

IN THE UNITED STATES DISTRICT COURT
FOR THE WESTERN DISTRICT OF TENNESSEE
EASTERN DIVISION

UNITED STATES OF AMERICA,)
)
 Plaintiff,)
)
 v.) No. 07-10074 Ml/P
)
 LORNE ALLAN SEMRAU,)
)
 Defendant.)

AMENDED REPORT AND RECOMMENDATION

Before the court by order of reference is the United States' ("government") Motion in Limine and Memorandum in Support to Exclude Defendant's Expert Witness Testimony of Dr. Steven Laken and Request by the United States for a Daubert Hearing, filed February 19, 2010 ("Motion to Exclude").¹ (D.E. 168.) On March 22, the defendant, Dr. Lorne Allan Semrau, filed a response in opposition to the motion and an Amended Notice of Filing of Affidavit of Mark Stork George, M.D. On March 25, the government filed a Supplement to its Motion to Exclude, arguing that in addition to excluding Dr. Laken's testimony under Fed. R. Evid. 702, the court should also exclude his testimony under Fed. R. Evid. 403. On April 29, the government filed an Addendum to its Motion to Exclude, attaching two recently published law journal

¹The motion was referred to the Magistrate Judge for a report and recommendation pursuant to 28 U.S.C. § 636(b)(1)(B) and (C).

articles. On May 11, Dr. Semrau filed a Notice of Filing Affidavit of F. Andrew Kozel, M.D., M.S.C.R, and on May 12, he filed a Notice of Filing Supplemental Materials and Authority.

On May 13 and 14, the court conducted a Daubert hearing on the motion.² All parties were present and heard. The court heard testimony from Dr. Steven J. Laken, Dr. Marcus E. Raichle, and Dr. Peter Imrey. The court received the following exhibits as evidence: (1) curriculum vitae for all three witnesses; (2) the "fMRI Testing Report" containing Dr. Laken's opinions; (3) a chart displaying the results of Dr. Semrau's examinations; (4) an article titled "Functional MRI Detection of Deception After Committing a Mock Sabotage Crime"; and (5) a fifty-three page slide presentation used during Dr. Imrey's testimony. Finally, on May 18, Dr. Semrau filed a Notice of Filing Supplemental Peer Reviewed Articles, Published Articles, and Scientific Presentations.

After careful consideration of the briefs and exhibits filed in connection with the present motion, the testimony of the witnesses and exhibits admitted at the hearing, and the entire record in this case, the court submits the following proposed findings of fact and conclusions of law, and recommends that the

²At the March 3, 2010 status conference with the court, the parties asked that the hearing be conducted on May 13 and 14, due to the unavailability of counsel during most of March and April, and because Dr. Laken and the government's two expert witnesses would not be available to testify at the hearing until the middle of May.

Motion to Exclude be granted.

I. PROPOSED FINDINGS OF FACT

A. Summary of the Charges

According to the Second Superseding Indictment, at all times material to the indictment, Dr. Lorne Allan Semrau was a licensed psychologist in Tennessee and a participating provider in the Medicare and Medicaid programs.³ Dr. Semrau was the owner and CEO/President of two Tennessee corporations, Superior Life Care Services, Inc. ("Superior") and Foundation Life Care Services, LLC ("Foundation"). Through these corporations, Dr. Semrau contracted with psychiatrists to provide mental health services to patients in nursing homes in Tennessee and Mississippi. Services provided by the psychiatrists included conducting initial patient evaluations, providing monthly medication management, and administering Abnormal Involuntary Movement Scale ("AIMS") tests on patients.

The indictment alleges that Dr. Semrau instructed the psychiatrists to fill out "log sheets" to document the services they provided to patients. These log sheets were maintained by Superior and Foundation, and contained the name of the nursing

³The U.S. Department of Health and Human Services administers Medicare and Medicaid through the Centers for Medicare & Medicaid Services ("CMS"). CMS enters into contracts with private insurance companies throughout the United States to administer the Medicare and Medicaid programs. These insurance companies process and pay the claims filed under these programs, and are subsequently reimbursed by CMS. During the relevant time period of the indictment, CIGNA was the contractor for Tennessee and CAHABA was the contractor for Mississippi.

home, the names of patients at the nursing home, the date and type of service claimed, and the name of the person who provided the service. In addition, the log sheets had a list of Current Procedural Terminology ("CPT") codes, which are codes established by the American Medical Association and used by medical providers to describe services provided. Dr. Semrau instructed the psychiatrists to circle on the log sheets "01" (CPT code 90801) for initial evaluations, "62" (CPT code 90862) for medication management, "312" (CPT code 99312) for evaluation and management of a patient, and "301" (CPT code 99301) for AIMS tests.

According to the indictment, between 1999 and 2005, Dr. Semrau allegedly engaged in a scheme to defraud Medicare, Medicaid, and other health care benefit programs by submitting false and fraudulent claims for payment. To carry out this scheme, Dr. Semrau directed his billing personnel to bill CPT codes that were different from the codes marked by the treating psychiatrists, and instructed the psychiatrists to claim a separate CPT code for AIMS tests. Dr. Semrau instructed Superior and Foundation employees to delete lower paying CPT codes from the log sheets and to substitute CPT code 99312 (a code that paid a higher rate of reimbursement), and he instructed billing personnel to file claims with CPT code 99312 instead of the lower paying CPT codes circled by the psychiatrists. Dr. Semrau also instructed the psychiatrists to perform AIMS tests approximately every six months and to circle

"301" on the log sheets. He instructed billing personnel to file claims for CPT code 99301 even though he knew that this test was not a separately reimbursable test and should have been performed with and billed as part of a regularly scheduled monthly medication management service. In total, "Semrau caused fraudulent billings of approximately \$3,000,000.00 to be submitted to Medicare and Medicaid in Tennessee and Mississippi thereby causing payments to be made to Superior and Foundation by CIGNA, CAHABA and Medicaid." (Second Superseding Indictment ¶ 20.)

Counts 1 through 60 of the indictment charge Dr. Semrau with health care fraud in violation of 18 U.S.C. §§ 1347 and 2; Counts 61 through 72 charge him with money laundering in violation of 18 U.S.C. §§ 1956, 1957, and 2; and Count 73 seeks forfeiture of property, including \$3,000,000.00. Dr. Semrau denies that he acted with the intent to defraud, asserts that his actions were reasonable under the circumstances because the CPT codes were confusing and unclear, and claims he followed instructions and guidance provided by CIGNA and CAHABA representatives.⁴

⁴In order to convict Dr. Semrau on the health care fraud charges, the government must prove that he "(1) knowingly devised a scheme or artifice to defraud a health care benefit program in connection with the delivery of or payment for health care benefits, items, or services; (2) executed or attempted to execute this scheme or artifice to defraud; and (3) acted with intent to defraud." United States v. Raithatha, 385 F.3d 1013, 1021 (6th Cir. 2004), vacated on other grounds, 543 U.S. 1136 (2005); see also United States v. Hunt, 521 F.3d 636, 645 (6th Cir. 2008).

