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File Name: 12a0312p.06

# UNITED STATES COURT OF APPEALS

FOR THE SIXTH CIRCUIT

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| UNITED STATES OF AMERICA, *Plaintiff-Appellee,* | ] | |
| | ] | No. 11-5396 |
| *v.* | ] | |
| LORNE ALLAN SEMRAU, *Defendant-Appellant.* | ] | |

Appeal from the United States District Court
for the Western District of Tennessee at Jackson.
No. 1:07-cr-10074-1—Jon Phipps McCalla, Chief District Judge.

Argued: April 12, 2012

Decided and Filed: September 7, 2012

Before: WHITE, STRANCH, and FARRIS, Circuit Judges.[*]

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## COUNSEL

**ARGUED:** J. Houston Gordon, LAW OFFICES OF J. HOUSTON GORDON, Covington, Tennessee, for Appellant. Stuart J. Canale, UNITED STATES ATTORNEY'S OFFICE, Memphis, Tennessee, for Appellee. **ON BRIEF:** J. Houston Gordon, LAW OFFICES OF J. HOUSTON GORDON, Covington, Tennessee, for Appellant. Stuart J. Canale, UNITED STATES ATTORNEY'S OFFICE, Memphis, Tennessee, for Appellee.

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## OPINION

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JANE B. STRANCH, Circuit Judge. Dr. Lorne Semrau appeals his conviction of three counts of healthcare fraud in violation of 18 U.S.C. § 1347. Among other issues, Dr. Semrau argues—on a matter of first impression in any jurisdiction—that

[*]The Honorable Jerome Farris, Circuit Judge for the United States Court of Appeals for the Ninth Circuit, sitting by designation.

results from a functional magnetic resonance imaging ("fMRI") lie detection test should have been admitted to prove the veracity of his denials of wrongdoing. For the following reasons, Dr. Semrau's conviction is **AFFIRMED**.

## I. BACKGROUND

Dr. Semrau, who holds a Ph.D. in clinical psychology, was president, owner, and CEO of two companies that provided follow-up psychiatric care to nursing home patients in Tennessee and Mississippi. These companies, Superior Life Care Services, Inc. and Foundation Life Care Services, LLC, offered services through contracting psychiatrists who submitted records describing their work to the companies. At Dr. Semrau's direction, Superior and Foundation billed these services to Medicare and/or Medicaid through private health insurance carriers CIGNA in Tennessee and CAHABA in Mississippi.

In order to facilitate processing of the millions of healthcare claims submitted each year, rendered services are categorized into various five-digit Current Procedural Terminology ("CPT") codes, which are compiled and published by the American Medical Association ("AMA"). The Centers for Medicare and Medicaid Services ("CMS") assigns fee schedules setting reimbursement levels for each code as well as "relative value units" corresponding to the amount of work that is typically required for each service. The fee schedules are submitted by CMS to carriers so that they may reimburse providers the appropriate amount depending on which CPT code is submitted. A CAHABA employee testified for the government that insurance companies rely on the honesty and integrity of providers to submit accurate claims because the vast majority are processed automatically without any review.

Submission of Medicare claims through a carrier requires providers to submit a "1500 Form" that includes information regarding the patient, the provider, and the services rendered, including the CPT code. The 1500 Form includes a notice stating: "Anyone who misrepresents or falsifies essential information to receive payment from

federal funds requested by this form may upon conviction be subject to fine and imprisonment under applicable federal laws."

One of the psychiatrists with whom Dr. Semrau's companies contracted was Dr. Roy Barnes. At trial, Dr. Barnes testified that his standard procedure of care was to (1) review past medical history, (2) obtain an update on mental and emotional status, (3) observe and evaluate, and (4) make a treatment recommendation. He normally spent six to eight minutes with a patient "unless they had some extra problem," in which case he would spend up to twenty minutes. Throughout the relevant time period, Dr. Barnes indicated that his services corresponded to CPT code 90862 by circling "62" on the log sheets created by and submitted to Dr. Semrau's companies.

According to a CIGNA provider manual, CPT code 90862 is intended for use by physicians who are prescribing or managing pharmacological therapy: "The service includes prescribing, monitoring the effect of the medication and adjusting the dosage. Any psychotherapy provided is minimal, usually supportive only. The physician work component . . . is equivalent to 25 to 30 minutes." From at least 1999 through 2001, Superior billed 90862 only for the type of evaluations described by Dr. Barnes for each of its contracting psychiatrists. During that time, Medicare paid about $37 per 90862 claim in Mississippi, and $24 per claim in Tennessee.

