commercially available tests and incorporating those into our testing panel.

At the DoD, we tie everything back to readiness and safety. We want a safe and ready force for the job that our folks do. Many of our individuals are in national security positions. Technically, military members are on duty 24/7. Drug abuse or misuse compromises our readiness.

Our younger soldiers or service members live in a shared living environment. Barracks are dorm-like areas where it is very easy to share drugs or perpetuate the culture to one another. We want to eliminate or deter that possibility. Many of the environments where we send our military personnel is where these illegal and other drugs are readily accessible and even manufactured. Finally, the majority of our recruits are generally 18-25 year old males. They make up about 40 percent of, the total number of members in our force, but two-thirds of the overall illicit positive results are from that high risk population.

As a brief history, the Drug Demand Reduction Program at DoD started in 1971 towards the end of the Vietnam War. President Nixon realized that we do not want to bring home service members who were drug addicted, particularly, to heroin. We started a drug testing program at that time. However, prior to 1981, if you tested positive, there were no career consequences associated with that positive. You could not be discharged from the service for a positive, but you could be put into a treatment or outreach program. In 1981, an incident changed the direction of the program and initiated a punitive process. On the aircraft carrier Nimitz, there was an accident where 14 service members were killed, a larger number were injured, several aircraft were destroyed, and damages totaled over $150 million. What was even more troubling was that six of the deceased service members had detectable levels of marijuana in their system, but it could not be directly tied to the accident. It raised the issue to a much higher level, including what we need to address and how do we do that. Later on that same year, a positive urinalysis became associated with punitive measures, such as court martial or separation from the service. A few years later, we issued our directive that formally defined how the program would operate. In 1986, testing of DoD federal civilian employees began. The program continued about the same for the next 20 years or so. We added drugs to the panel and changed some of our cutoffs. In 2010, the Chairman of the Joint Chiefs of Staff realized and emphasized that we needed to address prescription drug abuse, specifically, the prescription drug misuse for both opiates and benzodiazepine.

Every three years or so, the DoD performs a health-related behavior survey or study in which service members are asked a variety of questions, including on the use of illicit drugs or misuse of prescription medications. That data are shown here on this slide. The pink line, which begins in 1981, depicts the results of the survey. The question about whether the use of an illicit drug or the misuse of a prescription drug occurred within the past 30 days had a positive response of about 25% in 1981. In contrast, the 1981 positivity rate for urine drug testing was much lower at about seven percent. When the program changed and became punitive, both rates declined significantly through the mid-90s. Between 2005 and 2008, there is a spike in the self-reported abuse of prescription drugs. However, that spike is not necessarily related to an increase use. But rather, there were some changes to the questions and how those were answered affected the data. In 2011, self-report positivity decreased while our testing positive rate has remained around one percent. The next behavioral survey will occur this year.

Within the DoD, there are six drug testing laboratories, with each of the services represented. The Navy has three laboratories, one in Great Lakes, IL, just north of Chicago; one in Jacksonville, FL; and one in San Diego, CA. The Army has one in HI and another one in Fort Meade, MD. The Air Force has one laboratory at Lackland Air Force Base. From the beginning of the program, military staff specimens were tested at their service-specific laboratory. Over the last approximately five years as our funding has decreased and our need for efficiency increased, we focused on regionalization. Now, any service member specimen can go to any service's laboratory. The same testing is performed and results are reported similarly. We have redistributed our workload to make us more efficient and, essentially, spread out the work.

Our testing panel, shown here, is somewhat different than that for HHS-regulated specimens. We added hydrocodone, hydromorphone, oxycodone, and oxymorphone to our panel in October 2012. So all specimens are now tested for these drugs. Prior to 2012, the opioid drugs, oxycodone, hydrocodone, codeine, and morphine, were pulse-tested, that is, a certain percentage of specimens that are submitted to the laboratory were tested for those drugs. In October 2013, we added five selected benzodiazepines to our test panel. In December 2013, random synthetic cannabinoid testing of 10-

15 percent of the specimens was included in the panel. In addition, we perform probable cause testing of synthetic cannabinoids. A commander, through his legal department, can authorize drug testing for probable cause; we ensure that, when it is sent to a laboratory, it does get tested. Of course, any other special tests that are outside that panel are tested at the Armed Forces Medical Examiners System, Division of Forensic Toxicology, located at Dover Air Force Base, Delaware.

Our cutoffs are listed here, with screening cutoffs on the left and our confirmation cutoffs on the right. In particular, for our synthetic cannabinoids screen, we employ an immunoassay with a screening cutoff of 10 ng/ mL and a confirmation test with cutoff of 1 ng/mL.

Shown on this slide is fiscal year 2013 distribution of our positive drug tests, shown by unique service member. If a service member tested positive more than once, he/she is counted only once on this table. Marijuana is our number one illicit drug, followed by oxymorphone and then cocaine. In addition, for all the opiate drugs or any drug that requires a medical review, those with a legitimate prescription which accounts for that positive are not included in this distribution.

This slide shows the drug positive rate from 1987 through 2013. Around 1990, we dropped below one percent. We have hovered between 1 and 1.5 percent over the years, even through 2013.

The Department's approach to drug demand reduction is a systems approach. We consider it a readiness issue for our force. In particular, as misused prescription drugs have grown substantially, we needed to ensure that we are doing two things – deterring those service members that might do that, identifying those members who have illicitly used those drugs, and deal with them appropriately. We can't do that through drug testing alone. We also need support from our medical communities and from our military providers who provide these prescription medications to our service members. Are these opioid pain medications being provided in the correct amount? Are they monitoring their patients to ensure they are being transitioned off or slowly weaned off these drugs onto something less addictive? We also provide education and then those provide those services, where possible, to those who do require treatment or rehabilitation.

The other part of our program is it is a commander's program. Regardless of service, the unit commander is ultimately responsible for administering the program and adjudicating the results. What we propose, and what we are big proponents of, are random, frequent, unannounced collection events. Any day of the week and any time of the day is what we propose. It is through this type of randomness that our drug positive rate is very low. When a service member does test positive, commanders can adjudicate or process that individual for separation from the service. When these harsh consequences are made known or publicly released, it may hopefully deter that person who is on the fence about whether he/she will use drugs or not.

Our last approach is information sharing. We can link our drug testing data from our information management system to our Pharmacy Prescription Database and compare those results. These data are accessible by other department initiatives or taskforces, such as the Joint Pain Taskforce. The data can be read by unit.

One success that we are very proud of within our program is our Automated MRO Review Process. Since early 2012, we have been able to compare a positive result reported from the laboratory to a service member's prescription history electronically, allowing us to determine if a valid prescription exists for a certain drug. If both are positive, we call it a wash and the positive is considered a legitimate or authorized use. This process reduces the number of reviews required by our medical officers, permitting them to do the jobs that they were brought into the military to do, that is, patient care versus this medical review. Listed here are our wash rates. For instance, for almost 80 percent of our oxycodone positive results, those service members have a legitimate prescription. Wash rates are also shown for benzodiazepines and opiates. There is one drawback to this program. A service member must use either the DoD Pharmacy or TriCare insurance. Our National Guard and Reserve members, who use either their civilian employee prescription plan or insurance, are not captured. For the results of those service members, our normal medical review process is performed.