B. Functional Magnetic Resonance Imaging and Lie Detection

1. Background

Dr. Steven J. Laken is the President and CEO of Cephos Corporation, a company he founded in 2004 and located in Tyngsboro, Massachusetts.⁵ Cephos markets itself as a company that provides a variety of investigative services, including DNA forensic analysis, private detective services, and lie detection/truth verification using functional magnetic resonance imaging ("fMRI").⁶ (5/13/10 Tr. at 114-16.) Regarding its fMRI-based lie detection service, Cephos claims it uses "state-of-the-art technology that is unbiased and scientifically validated. We have offered expert testimony and have presented fMRI evidence in court."⁷ Cephos Lie

⁵Dr. Laken graduated from the University of Minnesota in 1993 with a Bachelor of Science degree in Genetics and Cell Biology. He received his Ph.D. in Cellular and Molecular Medicine at The Johns Hopkins School of Medicine. After receiving his Ph.D., Dr. Laken spent the next several years conducting cancer research. He has co-authored eighteen published articles, six of which relate to the use of fMRI in detecting deception. (5/13/10 Hearing, Ex. 1.)

⁶Apparently, Cephos is one of two companies in the United States that provides fMRI-based lie detection services. The other company is No Lie MRI.

⁷Dr. Laken testified at the Daubert hearing that, to his knowledge, fMRI-based lie detection testimony has only been presented in court on one prior occasion, a "post-conviction relief case" in South Carolina. (5/13/10 Tr. at 119-20.) However, it is unclear how that testimony was used by the court, and there is no indication that the admissibility of his testimony was ever challenged. He also testified that he recently learned that in a New York state court case, the court excluded him as an expert witness, but he was unaware of the details of that court's decision. Subsequently, the judge in that case issued a written opinion explaining that Dr. Laken's testimony was excluded under Frye v. United States, 293 F.

Detection: The Science Behind the Truth, <http://www.cephoscorp.com/lie-detection/index.php> (last visited May 28, 2010). It further states that "[t]he source of lying is in the brain - that is what Cephos measures with our truth verification brain imaging service using fMRI technology. We provide independent, scientific validation that someone is telling the truth." Id. Cephos holds a patent on a version of a fMRI-based lie detection method, which identifies Dr. Laken as its inventor. U.S. Patent No. 7,565,193 (filed June 13, 2005) (issued July 21, 2009).

At the heart of Dr. Laken's lie detection method is fMRI. Functional MRI enables researchers to assess brain function "in a rapid, non-invasive manner with a high degree of both spatial and temporal accuracy." Henry T. Greely & July Illes, Neuroscience-Based Lie Detection: The Urgent Need for Regulation, 33 Am. J.L. & Med. 377, 379 (2007); see also Teneille Brown & Emily Murphy, Through a Scanner Darkly: Functional Neuroimaging as Evidence of a Criminal Defendant's Past Mental States, 62 Stan. L. Rev. 1119,

1013 (D.C. 1923), because his testimony relating to the credibility of a key witness was "a matter solely for the jury and is clearly within the ken of the jury." Wilson v. Corestaff Servs. L.P., 2010 WL 1949095, at *3 (N.Y. Sup. Ct. May 14, 2010). As discussed later, Frye does not apply to this court's analysis. To this court's knowledge, no court has addressed the admissibility of fMRI-based lie detection under Fed. R. Evid. 702 and Daubert.

1138 (2010) (citation omitted).⁸ When undergoing a fMRI scan, a subject lies down on a bed, which slides into the center of a donut-shaped magnet core. Brown & Murphy, supra, at 1139. As the subject remains still, he or she is asked to perform a task. If the task requires a response, the subject inputs a response with a hand-held controller. While the subject performs these tasks, magnetic coils in the scanner receive electric current and the device gathers information about the subject's Blood Oxygen Level Dependent ("BOLD") response.⁹ The data is then "heavily processed, aligned, smoothed, and filtered before it can be mapped onto a template of a human brain." Id. at 1139. By comparing the subject's BOLD response signals with the control state, small changes in signal intensity are detectable and can provide information about brain activity. Id. at 1140.

Dr. Laken first became interested in conducting research in

⁸Since 1991, approximately 8,700 articles have been published relating to fMRI and its various applications. See Greely & Illes, supra, at 379-80. The present motion does not challenge the reliability of fMRI generally, but rather its use by Dr. Laken in detecting deception.

⁹"A growing body of evidence suggests that mental states - such as thoughts and emotions - are represented by patterns of neuronal activation in specific regions or networks of the brain," and for certain "cognitive or emotional tasks, an increase in neural firing in a particular region or network is interpreted as the brain doing 'more' of that particular cognitive or emotional task." Brown & Murphy, supra, at 1138. Blood that carries oxygen "behaves differently in magnetic fields than deoxygenated blood does" and the "difference in the magnetic properties of oxygenated blood allows fMRI to detect changes in blood flow related to activity. This is called the [BOLD] response." Id.

the area of fMRI-based lie detection in or around 2003, and shortly thereafter, he began working closely with a small group of researchers in that field, including Dr. Frank Andrew Kozel, Dr. Mark S. George, and Dr. Kevin A. Johnson.¹⁰ Over the next few years, Dr. Laken and his fellow researchers conducted a series of laboratory studies to determine whether they could use fMRI to detect deception. Generally, these studies involved a test subject performing a task, such as "stealing" a ring or watch, and then scanning the subject while he or she answered questions about the task. The subjects were usually offered a modest monetary incentive (e.g. fifty dollars) if their lie was not detected.

Based on these studies, as well as studies conducted by other

¹⁰Dr. Kozel is an Assistant Professor in the Department of Psychiatry at the University of Texas Southwestern Medical Center, Dr. George is the Distinguished University Professor in the Department of Psychiatry, Radiology, and Neurology, at the Medical University of South Carolina, and Dr. Johnson earned his Ph.D. from the Medical University of South Carolina and is currently a fellow at Stanford University. Drs. Kozel and George are "Scientific Advisors" for Cephos. All three researchers have submitted affidavits in support of the admissibility of fMRI-based lie detection. The court gives little weight to their affidavits, as the affidavits largely contain conclusory statements and the government did not have an opportunity to question them about their opinions. The court notes, however, that they state in their affidavits that the fMRI-based lie detection findings have been confirmed only in a "controlled laboratory setting," and none of them claim that the technology is ready for real-world application. In fact, in a peer reviewed article, published in 2008, these same three researchers wrote that "Functional MRI is currently not ready to be used in real-world lie detection." Kevin A. Johnson, Mark S. George & F. Andrew Kozel, Detecting Deception Using Functional Magnetic Resonance Imaging, 28 Directions in Psychiatry SR1, SR8 (2008) [hereinafter Johnson et al., Detecting Deception].

researchers, Dr. Laken and his colleagues determined that the regions of the brain that are most consistently activated by deception are the right orbitofrontal/inferior frontal, the right middle frontal, and the right anterior cingulate.¹¹ They also claimed that by analyzing the subjects' brain activity, they were able to identify correctly when the subjects were being deceptive with a high level of accuracy, with reported results ranging from 86% to 93% accuracy. They reported their findings in several peer reviewed articles, including F. Andrew Kozel et al., Functional MRI Detection of Deception After Committing a Mock Sabotage Crime, 54 J. Forensic Sci. 220 (2009) [hereinafter Kozel et al., Mock Sabotage Crime], Johnson et al., Detecting Deception, *supra*, and F. Andrew Kozel et al., Replication of Functional MRI Detection of Deception, 2 Open Forensic Sci. J. 6 (2009) [hereinafter Kozel et al., Replication].