In late 2002, CIGNA began an audit of Superior's billing practices in Tennessee and concluded that Superior had been billing at a higher rate than could be justified by the services actually performed, a practice known as "upcoding." In a letter to Superior dated January 23, 2003, CIGNA detailed its conclusion that Superior had overbilled fourteen of the eighteen claims reviewed at 90862 when it should have instead billed at 99311, which had a lower reimbursement amount. Code 90862 is for "psychiatric" treatments whereas 99311 is for "evaluation and management" services and generally describes a "basic follow-up nursing home visit" for a stable patient lasting about fifteen minutes.

CIGNA demanded reimbursement of the overpayment upon finding Superior to be "not 'without fault' in causing the over-payments because articles were published . . .

that explained the requirements for Medicare coverage and the documentation needed to support services billed." The letter cited a CIGNA produced "Medicare Bulletin" from July/August 2001that explained that 90862 "is not intended to refer to a brief evaluation of the patient's state or simple dosage adjustment of long term medication." In February 2002, Superior added a "311" code to its Tennessee log sheets and soon began billing under 99311 for its patient evaluations in that state. However, claims in Mississippi—which were not subject to the CIGNA audit—continued to be billed at the higher code 90862 even though the services were identical.

In January 2003, Superior began billing a new, higher code in Tennessee: 99312. The Tennessee log sheets were updated in March 2003 to replace the "311" code with "312." Code 99312 was defined as follows in the AMA's CPT code book:

> Subsequent nursing facility care per day for the evaluation and management of a new or established patient which requires at least two of these three key components: An expanded problem focused interval history, an expanded problem focused examination, and medical decision-making of a moderate complexity.
>
> Counseling and/or coordination of care with other providers or agencies are provided consistent with the nature of the problems and the patient's and/or family's needs. Usually, the patient is responding inadequately to therapy or has developed a minor complication. Physicians typically spend 25 minutes at the bedside [and] on the patient's facility floor or unit.

On July 1, 2003, Medicare reduced its Mississippi payment for code 90862 from $37 per claim to $23 per claim. Twenty days later, Superior began billing the higher code 99312 for the first time for its Mississippi claims. Because 99312 paid $45 per claim in Mississippi, Superior's change to this code resulted in an increased payment of $8 per claim from the previous 90862 rate instead of a reduced payment of $14 per claim at the new 90862 rate, for a net gain of $22 per claim. Although the Mississippi log sheets were revised shortly thereafter to include "312," Drs. Barnes and Thomas Walden continued circling only "62"; Drs. Colin Kelley and Joseph Guyton circled either "62" or "312" on their log sheets. On August 8, 2003, Dr. Semrau instructed his billing staff to bill all services indicated as 90862s as 99312s. Dr. Ana Sarasti, who began

contracting with Dr. Semrau in June 2003, was instructed to circle "62" for certain services even though 99312 was being billed.

For the next year and a half, nearly every service indicated as 90862 on the log sheets completed by the physician performing the service was billed at the higher 99312 rate in both Tennessee and Mississippi. Dr. Barnes testified that he did not know what a 99312 was during the time in question and "would have been concerned" to know this code was being billed for services for which he had indicated a different code. This practice continued until four days after a grand jury subpoena was served on Dr. Semrau and his companies on December 17, 2004, after which time code 90862 was billed when indicated on the log sheets.

On June 18, 2008, a federal grand jury returned an indictment against Dr. Semrau. The Second Superseding Indictment filed later that year charged him with sixty counts of healthcare fraud in violation of 18 U.S.C. § 1347, twelve counts of money laundering in violation of 18 U.S.C. §§ 1956 and 1957, and one count of criminal forfeiture. The healthcare fraud counts charged that Dr. Semrau "submitted and caused to be submitted an electronic claims form 1500 . . . claiming that the psychiatrists . . . of Superior provided a service described in CPT code 99312, when in truth and in fact as [Semrau] well knew the treating psychiatrists had circled CPT code 90862."