Within the DoD, we are able to adjust the test panel very rapidly. When we have indications that there is a change in drug use patterns or our service members may be abusing certain drugs, we perform prevalence testing, in which specimens that have been submitted to the laboratory are anonymously tested to determine if those drugs are positive. For example, before we added oxycodone to the test panel, we conducted a prevalence study. Those results, along with the Pharmacy Database, indicated that there was a significant number of service members using oxycodone without a valid prescription. Normally, from the time we start prevalence testing, obtain testing results, and change the panel is typically in less than a year. Other emerging threats for which we have done prevalence testing and started to address include Spice or synthetic cannabinoids. We began random testing for these in December 2013. We have also done prevalence testing for bath salts. Since we did not find a large number of service members in that study who were abusing those, we have not moved forward to add those to our random panel. We will continue to perform prevalence testing every few years to see if that is still a threat.

We are all familiar with Spice or synthetic marijuana. A large number of variants exist, and they continue to change. From our drug testing standpoint, we require a low-cost, large volume screening procedure. We have found a vendor whose assay we have incorporated into our laboratory. In December 2013, we started random testing approximately 20 percent of all specimens submitted. In addition, for those probable cause or reasonable suspicion service members, we can test up to about 5,000 synthetic marijuana specimens per month. Those are tested at either the Division of Forensic Toxicology of the Armed Forces Medical Examiner System or the Air Force drug testing laboratory at Lackland Air Force Base. These labs have the capability and have been certified to do that testing. Through April of this year, our overall synthetic marijuana positive rate was about 0.035 percent of the submitted specimens. Our testing rate is around 18 percent of the specimens submitted.

This concludes my short summary of where we stand within the DoD and our drug testing program. If anyone has questions, I will try to answer those.

DR. COOK: If a Board member has a question for Tom, please state your name and ask your question.

MR. HARRIS: Thank you for the presentation. We share the need for ensuring that our employees can safely and competently perform their assigned duties. Four really quick questions. You provided the positivity rates associated with all the drugs you test. Do you have additional information that you could share with me regarding age demographics on those test results?

DR. MARTIN: We do have that data. I don't have it right here in front of me, but I could share that data with Janine and she could send it out to you.

MR. HARRIS: Yes. Janine would have to figure out the process for that. For the second question, is your specimen validity testing equivalent to that described in the HHS Guidelines?

DR. MARTIN: For our military members, we do not use validity testing. All of our specimens are collected under direct observation.

MR. HARRIS: Okay. You described the automated MRO review process, calling it the wash process. Whose responsibility is it to make a fitness determination on the individual who tests positive but has a valid prescription? Who makes that determination that that individual can go back to work even with a valid prescription?

DR. MARTIN: I will try to answer that. Any fitness or return to duty determination resides with whichever MRO did that review. However, for the electronic verification, a medical person is not involved. This has been brought to our attention. We are developing a way where we can perform mostly the electronic wash.

MR. HARRIS: Another simple question. Is your drug testing panel equivalent for all DoD personnel or do you segregate by job function? Namely, do Air Force pilots get a bigger panel than a truck driver?

DR. MARTIN: No. Our military members all get the same panel.

MR. HARRIS: Okay. Thank you. My last question is how does the military describe a valid prescription? For how long is a valid prescription good?

DR. MARTIN: Each of the services is trying to wrap their hands around what they consider a valid prescription. If a person has a prescription and if they took that prescription and the physician didn't give a specific end date, such as take for 30 days or take for seven days, that person would typically receive an authorized use. However, if the prescription is over six months old, the MRO will refer that individual back to their primary care manager to re-evaluate whether the person should be taking that prescription or not. I am hoping that answered your question. We really don't have any duration.

MR. HARRIS: Thank you very much.

DR. MARTIN: You're welcome.

DR. COOK: Tom, this is Janine. I have one question for you. Barry, in his presentation, mentioned the increase in amphetamines. With ADHD and Adderall, are you also seeing this increase in your young servicemen, even if they do have a valid prescription?

DR. MARTIN: Within the last five years, we have seen an overall 300 percent increase in the number of service members testing positive for Adderall, as well as 300 percent increase in the number of these prescriptions written. Yes, we are seeing it, too. We are working on a plan to try to address and examine what is going on there.

DR. COOK: That is pretty dramatic. Does anyone else have any other questions for Tom?

DR. BROWN: Are there any educational processes that occur on a regular basis for service personnel to remind them that this type of testing is on-going and occurs at an established frequency? Does that vary by military branch?

DR. MARTIN: Overall, each service does produce on-going training, on-going education, and reminders. The commanders are required at least monthly to talk about the substance abuse program. Of course, each of the services does it differently. The Navy recently began social media campaigns, using Facebook and Twitter, talk about the dangers of drugs, the consequences of drug use, and things of that nature. All of the installations have pamphlets and educational materials that are available. Quarterly, everyone is required to receive either one or two hours of training on substance abuse programs or substance abuse issues within the department.

DR. SMITH: This is Donna Smith. I don't understand your answer about the 300 percent increase in amphetamine positives when I look at the slide with your data.

DR. MARTIN: That slide looks at unique service members. The data that I was just presenting was just on the number of positives. Service members would have multiple positive rates, but the number of prescriptions have gone up 300 percent. It is misleading comparing what I talked about versus that slide. Hopefully, that helps. Overall, it would be less than 300 percent by unique individuals. Looking only at overall numbers, it is right around 300 percent.

DR. SMITH: Thank you.

DR. COOK: Tom, thank you for your presentation. Enjoy Michigan. We will not take a quick break. We will reconvene in 10 minutes at 2:45 P.M. Thank you.

(Break)

DR. COOK: We will now reconvene. Our next speaker is Patrice Kelly, Acting Director of the Office of Drug and Alcohol Policy and Compliance within the Department of Transportation.

DOT Drug Testing Update

MS. KELLY: Thank you, Janine. The Office of Drug and Alcohol Policy and Compliance (ONDCP) lies in in the Office of the Secretary of the U.S. DOT; we are part of the Secretary's staff and are the only safety regulation within the Secretary's Office. Our unique role is of great importance to the Secretary.

In this leadership and responsibility statement, which is one of DOT's mission documents from the Office of the Secretary, ODAPC's mission, "the issue of the regulation to prevent alcohol and illegal drug misuse in the transportation system", is listed as part of the Secretary's leadership responsibilities,.

This statement from DOT's Secretary Anthony Fox explains why the program is important. Again, our program is recognizes by the Secretary as within his direct purview. We have more than six million regulated employees throughout the different DOT agencies and administrations. Safety is the DOT's number one goal. The Secretary views this program as important because it aligns directly with the safety needs for both the traveling public and the regulated transportation entities across the country among all the different modes of transportation.