2. Testing Conducted on Dr. Semrau

In an effort to support Dr. Semrau's defense that he did not act with the intent to defraud, sometime in or around December of 2009, Dr. Semrau's attorney, J. Houston Gordon, contacted Dr. Laken, to inquire about having a fMRI-based lie detection test

¹¹However, as Drs. Kozel, George, and Johnson have noted, other fMRI-based lie detection researchers have found other regions of the brain to have higher predictive value for deception. Johnson et al., Detecting Deception, *supra*, at SR-7.

conducted on Dr. Semrau. Dr. Laken agreed to test Dr. Semrau.¹² Dr. Laken decided to conduct two separate fMRI tests on Dr. Semrau, one test that would ask questions regarding the health care fraud charges and the other test that would ask questions regarding the AIMS tests charges.

Prior to the scheduled test date, Dr. Laken developed a set of twenty neutral questions and twenty control questions that would be asked during the scanning. The neutral questions included, for example, "Do you like to swim?", "Are you over age 18?", and "Do you like to watch TV?" Examples of the control questions included, "Do you ever gossip?", "Have you ever done something illegal?", and "Have you ever cheated on your taxes?"¹³

Mr. Gordon and Dr. Laken co-developed Specific Incident Questions ("SIQs"), that is, questions directly relating to the fraud and AIMS tests charges. The government was not notified that Dr. Semrau was going to take the deception test, and thus was not provided with an opportunity to submit its own questions to Dr. Laken to use during the test or to observe the testing procedures.

¹²Dr. Laken testified that his company agreed to cover all of the expenses associated with Dr. Semrau's test, including Dr. Laken's time and travel to Memphis to testify at the Daubert hearing and at trial. (5/13/10 Tr. at 122-25.) Dr. Laken acknowledged, however, that he and his company could stand to gain financially if courts decide to admit fMRI-based lie detection testimony.

¹³The neutral questions provided Dr. Laken with the "baseline" for the test. The control questions were designed to simply fill in empty spaces in the scan, and the responses were not considered during the deception analysis.

(5/13/10 Tr. at 128-29.) The SIQs for the first scan included the following:

- Did you ever instruct SLCS and FLCS' billing employees to bill psychiatrist's services, which had historically been billed by the corporations under CPT Code 90862, under CPT Code 99312?
- Did you ever tell the billing personnel of SLCS and FLCS that you had received instructions (or guidance) from Cigna Medicare's provider services representatives to bill CPT Code 99312?
- Did you ever receive varying instructions or guidance regarding which codes to bill, including being told that 99312 would be the appropriate code to use instead of 90862?
- Did the instructions you received concerning billing services under CPT Codes 99312 and 90862 vary from conversation to conversation you had with Cigna Medicare services representatives?
- Did you rely upon the instructions/guidance given by Cigna Medicare to change from billing CPT Code 90862 to 99312?
- Did you bill CPT Code 99312 to cheat or defraud Medicare?
- Did you bill CPT Code 99312 to cheat or defraud Medicaid/TennCare?
- Did you seek guidance by telephone from provider services representatives at Cigna as to which code was appropriate?
- Did you understand that 99312 was an appropriate code to bill for the psychiatrist's services after speaking with provider services representatives at Cigna?
- Did you cause SLCS and FLCS to stop billing 90862 and to start billing 99312 in order to defraud the government?
- Did you ever receive instructions or guidance

regarding which codes to bill, including being told that 99312 would not be the appropriate code to 90862?

- Were the instructions you received concerning billing for services under CPT Codes 99312 and 90862 always the same from conversation to conversation you had with Cigna Medicare services representatives?
- Did you rely on your own to change from billing CPT Code 90862 to 99312?
- Did you cause SLCS and FLCS to stop billing 90862 and to start billing 99312 because of instructions from Cigna?

(5/13/10 Hearing, Ex. 2.) The SIQs for the second scan included the following:

- Did you enter into a scheme to defraud the government by billing for AIMS tests conducted by psychiatrists under CPT Code 99301?
- Did you believe that AIMS tests performed by psychiatrists was a necessary service that could be separately billed?
- Did you call Cigna Medicare's provider services office in Nashville to inquire as to how to bill for AIMS tests performed by psychiatrists?
- Did you ever speak to Dr. Richard Light, the Tennessee Medicare Director for Cigna regarding billing for AIMS tests?
- Did you rely upon guidance from Dr. Richard Light as to the appropriate CPT Code to use in billing for AIMS tests performed by psychiatrists?
- Did you follow what Dr. Light told you in billing for the AIMS tests by psychiatrists under CPT Code 99301?
- Before the 2005 suspension notice, were you ever told that AIMS testing was not a reasonable and

necessary service, reimbursable under Medicare?

- Did SLCS and FLCS submit records of patients who had been given AIMS tests in 2001 and billed under 99301 among the thousands of records for review by Cigna in 2000 and 2001?
- Prior to the government's lawsuit and this indictment, were you told that the billing for AIMS testing by psychiatrists under CPT Code 99301 was inappropriate?
- Did you ever knowingly intend to defraud the government by billing for AIMS tests?
- Did you know that AIMS tests performed by psychiatrists was not a necessary service that could be separately billed?
- Did you not follow what Dr. Light told you in billing for the AIMS tests by psychiatrists under CPT Code 99301?
- Prior to the government's lawsuit and this indictment, were you told that the billing for AIMS testing by psychiatrists under CPT Code 99301 was appropriate?
- Before the 2005 suspension notice, were you ever told that AIMS testing was a reasonable and necessary service, reimbursable under Medicare?
- Did you continue to pay the psychiatrists because you believed that SLCS and FLCS were properly billing for services provided?

(Id.)

On December 30, 2009, Dr. Semrau traveled to Framingham, Massachusetts, to undergo the tests. Dr. Laken explained the fMRI testing procedure to Dr. Semrau and had him sign a consent form, provide a urine sample for drug screening, fill out an Annette Handedness questionnaire, and complete a MRI safety form. Dr.