Dr. Semrau's defenses were generally that (1) the codes were sufficiently equivalent that submitting code 99312 was objectively reasonable, (2) any improper billing was unintentional and despite his good faith attempts to be compliant because of the complicated and confusing nature of the codes, and (3) CPT codes do not have the force of law and cannot result in criminal penalties from misuse. He testified that he relied on advice from CIGNA's toll-free provider support phone line, which confirmed that his billing decisions were legitimate. To corroborate this claim, he unsuccessfully attempted to introduce three pieces of evidence: CIGNA telephone records that would purportedly prove he had called the support number, two reports that showed carrier support telephone lines sometimes gave inaccurate information, and results of a fMRI

lie detector test that found he was generally truthful when, during the test, he said his billing decisions were made in good faith and without an intent to defraud.

After a twelve-day jury trial, Dr. Semrau was convicted of three counts of healthcare fraud, each of which stemmed from bills submitted for Dr. Barnes's services. He was acquitted on the remaining counts, save two which had previously been dismissed. He was sentenced to concurrent eighteen-month terms of imprisonment and subsequent three-year terms of supervised release, and ordered to pay $245,435 in restitution. Dr. Semrau timely appealed his conviction but has not challenged his sentence.

## II. DISCUSSION

### A. Admissibility of fMRI Tests

Dr. Semrau argues that the district court erred in excluding opinion testimony from Dr. Steven Laken, who would have testified that fMRI testing indicated that Dr. Semrau was generally truthful when he said he attempted to follow proper billing practices in good faith. The admissibility of fMRI lie detection testing in a criminal case is an issue of first impression for any jurisdiction in the country, state and federal.[1] After carefully reviewing the scientific and factual evidence, we conclude that the district court did not abuse its discretion in excluding the fMRI evidence under Federal Rule of Evidence 702 because the technology had not been fully examined in "real world" settings and the testing administered to Dr. Semrau was not consistent with tests done in research studies. We also hold that the testimony was independently inadmissible under Rule 403 because the prosecution did not know about the test before it was conducted, constitutional concerns caution against admitting lie detection tests to bolster

[1] A New York state court considered the admissibility of fMRI lie detection technology in a civil case. *Wilson v. Corestaff Servs. L.P.*, 900 N.Y.S.2d 639 (N.Y. Sup. Ct. May 14, 2010). Other courts have reviewed attempts to use fMRI tests to demonstrate impaired brain functionality. *Turner v. Epps*, 460 F. App'x 322, 323–24 (5th Cir. 2012); *Hooks v. Thomas*, No. 2:10CV268-WKW, 2011 WL 4542901, at *2–3 (M.D. Ala. July 1, 2011) (Report and Recommendation), adopted 2011 WL 4542675 (M.D. Ala. Sept. 30, 2011); *see also State v. Andrews*, 329 S.W.3d 369, 383–84 & n.12 (Mo. 2010) (reviewing fMRI research on juvenile brain development); *Entm't Software Ass'n v. Granholm*, 404 F. Supp. 2d 978, 982 (E.D. Mich. 2005) (reviewing fMRI research on "media violence exposure and brain activation").

witness credibility, and the test results do not purport to indicate whether Dr. Semrau was truthful about any single statement.

### 1. Background[2]

#### a. fMRI Science

Dr. Steven J. Laken, Ph.D., is the President and CEO of Cephos Corporation, a company he founded in Tyngsboro, Massachusetts in 2004. 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 fMRI. Regarding its fMRI-based lie detection service, Cephos claims that 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."[3] Cephos Lie Detection: The Science Behind the Truth, http://www.cephoscorp.com/lie-detection/index.php (last visited July 16, 2012). Cephos holds a patent on a version of an 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 imaging. An fMRI 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). When undergoing an fMRI scan, a subject lies down on a bed

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[2]Magistrate Judge Tu Pham conducted a two-day evidentiary *Daubert* hearing on this matter and issued a forty-three-page Report and Recommendation ("R&R"). *United States v. Semrau*, No. 07–10074 Ml/P, 2010 WL 6845092 (W.D. Tenn. June 1, 2010). The R&R was adopted in its entirety by the district court and described as "carefully done" by Professor Owen Jones, who observed the hearing. Alexis Madrigal, *Brain Scan Lie-Detection Deemed Far From Ready for Courtroom*, Wired.com (June 1, 2010), http://www.wired.com/wiredscience/2010/06/fmri-lie-detection-in-court. The below section is an abbreviated review of the R&R's proposed findings of fact.