The program services that our office provides includes, first and foremost, advising the Secretary and the DOT agency administrators on program issues at both the national and international levels. I have been doing more international work. We assist ONDCP on supply reduction and demand reduction issues. We also advise and work with the DOT agencies and the U.S. Coast Guard (USCG) on drug and alcohol program activities.

We provide consultation and liaison. With the DOT agencies, including Federal Aviation Administration (FAA), Federal Transit Administration (FTA), Federal Railroad Administration (FRA), (USCG), Pipeline and Hazardous Materials Safety Administration (PHMSA), our clients within the program offices, and the Federal Letter Carriers, we take a ONE-DOT approach. This approach allows us to maintain a certain consistency, specifically with Part 40, which are the procedural regulations for how testing is conducted. We also try to, where possible, unite the modes of transportation together for a ONE-DOT approach, recognizing that there are subtleties and differences between these different transportation modes. Each DOT agency and the USCG describe in their regulations who is subject to testing, in terms of both the employer and the employees, and they prescribe the specifics of testing under that particular agency's regulative purview.

We also provide consultation and liaison within the executive branches of ONDCP, HHS, Homeland Security, DoD, NRC, Department of Justice (DOJ), Drug Enforcement Administration (DEA), and others, including foreign governments. More and more, foreign governments are approaching us about our successes and our challenges and to share with us what they have learned about drug and alcohol testing in their respective nations. Obviously, drug and alcohol testing is becoming worldwide. We are excited to be in the forefront, especially when it comes to testing.

We provide consultation and act as a liaison with industry stakeholders and our customers. The ODAPC staff members have participated in MRO and substance abuse professional (SAP) training. We are providing more training to the DOT agency inspectors. We are increasing our outreach to provide more information about Part 40, about the Model Regulations, about changes that we see on our horizon. This outreach keeps our stakeholders informed and guides the industries toward compliance rather than fixing problems through enforcement activities. Our DOT agencies are very effective at enforcement, but as the Policy and Compliance Office, we seek compliance.

We also collect and analyze data and information. During this presentation, I will present the laboratory data that are reported to us every six months by the 35 HHS-certified laboratories. Finally, in addition to providing consultation and liaison, we develop plain language regulations, guidance, and policy.

Our program history began with regulations in the 1980s. With the Omnibus Transportation Employee Testing Act of 1991, Congress ratified the testing that we were already performing doing and blessed the various procedures that we had put in place, including the liaison with HHS for our laboratory work. Congress, in the Omnibus Act, stated very

clearly that we will work with HHS on the scientific aspects. Hence, we consider the HHS and especially DWP to be close partners in our efforts to work out the testing details for the transportation drug and alcohol testing regulations and to ensure our continued success with transportation safety. Part 40 introduced the alcohol testing rules in 1994. The regulations underwent a major rewrite in 2000. Because the initial preamble and the regulations themselves were well written and we also had resource materials as references, this rewrite was not too difficult. In 2003, the ONE-DOT management information system was formed, which allowed us to bring together the data collected from the different transportation-regulated entities. The semi-annual laboratory data collection began in 2008. In 2009, we received a U.S Court of Appeals unanimous decision with respect to direct observe collections, in which not only did the D.C. circuit court uphold our fourth amendment justification in our testing program, but also specifically with direct observe collections. It is an important tool to beat drug test cheaters; it has proven to be very effective. In 2009, our office issued a medical marijuana statement, which emphasized that marijuana remained a Schedule 1 drug and was not acceptable for use in the transportation industries. In 2012, we published a second notice, which reiterated the same message, when recreational marijuana became popular; marijuana is a Schedule 1 drug and is not acceptable for use in the transportation industries. Our federal regulations preempt those of the states. In 2010, we published our final rule, in which we harmonized with HHS on specimen validity testing.

The Omnibus Transportation Employee Testing Act codifies our drug and alcohol testing of safety-sensitive personnel. It maximized donor privacy, it specified task type, and stipulated use of HHS-certified laboratories, protocols, and drugs. The labs certified by HHS are the laboratories that we must use in our program.

The split specimen collections are a requirement of federal law, the Omnibus Act, ensuring safeguards for alcohol testing, privacy, and confidentiality. Specimen collection is a federal search and seizure and controlled by the U.S. Constitution's fourth amendment. Whenever the courts assess our processes, they evaluate the balancing act between the DOT's need to maintain transportation safety versus the rights of individuals for privacy and confidentiality. The vast majority of individuals are not guilty of illegal drug use or alcohol misuse. Therefore, the majority of folks have a very strong interest in privacy and confidentiality. However, the court ruled in 2010 that, for direct observed collections, the privacy and confidentiality concerns of drug test cheaters or people who had previous positive or non-negative results requires a different balancing act whereby those peoples' interests weigh less against transportation safety. Therefore, those individuals have fewer rights than they would have otherwise.

Our program goals include ensuring the safety and security of the traveling public. We want to reduce the demand for drugs by transportation workers, reduce alcohol misuse in the transportation industry, create prevention and treatment opportunities, and keep employees who test positive or refuse the test off-duty until they have successfully complied with treatment. Another of our program goals is ensuring the fairness and integrity of the testing process. This is a balance between the fourth amendment on search and seizure and maintaining employee privacy and confidentiality. It is also important that we have gatekeepers to ensure due process. Those gatekeepers include the HHS-certified drug testing laboratories, which are inspected by NLCP; the use of evidential breath testing devices; and MROs, who are really important gatekeepers in our process to verify that the drugs for which people test positive are drugs that are being used illegally. The SAPs are our gatekeepers to ensure that people who have non-negative results are kept out of safety sensitive work until they have complied with the required treatment or education that the staff deems appropriate. Also ensuring the fairness and integrity of our program includes making sure that systems are auditable and reviewable by the DOT agencies. Finally, we publish our regulations in plain language.

Shown here is our family portrait. FMCSA has approximately 540,000 employers and 3.9 million employees. FAA has 6,900 employers and 450,000 employees. Listed here are the current counts for employers and employees within the FRA, FTA, Pipelines, and USCG industries.

Shown here is the summary of the components of the DOT program. Our program includes the requirement to have employer policies, which is not specifically listed under Part 40 but is under the Model Regs. Under the ONE-DOT approach, we want the stakeholders to know that employer policies are required. Employees are required to have prevention education and information, supervisors are required to have training on substance abuse, drug testing programs must be in place, licensed physicians must review drug test results, alcohol testing programs are mandated,

employees must be removed from safety-sensitive duties for violations, a SAP evaluation is needed for violators, and rehabilitation is required before return to duty.

The tested drugs are a five panel. In our industry, there is confusion because of the number of drugs requiring confirmation is 11. For us, we consider it to be a five panel drug category. In the right panel are listed the drugs for which we confirm. The one shown in red ones are Schedule I drugs while those in black are Schedule II. Another point of confusion involves the addition of hydrocodone, hydromorphone, oxycodone, and oxymorphone to the testing program because they are considered prescription medications. This is a common misconception, but these are Schedule II prescription medications. Our MROs know what they are doing, so we don't foresee problems with regards to that.