Laken also interviewed Dr. Semrau to screen him for Axis I disorders. The results of the drug and Axis I disorders screening were negative. Based on those results, Dr. Laken determined that Dr. Semrau was a good candidate for fMRI.

In each fMRI scan, Dr. Semrau was visually instructed to "Lie" or to tell the "Truth" in response to each SIQ. He was told to respond truthfully to the neutral and control questions. Dr. Semrau practiced answering the questions on a computer prior to the scans. Dr. Laken observed Dr. Semrau practice until Dr. Laken believed that Dr. Semrau showed sufficient compliance with the instructions, responded to questions appropriately, and understood what he was to do in the scanner. Dr. Semrau then underwent two fMRI scans on December 30, 2009.

At about 6:00 a.m., Dr. Semrau was placed in the scanner and a display was positioned over Dr. Semrau's head that flashed the questions. The order of the questions was randomized and the response to each question was recorded. According to Dr. Laken, Dr. Semrau tolerated the first fMRI procedure well, but he expressed some fatigue after completing the first scan. After completing the second fMRI scan on December 30, Dr. Semrau stated that the questions were long and he had a difficult time reading the questions before responding. A radiologist reviewed the brain scans taken on December 30, and found that they did not show any obvious abnormalities.

On January 4, 2010, Dr. Laken reviewed the scans taken on December 30. Dr. Laken analyzed the scans using his fMRI testing protocol, found that Dr. Semrau answered an appropriate number of questions, responded correctly, and had no excess movement. Dr. Laken found no imaging artifacts. From the first scan, which included SIQs relating to defrauding the government, the results showed that Dr. Semrau was "not deceptive." However, from the second scan, which included SIQs relating to AIMS tests, the results showed that Dr. Semrau was "being deceptive." According to Dr. Laken, "testing indicates that a positive test result in a person purporting to tell the truth is accurate only 6% of the time."¹⁴ (5/13/10 Hearing, Ex. 2 at 6.) Dr. Laken also believed that the second scan may have been affected by Dr. Semrau's fatigue. Based on his findings on the second test, Dr. Laken suggested that Dr. Semrau be administered another fMRI test on the AIMS tests topic, but this time with shorter questions and

¹⁴According to Dr. Laken, this conclusion is supported by Kozel et al., Mock Sabotage Crime, supra, and, in particular, the fact that Dr. Semrau's score on the AIMS tests scan placed him at "6% Specificity." To challenge Dr. Laken on this point (as well as several other points), the government called Dr. Peter B. Imrey. Dr. Imrey earned his Ph.D. from the University of North Carolina at Chapel Hill in Biostatistics, and is currently Professor of Medicine at the Cleveland Clinic Lerner College of Medicine at Case Western Reserve University. Dr. Imrey testified that "[u]nder no circumstances does this number as reported by Dr. Laken and explained by Dr. Laken justify the claim that somebody giving a positive test result is unlikely to be a liar. Has a 6 percent chance of being a true liar. That simply is mathematically, statistically and scientifically incorrect." (5/13/10 Tr. at 424-25.)

conducted later in the day to reduce the effects of fatigue. The following revised SIQs were developed for the third scan:

- Did you enter into a scheme to defraud the government by billing for AIMS tests using 99301?
- Did you believe AIMS tests were necessary services when performed by psychiatrists?
- Did you believe separate billing for AIMS tests was required?
- Did you contact CIGNA's provider services office in Nashville on a regular basis?
- Did you call CIGNA's Nashville office to ask how to bill for AIMS tests?
- Did you speak to Dr. Richard Light regarding billing for AIMS tests?
- Were you told AIMS testing was not a reasonable and necessary service before the 2005 suspension notice?
- Did you rely on Dr. Light's guidance for appropriate CPT Codes for billing AIMS tests performed by psychiatrists?
- Did you rely on the 99301 advice from Dr. Light for billing?
- Did SLCS submit 2001 AIMS testing records billed as 99301 for review by CIGNA?
- Did FLCS submit 2001 AIMS testing records billed as 99301 for review by CIGNA?
- Were you told that billing AIMS testing at 99301 was inappropriate before this indictment and lawsuit?
- Did you ever knowingly intend to defraud the government by billing AIMS tests?
- Did you know AIMS testing could not be separately billed?

- Did you disregard Dr. Light's advice regarding AIMS tests performed by psychiatrists?
- Were you ever told it was appropriate to use 99301 for AIMS tests billing before this indictment and lawsuit?
- Did you pay the psychiatrists after the accounts were frozen because you believed SLCS and FLCS properly billed services?
- Did you ignore Dr. Light's advice on billing 99301 for AIMS tests?
- Did you bill 99301 for AIMS tests prior to talking to Dr. Light?
- Were you ever told AIMS testing was reasonable and necessary before the 2005 suspension notice?

(Id.)

The third scan was conducted on January 12, 2010 at around 7:00 p.m., and according to Dr. Laken, Dr. Semrau tolerated it well and did not express any fatigue. Dr. Laken reviewed this data on January 18, 2010, and concluded that Dr. Semrau was not deceptive. He further stated that based on his prior studies, "a finding such as this is 100% accurate in determining truthfulness from a truthful person." (Id. at 7.)

In conclusion, Dr. Laken found that "Dr. Semrau's brain indicates he is telling the truth in regards to not cheating or defrauding the government" and that his "brain indicates he is telling the truth in that he correctly provided AIMS tests as was

instructed."¹⁵ (Id.) At the Daubert hearing, the prosecutor questioned Dr. Laken on his conclusions:

Q. Now, you said - you mentioned something in your direct testimony that when you do a scan such as this and you ask the questions to the person in the scanner, that you said that you cannot tell whether or not Dr. Semrau is telling the truth as to any specific incident question. Do you understand that? Do I have that right?

A. Yeah. You're exactly right.

Q. But that you said it's more of an overall -

A. That's correct.

Q. - picture or whatever that you can say, well, generally, he was telling the truth to those specific incident questions.

A. That's correct.

Q. So it's possible that on some of the specific incident questions that he was not telling the truth?

A. It certainly is possible. Yes.

Q. . . . Can you say, well, he got 50 percent of them right, and the other 50 percent he lied?

A. So the problem in science, and I'll give you a story, and I guess, Judge, you can figure out what to do with it. But I mean, we had a person that came to me, and they were tested. It was a couple. And she made up a bunch of questions, and he was lying about one of those questions. They were similar like this. They were on 20 questions. He

¹⁵At the hearing, Dr. Laken emphasized that he was not offering an opinion about what Dr. Semrau's mental state was at the time that he allegedly committed the crime or whether Dr. Semrau possessed the requisite *mens rea*. Instead, Dr. Laken states that he can only testify that, in his opinion, Dr. Semrau answered the questions truthfully "overall."

lied on one question, and it showed that he was deceptive. When she confronted him, then he said, well, this is the question I lied on. Now, was he lying on more than one question? I don't know. Maybe he was. But an anecdotal story in a real world situation, one person is lying. We said that they were lying. He is confronted. He admits to something. So what does that tell you? I don't know. But in that situation if he was lying on one, maybe it ends up being that he shows that he was being deceptive on all of them.