Shown here is the confirmed positive drug testing data that we collect every six months from HHS-certified laboratories. These numbers are not MRO-verified positives. There were approximately 6.1 million tests performed in 2013. That was continuing a trend of increasing employment and increasing number of tests since 2009. During the second half of last year, there were about 3 million tests, as shown in this graph.

This graph depicts the overall positive rates for each category every six months. Remember, these are not MRO-verified positives but laboratory reported results. The overall positivity rate rose slightly from 1.72 percent to 1.76 percent in the second half of last year. The specimens rejected by the labs for fatal flaws are shown in green, and those remain low. However, tampered specimens, shown in red, increased somewhat.

This graph shows the percentage of positives by drug category. THC continues to be the most identified drug, with positive rates remaining the same for the second half of last year as compared to the first half at 0.74 percent. Amphetamines, including methamphetamine, are the second most frequently identified drug category. The positivity rate for amphetamines is currently at the largest percentage ever. Cocaine comes in third place as the most frequently identified drug. Cocaine showed a slight increase in the second half of last year, but still remained below the 2011 levels. An interesting trend note is that the positive rate for amphetamines has remained above that for cocaine since January of 2009. Finally, PCP is detected positive more frequently than the ecstasy drugs combined. Though DoD has discontinued testing for PCP, we still find individuals testing positive for PCP. To underscore the importance for us to continue to test, we recognize that these individuals are testing positive on PCP during random testing, which scares us to death. For people in the transportation industry to be using PCP at all is a reason why we will continue to require the testing. This last figure shows the actual number of positive results. Of the three million tests, 22,282 were positive for marijuana, 16,232 for amphetamines and methamphetamine, 7,888 for cocaine, 6,201 for opiates, and 649 for PCP.

Of our horizon issues, the eCCF is front and center. We applaud HHS for moving forward with this. We look forward to doing our own rulemaking as quickly as possible to conform to the changes that HHS has made. Also on our horizon is testing for additional Schedule II drugs, alternative specimen oral fluid testing, international issues, and the challenges of marijuana legalization.

Our program managers are Rafael Ramos at the FAA, Iyon Rosario at the FTA, Stanley Kastanas atof the PHMSA, Jerry Powers at FRA, Juan Moya at the FMCSA, and Patrick Mannion at the USCG.

I am the Acting Director of our ODAPC staff. I work closely on a daily basis with our General Counsel Office representative, Anne Bechdolt. Mark Snider, Bohdan Baczara, and Cindy Ingrao are Senior Policy Advisors. Bohdan is also the Acting Deputy Director of ODAPC. Our administrative staff include Vicki Bellet and Maria Lofton. Our consultants are John Sheridan, Bob Ashby, and John Shatinsky.

To give you an idea of the outreach efforts provided by ODAPC's four professional and two administrative staff in 2013, we sent over 147,000 listservs and addressed over 8,706 emails and phone calls from Ask ODAPC, the DOT program managers, and our regulated public. Our listserv has more than 28,000 subscribers. Our webpage is consistently one of the top five or six in all of DOT with over 421,000 visits last year. Our federal partners often ask us to send out notices on their behalf. For instance, we post DEA Take Back the Drug Day announcements and those from ONDCP. We do post on

our listserv for our federal partners because we have the largest listserv of this kind in the federal government for those individuals who are interested in federally-regulated testing.

Shown here is our homepage. At the time when we captured our homepage, we had a DEA post up. We also are active with the Deputy Attorney General on Drug Endangered Children, a program co-sponsored between ONDCP and DOJ. Hopefully, you will find our webpage to be useful. We have links to our sister agencies and post lots of information. Please visit our webpage. Also, if you are not already on our listserv, please consider signing up. The web address is http://www.DOT.gov/odapc.

We have recently revised our Documents-on-Demand where we make our documents available to the public, mostly as hyperlinks. These are retrievable either electronically or by submitting the form shown here, with boxes checked to denote the requested documents; hard copies are mailed as needed.

Shown here is our building. Thank you.

DR. COOK: Do any members of the DTAB have questions for Patrice?

MR. HARRIS: Are the data on slides 14, 15, and 16 MRO-verified?

MS. KELLY: No. Those are not MRO-verified, Paul. These are data that are reported directly from the laboratory prior to MRO verification.

MR. HARRIS: Does DOT collect any data that are MRO-verified?

MS. KELLY: We collect some of it through the management information system, the ONE-DOT MIS. It is a statistically valid sampling, but it is not a full collection. However, the data that I shared with you are a full collection our DOT testing submitted from all 35 HHS-certified laboratories. Our MRO-verified results are just a small percentage compared to the data shown here.

MR. HARRIS: Thank you.

DR. COOK: Any other questions for Patrice? Thank you, Patrice.

MS. KELLY: Thanks, Janine.

DR. COOK: Paul Harris, who is Senior Program Manager for the Fitness for Duty program within the U.S. Nuclear Regulatory Commission, will present.

NRC 10 CFR Part 26 Fitness for Duty Program

MR. HARRIS: Thank you, Janine. I want to extend a personal thank you to Ron for allowing us to participate in your DTAB and thank Janine and the DTAB members for listening to our presentation today.

10 CFR Part 26, Fitness for Duty Program, is a direct contribution to safety because it is a human reliability performance issue that helps provide assurance that personnel can safely and competently perform assigned duties at the nation's nuclear power plants and other NRC licensed facilities.

My name is Paul Harris and my contact information is shown here. This disclaimer, present in NRC presentations, says you can't use anything against me. The NRC is located in Rockville, MD outside of Washington, D.C. Today I will discuss trending, programmatic discussion, subversions, adulterations, and a temperature profile.

The NRC licenses and regulates the nation's civilian use of special nuclear material, including all the commercial nuclear material utilized by commercial nuclear power plants and hospitals, well loggers, mining companies, etc. This is done through the normal regulatory process of establishing requirements, guidance, and standards. The NRC also responds to emergency situations and events.

The NRC has four regional offices and a training center in Tennessee, where the NRC trains most or all of its inspectors. The NRC currently has approximately 5,500 employees. The NRC regulates commercial nuclear power at approximately 100 operating sites, representing 62 Fitness for Duty programs. Each commercial power plant is a heavily protected, secure facility. There are probably the most protected commercial facilities in the U.S. Also protected are the independent spent fuel storage installation casks, which are used to store spent nuclear material. Each cask contains 40-65 irradiated spent fuel assemblies. The loading is dependent upon heat load and the type of reactor that is discharging its fuel. The picture on the left hand side is the spent fuel pools. At the bottom left hand corner is a research and test reactor that is undergoing a pulse activity or at a high power rate. The other pictures depict some of the security features associated with the commercial nuclear power plants.

The commercial nuclear industry provides 19.6 percent of the nation's gross electrical generating capacity, which represents 810 billion kilowatt hours of electricity. It is a significant contributor to the economic infrastructure of the U.S. It provides base load capacity to the majority of the U.S. East Coast and Midwest, as well.

The Fitness for Duty Program is a direct contribution to safety because it ensures that people are fit for duty. These are our mission and vision statements, which I have provided for information purposes. The Fitness for Duty Program has four key elements: authorization requirements, drug and alcohol testing, behavior observation, and fatigue management. Very similar to the DOT/DoD, we care that the people can safely and competently perform their duties. Our program requirements are broadened into behavior observation programs, which is very equivalent to the Department of Energy (DOE) and DoD Human Reliability Programs. Authorization requirements are signed waivers of consent to drug testing self-announcements of illegal drugs, and self-announcements of arrests and warrants. As required by our regulations, we ask questions, such as whether or not you submit subverted drug specimens and whether or not you test positive on drug tests. We conduct suitable inquiries and individual background investigations, including financial, criminal, academic, and work evaluations. For certain populations within the nuclear industry, we also conduct psychological examinations that are required for the licenses.

Fitness for duty is not defined in the requirements. Rather, the NRC technical staff defined fitness for duty as not being under the influence of any legal or illegal drug or substance as defined in testing cutoffs and MRO determination, being mentally and physically capable of safely and competently performing his/her duties, and not impaired by acute or cumulative fatigue. Besides drug and alcohol testing, we perform mental and physical evaluations. Depending on the safety and security activities that are being conducted, persons who have higher levels of responsibilities, such as commercial nuclear power plant operators or security officers, have very high standards associated with mental and physical capabilities. Our fatigue impairment parallels that of the transportation industry. Being fit for duty also means that the person is trustworthy and reliable. We do evaluate the trustworthiness and reliability of individuals by such means as background investigations and psychological assessments.

Regarding NRC sanctions, this is one area where the NRC is different than all other federal agencies. We do parallel many of activities that DoD and DOE do. One of the primary elements that make us different is that we implement sanctions, which is a requirement in our rule that licensees who test individuals under Part 26 must implement sanctions. These sanctions are based upon a three-tier evaluation. The first offense results in a 14 day denial while the third offense results in permanent denial. The industry maintains a comprehensive database of all employees and contractors who have gained access to commercial nuclear power plants and other NRC licensed facilities under the requirements of Part 26. If someone has violated a Part 26 drug and alcohol test or has been determined to be unauthorized to gain access, he/she is included on this list. All licensees have access to this database to identify whether or not an individual was tested positive at another site and, therefore, to determine whether or not to hire him or her. There are special cases for sanctions, which I have listed here. The most important are that licensees are authorized to administer more robust sanctions. Instead of 14 days, the licensee could opt for one year. Instead of a second offense

resulting in a five year denial, they could permanently deny the individual access to the facility. Most important is also bullet number subversion, adulteration, or refusal to test. If someone does subvert the test, refuse to cooperate with the collector, adulterate a specimen, or submit someone else's specimen, it is a permanent denial. That individual is entered into this national database maintained by the industry, and that person is denied access permanently. Other licensees have the access to this database and, therefore, can make their own employment decisions.

The next major difference in the NRC program is our implementation in 2008 of time-dependent alcohol limits. Unfortunately, alcohol, even though it is a legal drug, is prevalent within society and, therefore, is reflected within the commercial nuclear power industry workforce. On another slide, I will provide some more details on this. This time-dependency is based upon when the individual arrived onsite to when the individual was tested. It is graduated from 0.01 to 0.04, which is considered a positive test result and corresponds to the DOT testing limit as well. The 0.02 on initial testing corresponds as well with DOT testing. We implemented administrative actions at the lower limits and a time-dependency actions between 0.02 and 0.04.

Shown on this table are the drug and alcohol testing results for the commercial nuclear industry subject to Part 26. What is important to recognize is that the overall industry positive rate, found in the lower right hand corner of the top table, is 0.6 percent positive of all tests conducted. Breaking the data by employment type (full-time licensee employees vs. contractor/vendor employees) and test categories, the percent positive for licensee employees is 0.23 percent while the positivity rate for the contractor/vendors is 0.79 percent. Thus, contractor/vendors are driving the industry positivity rate higher than the licensee employees. There are reasons for this difference. Number one, the contractor/vendors are more representative of the general workforce. The general population positivity rates are higher in the general population than they are within specific work categories, such as DoD, DOT, and other testing programs. Notice that the difference is about three-fold, which has remained consist for years, which I will show later. The total number of tests we conducted in 2013 is 161,000 tests, as compared to about 171,000 total tests in 2012. Though we are a small fish in the big ocean of federal drug testing programs, our test results are comprehensive, as I will show in the next few slides.

This slide shows the overall trending. The three graphs illustrate pre-access, random, and for a cause testing data. In each figure the upper line, which represents the contractor/vendors percent positives, is about two to three times greater than licensee employees, which has been constant for years. Would I like them to merge together at the lower value? Yes, I would. Am I looking for help to do that? Yes, I am. That "yes, I am" is the general workforce population that everyone is focused on through the drug testing programs implemented by HHS. The 2013 trends are relatively stable compared to where we were. In 2009, the little data blip, which most likely resulted from the rule change we implemented in 2008. Take note of the low testing rates found in the nuclear industry.

We test for the same drugs that are in the HHS guidelines. Therefore, we are consistent with DOT in drug testing. The nuclear industry is also allowed to expand their drug testing panels to other drugs. We have licensees and owner/operators of commercial nuclear facilities who are testing for semi-synthetic opiates and benzodiazepines, which is very similar to what DoD is testing for as well. Marijuana continues to be our prevalent drug, at 46 percent of all positive tests, followed by alcohol at 23 percent. Next are amphetamines at eight percent, which is relatively low.

I have asked a number of questions today to a number of the presenters about subversions, adulterations, and invalids. The reason I asked these questions is because our total number of refusals to test is about 10 percent, which is higher than our testing rate for amphetamines. Our technical staff is looking at this. How can we improve our identification of subversion attempts and adulterations in our assessment of invalids? From my previous questions I wanted to learn where we can improve our evaluation of these invalids and what we should focus on.

The next graph shows our alcohol positives broken down by test category. The total number of tests here is 229. Pre-access testing is, by far, is where we are finding the most positive tests. About 65 percent of the total tests that are positive occur on pre-access. This means that I am identifying positive individuals and stopping them at the gates and not permitting them inside the nuclear power plant. I don't have to worry about them because they self-screen out by testing positive. Random and the for cause testing occur inside the power plants. I am really concerned about these positives because these individuals are inside the power plants when testing positive for alcohol. Is that a fitness for duty

concern for the technical staff? Yes, it is. The follow up testing rate demonstrates that these individuals are unable to remove themselves from the impairment conditions of alcohol. This breakdown of alcohol positives is color coded by alcohol concentrations. For random testing positive results with an alcohol of 0.04 or greater, there are 22 individuals who are positive in the whole industry. That is a concern. Why are we catching them on a random? That means they are drinking all the time and are inside the power plant when it just so happens they get caught by a random test. Though the for cause positive testing rate is much higher, these individuals are still inside the power plant. Our data can be analyzed to focus inspections by providing pre-access and random positive rates at a particular power plant site. This level of data detail is seen the next slides.