Q. All right. So in looking at the specific incident questions that Dr. Semrau was asked on scan number one, and I'm just reading from page 8 of your report, did you ever instruct SLCS FLCS billing employees to bill psychiatry services which had historically been billed by the corporation under CPT code 90862 under CPT code 99312, was he telling the truth when he answered that question?

A. I don't know.

Q. Let me go to the second question. Did you ever tell the billing personnel of SLCS and FLCS that you had received instructions or guidance from Cigna Medicare provider services representatives to bill CPT code 99312? Was he telling the truth on that question?

A. Again, I don't know.

Q. Okay. Just to save time, if I ask you the same question for all of those specific incident questions that were performed in scan one, could you tell me whether or not he was telling the truth as to any of those particular questions?

A. No.

Q. But your opinion was as to scan one he passed?

A. Correct.

. . . .

Q. And, again, I won't waste the Court's time, but if I read every specific incident question in scan

number two and asked you could you tell me whether or not Dr. Semrau was telling the truth to any of those questions, what would you say?

A. I would say I don't know.

(5/13/10 Tr. at 137-41.)

II. PROPOSED CONCLUSIONS OF LAW

A. Rule 702 and *Daubert*

Federal Rule of Evidence 702 provides as follows:

If scientific, technical, or other specialized knowledge will assist the trier of fact to understand the evidence or to determine a fact in issue, a witness qualified as an expert by knowledge, skill, experience, training, or education, may testify thereto in the form of an opinion or otherwise, if (1) the testimony is based upon sufficient facts or data, (2) the testimony is the product of reliable principles and methods, and (3) the witness has applied the principles and methods reliably to the facts of the case.

Fed. R. Evid. 702. In Daubert v. Merrell Dow Pharmaceuticals, Inc., 509 U.S. 579 (1993), the Supreme Court held that the Federal Rules of Evidence superseded the "general acceptance" test of Frye v. United States, 293 F. 1013 (D.C. Cir. 1923), and that trial courts were required to make an initial determination of whether the reasoning or methodology underlying the testimony is scientifically valid and whether that reasoning or methodology can be applied to the facts in issue. Daubert, 509 U.S. at 592-93.

The court's gate-keeping role is two-fold. First, the court must determine whether the testimony is reliable. Id. at 590; see also Greenwell v. Boatwright, 184 F.3d 492, 495-96 (6th Cir. 1999); United States v. Bonds, 12 F.3d 540, 555-56 (6th Cir. 1993). The

reliability analysis focuses on whether the reasoning or methodology underlying the testimony is scientifically valid. Daubert, 509 U.S. at 590. The expert's testimony must be grounded in the methods and procedures of science and must be more than unsupported speculation or subjective belief. Id. Courts are not to be concerned with the reliability of the conclusions generated. If the methodology, principles, and reasoning are scientifically valid, then it follows that the inferences, assertions, and conclusions derived therefrom are scientifically valid as well. Greenwell, 184 F.3d at 496.

To aid the trial court in its determination of whether an expert's testimony is reliable, the Supreme Court in Daubert suggested several non-exclusive factors to consider: (1) whether the theory or technique can be tested and has been tested; (2) whether the theory or technique has been subjected to peer review and publication; (3) the known or potential rate of error of the method used and the existence and maintenance of standards controlling the technique's operation; and (4) whether the theory or method has been generally accepted by the scientific community. Daubert, 509 U.S. at 593-94; see also First Tenn. Bank Nat'l Ass'n v. Barreto, 268 F.3d 319, 334 (6th Cir. 2001). In addition, the court may consider "whether the experts are proposing to testify about matters growing naturally and directly out of research they have conducted independent of the litigation, or whether they have

developed their opinions expressly for purposes of testifying" because the former "provides important, objective proof that the research comports with the dictates of good science." Smelser v. Norfolk S. Ry., 105 F.3d 299, 303 (6th Cir. 1997).

The Supreme Court has emphasized that, in assessing the reliability of expert testimony, whether scientific or otherwise, the trial court may consider one or more of the Daubert factors when doing so will help determine that expert's reliability. Kumho Tire Co. v. Carmichael, 526 U.S. 137, 147, 150 (1999). The test of reliability is a "flexible" one, and the Daubert factors do not constitute a "definitive checklist or test," but must be tailored to the facts of the particular case. Id. (quoting Daubert, 509 U.S. at 593); see also Ellis v. Gallatin Steel Co., 390 F.3d 461, 470 (6th Cir. 2004). The particular factors will depend upon the unique circumstances of the expert testimony at issue. Kumho Tire, 526 U.S. at 151-52.

The second prong of the gate-keeping role requires an analysis of whether the expert's reasoning or methodology can be properly applied to the facts at issue, that is, whether the opinion is relevant. See Daubert, 509 U.S. at 591-93. This relevance requirement ensures that there is a "fit" between the testimony and the issue to be resolved by the trial. Bonds, 12 F.3d at 555. Thus, an expert's testimony is admissible under Rule 702 if it is predicated upon a reliable foundation and is relevant.

The rejection of expert testimony, however, is the exception rather than the rule, and "the trial court's role as gatekeeper is not intended to serve as a replacement for the adversary system." Fed. R. Evid. 702 advisory committee's note (amended 2000) (quoting United States v. 14.38 Acres of Land, 80 F.3d 1074, 1078 (5th Cir. 1996)). "Vigorous cross-examination, presentation of contrary evidence, and careful instruction on the burden of proof are the traditional and appropriate means of attacking shaky but admissible evidence." Daubert, 509 U.S. at 596.

Finally, the proponent of the evidence has the burden of establishing that all of the pertinent admissibility requirements are met by a preponderance of the evidence. See Fed. R. Evid. 104(a); see also Bourjaily v. United States, 483 U.S. 171, 175-76 (1987); Smelser, 105 F.3d at 303; W. Tenn. Chapter of Associated Builders & Contractors, Inc. v. City of Memphis, 300 F. Supp. 2d 600, 602-03 (W.D. Tenn. 2004).

B. Motion to Exclude Under Rule 702

The court's Rule 702 analysis begins with a determination of whether the witness is qualified by "knowledge, skill, experience, training, or education" to offer his or her opinion. This requirement has been treated liberally by the courts. See In re Paoli R.R. Yard PCB Litig., 916 F.2d 829, 855 (3d Cir. 1990). Over the past several years, Dr. Laken has personally conducted research in the field of fMRI-based lie detection (including laboratory

studies), is the inventor of the Cephos patent, has written articles in peer reviewed scientific journals on the subject, and regularly conducts fMRI-based lie detection tests on individuals through his company. The government did not challenge Dr. Laken's qualifications as an expert in its briefs or at the Daubert hearing. Thus, the court finds that Dr. Laken is preliminarily and generally qualified by his knowledge, skill, experience, training, and education to offer an opinion on fMRI-based lie detection in this case.