This slide is one of my favorites. It is the most convoluted slide that my contractor could ever provide me. Bless his heart for being so good at this. It really captures all we can do. On the X axis is listed the nuclear sites by name. The drug and alcohol testing program under the NRC's inspection/oversight process is considered security-related information. Therefore, site-specific information associated with testing results through the conduct of inspection is controlled as security-related information and not disseminated to the public. However, our inspectors are provided this information at inspection. At each individual site, they can evaluate the number of test subversions, as shown in the red bar chart. The number of dilute positives is shown in blue. The number of pre-access versus random positive rates by nuclear site are shown as dotted versus dashed lines, respectively. If the site random rate is significantly higher than the pre-access rate, I tend to question what is going on at that site and could direct NRC resources to that particular site. It is very, very difficult to make overall, general, sweeping comments regarding this information without knowing what is happening at the particular site. Examining the center spike, we would ask why that pre-access positive rate is so high. We would send an inspector there to evaluate that high pre-access rate. Possible explanations include a refueling outage which required the hiring of 1,000 people for maintenance work inside the power plant and the associated pre-access testing. Conversely, the random testing rate is relatively low. This implies that drug users are not getting inside the power plant. Thus, we have some reasonable assurance that that plant is being operated by personnel who are fit for duty. This is an example of the type of data the NRC now has to inform their inspection and auditing processes.

These data can be parsed by geographic prevalence. This analysis is important when several commercial nuclear power plants are located within a general vicinity of each other. In South Carolina, for instance, the data could be analyzed by power plant to detect geographical trends. Does that geographical area have a problem with marijuana? Does it have a problem with cocaine?

We also know what laboratories these facilities are use. For example, if the Vogtle, V.C. summer, Hatch, and Catawba sites are all utilizing the same HHS-certified laboratory, I can assess the performance of that laboratory. This is why I posed the questions to HHS earlier this morning about the NLCP and whether or not we can assess those audits. It informs the NRC inspection program of these facilities if need be. Currently, we don't have any concerns with the operation and the performance of any HHS-certified lab. We don't have a concern with the industry on whole. It is just a matter of evaluating the data to reduce the regulatory burden on affective entities while maintaining the same level of assurance.

For programmatic discussion, I have listed 12 items. Number one is performance-based auditing of the HHS-certified labs. I have listed this in this public meeting to inform the public that this is something the technical staff is considering. Are we going to do it? No. It is a rulemaking decision made by the NRC, and we are not there yet. The NRC implements performance-based inspection of all their material licensees in commercial nuclear power plants. A performance-based inspection or audit of an HHS certified lab is very consistent with how the NRC conducts its inspections and audits of affected entities. We will not change the requirements, but it is something that the technical staff is considering. Number two pertains to the very specific question that I asked Charles LoDico this morning. How do we examine the laboratory problems? These problems might exist. The labs take corrective actions to fix problems, which we appreciate. We take comfort in knowing that HHS, the NLCP, and the labs themselves take these problems very seriously and correct their issues. Constructing a geographical mapping like I showed you on the previous slide, I could isolate a problem to a particular lab and coordinate with HHS and the laboratory to improve the problems that we identify. Thirdly, for MRO guidance on semi-synthetic opiates, I queried HHS on that question this morning regarding the update of the MRO Manual. Regarding the voluntary announcement of all medications, in 1989 when the NRC implemented its drug testing

provisions in 10 CFR Part 26, we had a provision whereby the individual could announce his or her medications. That provision was removed in a 2008 amendment to the rule. Now, the staff is evaluating whether or not to have voluntary announcements. This would be voluntary on the individual; he or she may or may not want to announce but could if desired. This is very similar to what DoD is doing with their wash system, which is why I asked DoD the question on how do they evaluate that. The concern is whether we are testing for all the drugs that could cause impairments. Well, I think the HHS panel is a great start. Though benzodiazepines and barbiturates are not included on the panel, someone on these medications may want to announce them to the licensee as potentially impairing. If it is potentially impairing, it would fall within the scope of the fitness for duty program. That individual would be evaluated as to whether or not he or she can come on duty and perform his or her activities. There is no need to discuss hair and oral fluid specimens because HHS is already evaluating them. The conduct of security-related searches is an internal item in which the collector is identifying the preponderance of all subversions and refusals of testing. The collector is the boots on the ground, identifying approximately 90 percent of all the subversions. Though the labs are also identifying subversions, adulterations, invalids, and dilutes, the collectors are also identifying refusals and subversions in real time. The conduct of searches within nuclear-regulated entities, such as commercial nuclear power plants, falls under security. If a collector has a security issue, such as the donor bringing a prohibited item into the power plant, under the regulations, that individual can be searched under our security provisions. This search is outside the scope of a HHS or a DOT pre-urinalysis test search. This is HHS/DOT-prohibited search is allowed for NRC as a security search. A number of nuclear facilities in the United States have an initiative to bring drug-sniffing dogs on their sites to search for drugs in the workplace. We support this way to a workplace drug-free environment. We want to implement that. The licensees embrace bringing drug-sniffing dogs on their sites to look for illegal drugs and do it on their own initiative above and beyond Part 26. We are also examining minimum volume requirements and the use of mirrors for direct observation. We are trying to bring in situ cup adulterant testing upon collection to enable collectors in most facilities to identify subversions, adulterations, and substitutions at the collection facility, thus pre-screening workers prior to admission into the power plants.

For subversions and adulterations, vigilance is most important at the collection site. Most subversions are identified as temperature-based. Many subversions are detected based upon differences between specimen bottles A and B, such as temperature and color differences. I would like to know more information on creatinine and pH differences between specimen bottles A and B at the collection facility. Few subversions are identified through the lab testing.

Securing non-essential items prior to collection was discussed on the previous slide. Other collection issues include refusing to follow directions and intimidating the collector. Most collectors within the nuclear industry are employees of the commercial nuclear power plants. Intimidation doesn't go very far because the collector can pick up the phone and call for help. If we don't use NRC licensee collectors and instead hire collectors outside the commercial nuclear industry, we would have to examine that.

I wonder whether alcohol subversions exist. More research is needed to evaluate whether alcohol subversions exist. Perhaps my contractors could evaluate this since this is outside the purview of HHS. Alcohol and marijuana are my top two detected substances in the commercial nuclear industry. I would love to drive down those numbers, especially when 10 percent of all positives are refusals to test, which includes subversions.

Regarding unknown adulterants, I queried Quest Labs earlier today about synthetic urine. Are we effective at identifying subversions? This is the overall, big picture initiative that we are trying to do as a tech staff.

These tables of adulterants were obtained from Barry Sample's Quest Diagnostics website. Barry has already talked about this, and I asked him about it. The oxidizing adulterants in the drug testing program are not identifying anything. We are utilizing these data to formulate a more robust regulatory framework to identify subversions, refusals to test, and adulterants.
This graph from Quest Diagnostics shows the increase in the number of invalids, the lack of oxidizing adulterants, and the few identified substituted specimens. We are examining what is going on in the industry. Are we testing for the right things? Can specimen validity testing be enhanced? Can we perform pre-testing for substituted specimens? These are the types of things that the NRC technical staff is studying.

Things that the NRC needs include enhancements to MRO guidance. HHS has taken a phenomenal lead in updating that manual, including the addition of semi-synthetic opiates. My concern still remains drug cocktailing, the mixing of drugs, and how that impacts the impairments of an individual. Clearly, we have indications in the nuclear industry of individuals taking amphetamines and then taking another drug to fall asleep. They are picking themselves up while on duty, and when off duty, they want to fall asleep. What kind of impairment is associated with that? Can the MROs be provided good guidance on what to look for? Hair and oral fluid specimens, which I already discussed, is coming. We are waiting until that regulatory process is complete and it is implemented. As mentioned previously, we are examining latitude on minimum urine volume requirements, synthetic urine and adulterants, and better evaluation of invalids. We are also evaluating enhanced criteria to evaluate the types of collections that we are doing, such as differences in creatinine, pH, temperature, metabolites, and color between the specimens A and B.

Transitioning to data on subversions, this figure shows that all the subversions are occurring on pre-access testing. Who is catching these? The collectors are. This is why vigilance is needed in the collector ranks. In the nuclear industry, we do not have many subversions, but it is ten percent of the total. On pre-access, we are catching about 110, with random, follow up, and for cause being much less. The for cause and random testing subversions are of significant concern to the technical staff because these people are subverting the drug testing program while inside the power plants. I want to prevent that. This is something that I want to focus on and this is why.

The data that we can evaluate now allows us to see when the subversion has taken place. This slide shows we had 145 subversion attempts in 2013. Some donors self-select out by refusing to provide a specimen, which is subversion. Next block down below that is subversion suspected, which includes temperature out of range. The preponderance is temperature, with 104 out of 145 detected. Specimen characteristics detect seven subversions followed by paraphernalia. Previously, I said that the collector has to be vigilant. They have to hear, listen, see, and ask questions. If they think a donor is subverting the drug test, they should ask the person whether he/she is subverting the drug test. Maybe that is not the question to ask, but that is the philosophy that I would like to implement. The next category involves the specimen collected appearing normal, but the lab validity tests determine whether or not the specimen is adulterated or substituted. Notice we have zero for adulteration, which is consistent with the Quest data. We have four substituted. What else is important on this slide? We have 56 donor refusals and 15 where the collector stopped process because the donor was probably not following instructions.

The technical staff will be presenting to HHS for an independent regulatory review of an analytical software program to determine whether the specimen is outside of temperature specifications. Entered data include room temperature, body temperature, sample fill line, and minimum specimen temperature. The software determine whether the measured specimen temperature is high, low, or acceptable. What is this program good for? It is good for collectors and training purposes. I think DOT should maybe look at this for training purposes. We are not proposing this as regulatory requirement; however, we would like our federal partners to help us review this to provide appropriate guidance to others in the utilization of this for training purposes. When a donor submits a specimen that has a high or low temperature, we can, from a training perspective, understand why it is high or low based upon room temperature, body temperature, and the sample fill line. Temperature also depends upon where the specimen container is placed after the urinalysis is performed. Depending on what type of surface the filled container is placed, such as a metal, wooden, or porcelain surface, the rate of heat transfer to the surface affects the temperature of the bulk urine fluid inside the cup; it can go well below 90. N This has to do with the HHS Guidelines provision that says thou shall perform a temperature evaluation of the urine within four minutes of the person providing urine specimen in the cup. We asked whether maybe we could evaluate this better. Ron, I will work with your staff to perform an independent review of this.

If there are any questions, I would be very happy to address them.

DR. COOK: Do any board members have questions for Paul? Thank you, Paul. For our last presentation today, Ron Flegel, who is the Director of DWP, will provide an update on the Federal Workplace Drug Testing Programs testing data.

Federal Workplace Drug Testing Programs

MR. FLEGEL: I want to thank our federal partners, including NRC, DOT, and DoD, for excellent presentations today.

I will now launch into the Federal Workplace Drug Testing Programs data for the year. Based on the March 2014 NLCP laboratory listing, the laboratories are as follows: 3 category 0, 11 category 1, nine category 2, 1 category 3, 5 category 4, and 5 category 5 labs. A category 5 would be the largest laboratory and a category one would be the smallest laboratory.

For regulated specimen testing from 2004-2013, from 2004 through 2007, the number of regulated specimens tested increased. Unfortunately, due to the recession, the numbers decreased dramatically in 2008 and 2009. In 2009, an increasing trend is seen into 2013. Currently, about 6.1 million regulated specimens are tested. This slide focuses on regulated specimen tests for 2009-2013, showing the increasing trend.

This slide depicts monthly totals of regulated specimens tested between 2009 through 2013. Notice that the number of specimens tested by month is greater for 2013 for each month compared to 2009 levels. This trend by year per month shows that the number of specimens tested usually increased around the April to May timeframe.

The regulated specimens reported as positive, adulterated, invalid, or substituted from 2009-2013 increased from 2009 through 2013. In 2009, these specimens totaled approximately around 87,000 and increased to about 121,000 to 122,000 in 2013, indicating an increasing trend in those regulated specimens reported as positive, adulterated, invalid, or substituted. This graph is a breakdown of monthly totals of regulated specimens reported as positive, adulterated, invalid, or substituted by year and by month. Highest levels are seen in 2013 by month when compared to the other years. In August, September, and October, there is a pretty significant increase in those specimens reported as positive, adulterated, invalid, or substituted. This graph shows the distribution of specimens reported, as drug positive, adulterated, invalid, or substituted by drug from 2009-2013. Notice the increase in the number of amphetamine and methamphetamine positives. THC levels remain relatively the same, but there was a small spike in the amount of THC invalids reported in 2013. Substituted, adulterated, and invalids of the other analytes, such as PCP, morphine, codeine, and benzoylecgonine, have remained the same. There is a small or a continuing increase for 6-acetylmorphine.

This graph examines those specimens reported as invalid for pH, broken down by the percentage of pH-related invalids and the percentage of invalids that are related to low pH. There was a significant increase in the low pH invalids, shown by the red bars, from September through November 2011. This trend started to decrease into 2012 and remained at about the same level through early 2013. Later in 2013, these low pH invalids decreased.