Although Dr. Laken is qualified to offer an opinion, the court nevertheless concludes that his testimony should be excluded because, at least at this early stage in its development, fMRI-based lie detection does not satisfy the requirements of Rule 702.

1. Testing and Peer Review

The first two Daubert factors are whether the theory or technique can be and has been tested and whether it has been subjected to peer review and publication. 509 U.S. at 593; see also Bonds, 12 F.3d at 540 n.17 (noting that the first two Daubert factors "go hand in hand"). The court finds that the underlying theories behind fMRI-based lie detection are capable of being tested, and at least in the laboratory setting, have been subjected to some level of testing. It also appears that the theories have been subjected to some peer review and publication, particularly within the last five years, as evidenced by the articles co-

authored by Dr. Laken, (see 5/13/10 Hearing, Ex. 1 at 1-3 (listing articles co-authored by Dr. Laken on fMRI-based lie detection)), and the numerous peer reviewed articles by other researchers (see Notice of Filing Supplemental Materials and Authority in Support of Def.'s Opp'n and Mem. in Supp. of Opp'n to United States' Mot. in Limine to Exclude, D.E. 200 (attaching peer reviewed articles); Notice of Filing Supplemental Peer Reviewed Articles, Published Articles, and Scientific Presentations, D.E. 207 (citing recent articles)).¹⁶

2. The Known or Potential Rate of Error and the Existence and Maintenance of Standards

The next Daubert factor is the known or potential rate of error and the existence and maintenance of standards controlling

¹⁶The first peer reviewed article that described studies with fMRI-based lie detection was published only as recently as 2001. Between 2001 and 2008, only thirteen fMRI-based lie detection studies were conducted and reported. See Greely & Illes, supra, at 394-402 (discussing fMRI-based lie detection articles); Johnson et al., Detecting Deception, supra, at SR-4 (listing thirteen fMRI-based lie detection studies). Of the thirteen studies, the sample sizes ranged between a low of five subjects to a high of only thirty-one subjects, and "[a]ll of the studies . . . involved simple laboratory experiments with a relatively small number of subjects." Johnson et al., Detecting Deception, supra, at SR-4. Only three of the studies attempted to assess differences in truthful and deceptive responses within an individual; the other studies looked only at averaged group data, which is of limited value as compared to studies of individuals. Greely & Illes, supra, at 402 ("Information that, on average, a group of twelve people showed significant activation in a particular region does not tell us how many of the individual subjects showed activation in that region. It could have been all, many, or only a few."). However, since 2008, several additional studies have been published on this subject.

the technique's operation. 509 U.S. at 594. Dr. Laken testified at the Daubert hearing that there are published known error rates. On the other hand, Dr. Imrey disputes the validity of the error rates because they are based on too small of a sample size. While it is unclear from the testimony what the error rates are or how valid they may be in the laboratory setting, there are no known error rates for fMRI-based lie detection outside the laboratory setting, i.e. in the "real-world" or "real-life" setting. See United States v. Baines, 573 F.3d 979, 990-91 (10th Cir. 2009) (although real world error rates were not known, the court found that fingerprint analysis reported error rate of one in 11 million met Daubert standard); United States v. Crisp, 324 F.3d 261, 280 (4th Cir. 2003) (finding government did not satisfy third Daubert factor partly because handwriting expert studies that more accurately reflect real world conditions showed higher error rates); United States v. Cordoba, 194 F.3d 1053, 1059-60 (9th Cir. 1999) (no error in district court's finding that "the error rate of real-life polygraph tests is not known and is not particularly capable of analyzing"); United States v. Ramirez, No. H-93-252, 1995 WL 918083, at *2 (S.D. Tex. Nov. 17, 1995) (stating that while error rate for polygraph in the laboratory setting has been shown to be "very low," the error rate in real life situations is not known to a reasonable degree of scientific certainty). In Cordoba, the court upheld the district court's rejection of the error rate

testified to by the polygraph expert because the results of the tests were not transferable to real-life exams:

The district court found, based on the testimony of Cordoba's expert witness, Dr. Raskin, that studies indicate that a properly conducted, high quality [polygraph] examination can have a 5-10% error rate. . . . The district court determined, however, that the results of these tests were not transferrable to real-life exams. Due to the number of variables which can impact the reliability of a particular exam including variations in the particular polygraph examiner's skills, the subjectiveness of the examiner, the susceptibility of the subject to control the results of the exam by employing countermeasures, and the setting of the exam, the district court found that "the error rate of real-life polygraph tests is not known and is not particularly capable of analyzing."

194 F.3d at 1059. Here, like in Cordoba, the error rate of real-life fMRI-based lie detection is unknown. In Mock Sabotage Crime, Drs. Laken, Kozel, George, and Johnson, among others, discuss the factors that could affect the test results:

This study has several factors that must be considered for adequate interpretation of the results. Although this study attempted to approximate a scenario that was closer to a real-world situation than prior fMRI detection studies, it still did not equal the level of jeopardy that exists in real-world testing. The reality of a research setting involves balancing ethical concerns, the need to know accurately the participant's truth and deception, and producing realistic scenarios that have adequate jeopardy. In addition, this study only involved healthy adults who were not taking any medications. Thus, whether fMRI deception testing would work is *unknown* for participants who are taking a medication, who have a significant psychiatric or medical condition, or who are outside the 18-50 year age range. Future studies will need to be performed involving these populations.

(D.E. 200-44 at 9 (emphasis added).)¹⁷ Similar concerns are echoed by Drs. Kozel, George, and Johnson, in Detecting Deception:

In addition to the challenges of developing appropriate test questioning paradigms, there are numerous other obstacles that must be overcome. Probably one of the most difficult is developing experimental protocols that can be generalized to real-world situations. . . . [A]ll of the studies to date have involved simple laboratory experiments with a relatively small number of subjects. While most studies have sample sizes that are appropriate for cognitive imaging studies, only one study has more than 30 subjects. Additionally, subjects are selectively screened, and often restricted by age, gender, and handedness, which reduces the ability to generalize the results. **Furthermore, different types of lies may produce different brain patterns. For instance, differences have been reported in false confessions versus false denials,** spontaneous isolated lies versus memorized coherent scenario lies, and autobiographical versus non-autobiographical deception. Thus, one may need to develop different protocols for different applications (e.g. employment screenings versus testing for involvement in a specific crime).

Three other issues that have yet to be addressed in the literature are time, motivation, and independence of deception behavior from investigator control. In terms of time, the deceptive event occurs shortly before scanning in most studies, while this likely will not be the case in many real life applications. Many studies entail little motivation or jeopardy at all, while the motivation (e.g. \$50 for successful deception) or jeopardy (revealing personal autobiographical information) in other studies is not equivalent to what would be at stake in real applications. Because of ethical concerns, there are limits to the scenarios in which research subjects can participate. Current study questions range in valance from having deceptive responses regarding mundane daily events to the staged

¹⁷Dr. Semrau was 63 years old at the time he underwent testing by Dr. Laken. When asked by the government, "So the application of your technology to somebody who is 63 years old is unknown?", Dr. Laken responded "Is unknown. That's correct." (5/13/10 Tr. at 190.)

firing of a gun. **Finally, and importantly, deceptive behavior is controlled in the laboratory setting. In all studies to date, the research team directs participants to deceive about a certain condition or choice of conditions.** Despite creative designs, the behavior may resemble compliance with a cognitive task more than independent, volitional deception. Ultimately, validity using real cases where truth versus deception can be independently confirmed via other methods would be ideal. However, obtaining reasonable sample sizes and other logistics may hamper efficiency of such field testing.

Johnson et al., supra, at SR-5 to SR-6 (internal footnotes omitted) (emphasis in original). The authors conclude by stating "Functional MRI is currently not ready to be used in real-world lie detection." Id. at SR-8; see also Greely & Illes, supra, at 402 ("At least six different issues raise concern about [the accuracy levels claimed]: the small number of studies with individual effects, the lack of replication, the small and nondiverse groups of subjects, the inconsistency of reported regions of activity [in the brain], the artificiality of the deceptive task, and the lack of attempted countermeasures."); Kozel et al., Replication, supra, at 10 ("[F]urther work needs to address how robust these findings might be with different testing scenarios and populations. . . . Testing when there is greater risk (e.g. prison, large financial loss, etc.) or in people with illnesses taking medications may result in a different outcome. . . . Different analysis strategies and testing formats will require independent evaluation and

replication.").¹⁸

Regarding the existence and maintenance of standards, Dr. Laken testified as to the protocols and controlling standards that he uses for his own exams. Because the use of fMRI-based lie detection is still in its early stages of development, standards controlling the real-life application have not yet been established. See Johnson et al., Detecting Deception, *supra*, at SR-5 to SR-6. Without such standards, a court cannot adequately evaluate the reliability of a particular lie detection examination. Cordoba, 194 F.3d at 1061. Assuming, *arguendo*, that the standards testified to by Dr. Laken could satisfy Daubert, it appears that Dr. Laken violated his own protocols when he re-scanned Dr. Semrau on the AIMS tests SIQs, after Dr. Semrau was found "deceptive" on

¹⁸Dr. Laken testified that it would be difficult to conduct fMRI-based lie detection studies in the real world setting and thus obtaining error rates outside the laboratory setting would be similarly difficult. While it may be difficult to address the concerns raised in researchers' articles regarding testing subjects who are facing the prospect of going to prison, additional studies can surely be conducted to address the other concerns raised in the peer reviewed articles and by this court. Moreover, the court notes that potential or known error rates is but one factor under the Daubert analysis and that in the future, should fMRI-based lie detection undergo further testing, development, and peer review, improve upon standards controlling the technique's operation, and gain acceptance by the scientific community for use in the real world, this methodology may be found to be admissible even if the error rate is not able to be quantified in a real world setting. Bonds, 12 F. 3d at 560 ("Although we find that on the basis of the record before us the rate of error is a negative factor in the analysis of whether the FBI's procedures are scientifically valid, the error rate is only one in a list of nonexclusive factors that the Daubert Court observed would bear on the admissibility question.").

the first AIMS tests scan. None of the studies cited by Dr. Laken involved the subject taking a second exam after being found to have been deceptive on the first exam. His decision to conduct a third test begs the question whether a fourth scan would have revealed Dr. Semrau to be deceptive again.

The absence of real-life error rates and the lack of controlling standards in the industry for real-life exams are negative factors in the analysis of whether fMRI-based lie detection is scientifically valid. See Bonds, 12 F.3d at 560.

3. Whether the Theory or Method Has Been Generally Accepted by the Scientific Community

The court next considers whether the theory or method has been generally accepted by the scientific community. “Widespread acceptance can be an important factor in ruling particular evidence admissible, and a known technique that has been able to attract only minimal support within the community may properly be viewed with skepticism.” Bonds, 12 F.3d at 560 (quoting Daubert, 509 U.S. at 594) (internal citation omitted). No doubt in part because of its recent development, fMRI-based lie detection has not yet been accepted by the scientific community. As noted above, experts in the field are of the opinion that fMRI “is currently not ready to be used in real-world lie detection.” Johnson et al., Detecting Deception, supra, at SR-8; see also Ingfei Chen, The Court Will Now Call It’s Expert Witness: The Brain, Stanford Lawyer 19 (Fall 2009) (finding that “they haven’t convinced the broader neuroscience

community that the fMRI method is good enough yet to use in the real world, with all of its variegated deceptions of complicated half truths and rehearsed false alibis. Experimental test conditions are a far cry from the highly emotional, stressful scenario of being accused of a crime for which you could be sent to prison."); Nancy Kanwisher, The Use of fMRI in Lie Detection: What Has Been Shown and What Has Not (D.E. 168, Ex. 4 at 12) (finding that "[b]ecause the published results are based on paradigms that share none of the properties of real world lie detection, those data offer no compelling evidence that fMRI will work for lie detection in the real world. No published evidence shows lie detection with fMRI under anything even remotely resembling a real world situation."); Joseph R. Simpson, Functional MRI Lie Detection: Too Good to be True?, (D.E. 168, Ex. 2 at 5) (finding "how well fMRI lie detection would work in real life situations remains an open question").

In sum, the above-described application of the Daubert factors leads the court to conclude that Dr. Laken's testimony is inadmissible under Fed. R. Evid. 702.¹⁹ On that basis, the court recommends that the motion be granted.

C. Motion to Exclude Under Rule 403

In addition to asking the court to exclude Dr. Laken's

¹⁹In light of the above finding that the proposed testimony is not reliable, the court need not address the relevancy prong.

testimony under Fed. R. Evid. 702 and Daubert, the government also moves to exclude his testimony under Fed. R. Evid. 403. The government contends that the probative value of Dr. Laken's testimony is substantially outweighed by the danger of unfair prejudice to the government. The court agrees.

Rule 403 provides the court with a basis for excluding evidence independent of Daubert. United States v. Sherlin, 67 F.3d 1208, 1217 (6th Cir. 1995); see also United States v. Ramirez-Robles, 386 F.3d 1234, 1246 (9th Cir. 2004) (finding that "Rule 403 and Daubert address different aspects of evidence and therefore act independently"). Under Rule 403, if the unfair prejudice substantially outweighs the probative value of the evidence, the evidence is inadmissible. United States v. Thomas, 167 F.3d 299, 308-09 (6th Cir. 1999). While the Sixth Circuit Court of Appeals has not addressed fMRI-based lie detection specifically, courts in this circuit have consistently found that the high risk of unfair prejudice associated with the admission of testimony regarding unilaterally obtained polygraph results will preclude such testimony from being admissible. See id.