Shown here is the percentage of specimens reported invalid by invalid category and by month in 2013. For physical characteristics, shown on the left and reported by month there is a decreasing number reported. For creatinine and/or specific gravity also, there is a decrease in the number reported as invalid for this category. The same trend applies for GC-MS, but with lesser numbers. For immunoassay interference, the trend has increased dramatically in the October, November, and December timeframe, which is contributing to the increase in the number of invalids seen in the last three months of 2013. When we study the 2014 data, we will determine if that trend is continuing or will begin to decrease. For oxidants, there was a large spike in January, which subsequently leveled off and then decreased. For pH, early in the year, a rising trend of is seen through July, which has since tapered off.

The percentage of specimens reported as invalid due to immunoassay interference and by month is shown by analyte immunoassay. The amphetamines are trending upwards. Cocaine and MDMA remain the same or lower. The 6-acetylmorphine screening assay is where the most assay interference invalids are derived. PCP and THC reported immunoassay interferences are decreasing. It would appear that most of the immunoassay interferences are from the 6-acetylemorphine immunoassay.

These data are specimens reported as invalid by Category 3, 4, and 5 laboratories due to the immunoassay interference. This snapshot is of those specific laboratories that are reporting immunoassay interference based on the immunoassay

that they are currently using. Laboratory C had a significant increase in immunoassay interference and thus reported numerous invalids. There is also an increase in Laboratory D, as well as F and G. Thus this interference is not just localized to one laboratory. There are several laboratories that are reporting immunoassay interference, causing these laboratory specimens to be reported as invalid. This invalid trend is currently under investigation. We are examining why there is a spike in immunoassay interference and what is causing that spike.

In summary, the number of regulated specimens tested from 2009-2013 increased by about 15.6 percent. The yearly increases range from 2.5 to 4.5 percent. The number of regulated specimens reported as drug positive, adulterated, invalid, and substituted from of 2009-2013 increased by 39.8 percent, which is a concern for us. The annual increase ranged from 3.3 to 13.7 percent. Also, specimens reported as invalid due to the low pH have decreased from the levels seen in 2011-2012. The number of specimens reported for this reason has returned to rates seen in 2009. Specimens reported as invalid due to immunoassay interference increased in 2013 and appear to continue to increase in 2014.

With that, I thank you. I will turn it back over to Janine if there are no questions.

DR. COOK: Do any members of the Board have questions for Ron? Now, we will proceed to our public comment period about 15 minutes early. Two people have registered to give public comment. If anyone else would like to give a public comment, please press *1 and notify the operator. Proceeding alphabetically, our first public commenter is Sarah Ashby, who is Vice President and General Counsel of Psychemedics Corporation. Sarah, if you would press *1 and the operator will open your line.

Public Comments

MS. ASHBY**:** Thank you so much. Janine, thank you very much for the introduction. As Janine mentioned, my name is Sarah Ashby. I'm Vice President and General Counsel at Psychemedics Corporation. As some of you know, we are a hair drug testing lab. Thank you very much for the opportunity to comment. I am actually fairly new to the drug testing industry, as of about two and a half years ago or so. I attended my first DTAB meeting in July 2013 and attended the September 2013 meeting remotely. Both of those meetings seemed to focus to a great extent on hair.

The reason I wanted to comment today was because a concern that I have and that some of my colleagues have on a lack of balance in some the information being provided to you about hair testing science as you consider adding this specimen to the Guidelines. There were two things that struck me, in particular, in the two meetings that I attended. One was there seemed to be a deficit of information provided about legal precedent, basically, the types of cases where hair drug testing has been upheld. And secondly, a lack of information about decontamination studies. The first thing I wanted to mention was just one presentation, in particular, last summer quoted a civil service decision that was critical of hair testing and that is currently, right now, on appeal. Yet, in the same presentation, there was no reference to basically 20 plus years of legal precedent in many different contexts—civil and criminal—where hair testing has been upheld. As you may know, in many legal cases like that there is very rigorous scrutiny of testing before it can even be allowed as evidence, in terms of looking at the standards, the scientific procedures, acceptability, and reliability. I was just concerned that information wasn't getting to you, in terms of the legal context and one of the practical applications for hair testing. I just wanted to bring that up as sort of a counterbalance to information that was provided then.

On the second issue about lack of information about decontamination studies was something else that was of concern. In fact, one of the July 2013 presentations said there were "very few studies" of decontamination, when in fact there are many of them out there. I've compiled some of them for your review, just targeting the discussion that I believe you will be having tomorrow afternoon about decontamination of hair specimens. Janine kindly circulated those to you. I did go ahead and bracket some of the portions and noted the page numbers that I think would be particularly helpful instead of just a giant document dump. I hope that will be useful for your discussion. There was one study, in particular, that I wanted to draw attention to and that was the 2011 Department of Justice (DOJ) Report, which specifically stated that the "most significant impact of this research will be the need for hair drug testing guidelines to require the use of extended decontamination wash procedures and mathematical calculations, in addition to currently used cut-off concentrations and the BE/COC ratio." The reason I wanted to bring that study up was because it really highlights how

critical decontamination procedures are in distinguishing use of drugs from exposure to drugs, which I know is really a lynchpin of sort of the concern in moving forward with hair testing. This was really critical research from 2011 that wasn't even mentioned in last summer's meeting or in the September meeting. I just wanted to draw attention to that because I think it really is something that is very important, seemingly very important in your decision whether to add hair testing because this was a study not only that looked at the wash procedures, but actually made a recommendation as to what should be included in the Guidelines. There is another study that I hope you will take a look at. That is the 2004 study in the handout, which actually is a recipe for a wash procedure that works and that is accessible to any lab. I hope that is something you will take into consideration, as well.

I want to, basically, in summary, make sure you are getting all the information that you need for a complete picture of hair testing, including all the research on contamination. Also, I would just ask that you bear in mind that this type of testing has been used at least in workplace, sometimes in other settings, too, for at least 25 years. It's had proven success in deterring drug use and increasing safety. I think those were things that were borne out specifically last summer by the J.B. Hunt's statistics, which were very, very compelling. Hair testing is used here, in the U.S. and also internationally. It has a longer window of detection as you know, and really provides a powerful, upfront deterrent to drug use, which is, of course, our main goal here. Thank you very much for the opportunity to provide the studies and also to make a comment. I appreciate your time.

DR. COOK: Thank you, Sarah. Thank you for the handout that you provided us, which I did share with the Board. It will be taken under consideration in the closed session. Our next public commenter is Judith Barrett of the International Paruresis Association. Judith, please press *1 to connect with the operator. She will then unmute you.
MS. BARRETT: Thank you for this meeting and for the opportunity to comment. I had written a question to Ron, which he responded to and then a follow up question, which I also emailed. I think that will satisfy the questions that I had today.

DR. COOK: Okay. Thank you very much. Is there anyone else who did not register for public comment who would like to give public comment at this time? If so, please press *1 and contact the operator.

I now officially close the public comment period as well as this June 10th open session. We will reconvene tomorrow morning at 10:00 a.m. in open session using the same call-in information from today. Thanks, everyone.

(Whereupon, the meeting adjourned at 4:10 p.m.)