In Sherlin, the defendant sought to admit polygraph results purportedly showing that he was truthful when he denied committing arson and that he did not lie to the grand jury. The polygraph examination was unilaterally obtained by the defendant, without the knowledge or acquiescence of the government. The Court of Appeals

found no error in the district court's exclusion of the polygraph results. It held that the unilaterally obtained polygraph test, in the absence of any prior stipulation that the results would be admissible, was of substantially less probative value because the defendant risked nothing by taking the lie detector test, the results of which (if he failed) would never have been released. Sherlin, 67 F.3d at 1216-17.

In addition, the court found that any probative value of the results was substantially outweighed by the danger of unfair prejudice. The defendant's credibility was the predominant issue in the case, and "the use of a polygraph solely to bolster a witness' credibility is 'highly prejudicial,' especially where credibility issues are central to the verdict." Id. at 1217 (citation omitted); see also Barnier v. Szentmikloski, 810 F.2d 594, 597 (6th Cir. 1987) ("[E]vidence of a lie detector test . . . [to] bolster[] [a party's] credibility was highly prejudicial . . . since the entire case hinged on whether the jury believed [that party.]"); United States v. Marlinga, No. 04-80372, 2005 WL 1459138, at *4 (E.D. Mich. Apr. 12, 2005) (citing Sherlin). Thus, under a Rule 403 analysis, the polygraph results were deemed inadmissible. Sherlin, 67 F.3d at 1217.

In Thomas, the Court of Appeals again addressed the admissibility of polygraph results under Rule 403. 167 F.3d 299. The court affirmed the trial court's denial of the defendant's

motion for an evidentiary hearing regarding the results of his privately commissioned polygraph test. Id. at 307-08. The results of the examination supposedly validated the defendant's claim that he was not involved in the receipt and possession of a 1,000 pound shipment of marijuana. As in Sherlin, the government was not aware of the examination until after its completion and had no opportunity to approve of or submit questions to the examiner. The court concluded that, because the defendant's family independently hired the examiner to conduct the polygraph examination without knowledge or approval by the government, the results were inadmissible under Rule 403. The court questioned the dubious value of unilaterally obtained lie detection tests:

[N]ot only was it within the district court's discretion to refuse to hold an evidentiary hearing on the examination, *but admitting the polygraph results would have been subject to reversal by this court.* It cannot be doubted that the prejudicial effect of [the defendant's] polygraph results would have substantially outweighed its probative value, because [the defendant] had no adverse interest at stake in taking the test.

Id. at 308-09 (emphasis added); see also United States v. Ross, 412 F.3d 771, 773-74 (7th Cir. 2005) (citing Thomas and Sherlin and stating that "courts have routinely rejected unilateral and clandestine polygraph examinations like the one taken here, citing concern that a test taken without the government's knowledge is unreliable because it carries no negative consequences, and probably won't see the light of day if a defendant flunks"); Barnier, 810 F.2d at 597 (finding that district court should not

have admitted polygraph evidence under Rule 403 because probative value of polygraph was doubtful where test was obtained at advice of party's own counsel and without knowledge of opposing party); United States v. Rozin, No. 1:05-cr-139, 2007 WL 2155850, at *3 (S.D. Ohio July 24, 2007) (finding that "[g]iven the [unilateral nature] of the [polygraph] exam . . . the results [were] so unreliable that their probative value would not outweigh the potential for prejudice"); Marlinga, 2005 WL 1459138, at *3 (applying Sherlin and Thomas in holding unilaterally obtained polygraph test inadmissible under Rule 403); United States v. Wright, 22 F. Supp. 2d 751, 753-54 (W.D. Tenn. 1998) ("Where there are no safeguards to insure the reliability of a polygraph . . . the probative value . . . is minimal and will be outweighed by the prejudicial effect . . .").²⁰

In this case, the court is confronted with similar issues as in Sherlin and Thomas. Although those cases involved the admissibility of polygraph results, rather than fMRI-based lie detection results, the concerns expressed in Sherlin and Thomas regarding the risk of prejudice in unilaterally obtained examinations is the same regardless of the technology employed.

²⁰In addition, the court in Thomas observed that over three years had passed since the time of the criminal act and when the polygraph exam was administered, thus making the reliability of the test "all the more dubious." 167 F.3d at 309. In the instant case, Dr. Semrau was tested six to eight years after the alleged criminal conduct.

Here, Dr. Semrau seeks to admit expert testimony as to the results of a unilaterally obtained lie detection examination. The examination was conducted without the government's knowledge and without an opportunity for the government to formulate, submit, or approve the questions asked of Dr. Semrau during the examination. Dr. Semrau risked nothing in having the testing performed, and Dr. Laken himself testified that had the results not been favorable to Dr. Semrau, they would have never been released. Like in Sherlin and Thomas, Dr. Semrau seeks to admit the results of the fMRI scans for the sole purpose of bolstering his credibility before the jury on issues that are central to this case.²¹

Exclusion under Rule 403 is particularly appropriate in this case because, as Dr. Laken testified, although he believes that Dr. Semrau's responses to the SIQs were truthful "overall," he cannot offer any opinion as to whether Dr. Semrau was deceptive or truthful as to any specific SIQ. Based on his inability to identify which SIQs Dr. Semrau answered truthfully or deceptively, the court fails to see how his testimony can assist the jury in deciding whether Dr. Semrau's testimony is credible.

Therefore, the danger of unfair prejudice associated with

²¹In addition, admitting Dr. Laken's testimony would raise the same concerns expressed by the four-Justice plurality in United States v. Scheffer, 523 U.S. 303 (1998): "diminishing the jury's role in making credibility determinations" and collateral litigation over the lie detection evidence that "threatens to distract the jury from its central function of determining guilt or innocence." Id. at 313-14.

admitting Dr. Laken's fMRI-based lie detection opinions substantially outweighs any probative value attributable to them. The court recommends that the Motion to Exclude be granted under Rule 403.

III. RECOMMENDATION

For the reasons above, the court recommends that the government's Motion to Exclude be granted.

Respectfully submitted,

s/ Tu M. Pham
TU M. PHAM
United States Magistrate Judge

June 1, 2010
Date

NOTICE

ANY OBJECTIONS OR EXCEPTIONS TO THIS REPORT MUST BE FILED WITHIN FOURTEEN (14) DAYS AFTER BEING SERVED WITH A COPY OF THE REPORT. 28 U.S.C. § 636(b)(1)(C). FAILURE TO FILE THEM WITHIN FOURTEEN (14) DAYS MAY CONSTITUTE A WAIVER OF OBJECTIONS, EXCEPTIONS, AND ANY FURTHER APPEAL.