[3]Dr. Laken testified at the *Daubert* hearing that, to his knowledge, fMRI-based lie detection testimony had only been presented in court on one prior occasion, a "post-conviction relief case" in South Carolina. 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.

that slides into the center of a donut-shaped magnet core. *See* 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, 1139 (2010). As the subject remains still, he or she is asked to perform a task while magnetic coils in the scanner receive electric current and the device gathers information about the subject's Blood Oxygen Level Dependent ("BOLD") response. 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 began working closely with a small group of researchers in this field in or around 2003 and conducted a series of laboratory studies to determine whether fMRI could be used 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 if their lie was not detected. Dr. Laken agreed during cross-examination that he had only conducted studies on such "mock scenarios" and was not aware of any research in a "real-life setting" in which people are accused of "real crimes." He also testified that his studies examined only subjects between the ages of eighteen and fifty, although "we don't see any decreasing or increasing or any changes across accuracy rates in those individuals." Dr. Semrau was sixty-three years old at the time he underwent testing.

Based on these studies, as well as studies conducted by other researchers, Dr. Laken and his colleagues determined the regions of the brain most consistently activated by deception and claimed in several peer-reviewed articles that by analyzing a subject's brain activity, they were able to identify deception with a high level of accuracy. During direct examination at the *Daubert* hearing, Dr. Laken reported these studies found accuracy rates between eighty-six percent and ninety-seven percent. During cross-examination, however, Dr. Laken conceded that his 2009 "Mock Sabotage Crime" study produced an "unexpected" accuracy decrease to a rate of seventy-one percent. *See* F.

Andrew Kozel et al., *Functional MRI Detection of Deception After Committing a Mock Sabotage Crime*, 54 J. Forensic Sci. 220, 228 (2009).[4]

Dr. Laken testified that fMRI lie detection has "a huge false positive problem" in which people who are telling the truth are deemed to be lying around sixty to seventy percent of the time. One 2009 study was able to identify a "truth teller as a truth teller" just six percent of the time, meaning that about "nineteen out of twenty people that were telling the truth we would call liars." Another study expressed concern that "accuracy rates drop by almost twenty-five percentage points when a person starts becoming fatigued." Dr. Laken also explained that a person can become sufficiently fatigued during testing such that results are impacted after about two "scans" because "[t]heir brain starts kind of going to sleep." Similarly, inadequate sleep the night before a test could cause such fatigue.

**b. Testing Conducted on Dr. Semrau**

In late 2009, Dr. Semrau's attorney, J. Houston Gordon, contacted Dr. Laken to inquire about having an fMRI-based lie detection test conducted on Dr. Semrau in hopes of bolstering the defenses that Dr. Semrau lacked intent to defraud and undertook actions to ensure proper billing compliance. Dr. Laken agreed to test Dr. Semrau and testify about his results at no cost.[5] Dr. Laken decided to conduct two separate fMRI scans on Dr. Semrau, one involving questions regarding the healthcare fraud charges discussed above and the other involving questions regarding charges that he improperly billed for Abnormal Involuntary Movement Scale ("AIMS") tests.[6]

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[4]This article concluded with the following observations: "More work with direct comparisons of paradigms and participant samples are [sic] needed to understand how the various technologies compare in detecting deception. Although the diagnostic ability of our method was greater than chance, future work is focused on improving specificity and using more realistic testing in order to enhance the utility of this technology in real-world applications." *Id.* at 231.

[5]Dr. Laken testified that his company covered all of the expenses associated with Dr. Semrau's testing as well as his own expert testimony in court. This included two hours of testing, his time writing the report, and his time and expenses to travel to Memphis to testify at the *Daubert* hearing.

[6]These charges alleged that Dr. Semrau instructed his billing personnel to bill AIMS tests under CPT code 99301 despite knowing that it was "not a separately reimbursable test but instead should be performed with and billed as part of a regularly scheduled monthly medication management service." Dr. Semrau was acquitted of all AIMS-related 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—such as "Is today Tuesday?"—provided Dr. Laken with the "baseline" for the results to improve accuracy. The control questions—such as "Have you ever used illegal drugs?" and "Have you ever lied to a court?"—are included "just to fill up empty space" and do not directly contribute to the final analysis. Attorney Gordon and Dr. Laken co-developed Specific Incident Questions ("SIQs") directly relating to the upcoding and AIMS charges. The SIQs for the first scan included questions such as "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?" and "Did you bill CPT Code 99312 to cheat or defraud Medicare?" The SIQs for the second scan included questions such as "Did you know that AIMS tests performed by psychiatrists [were] not a necessary service that could be separately billed?" The prosecution was not notified that Dr. Semrau was going to take the deception test and thus lacked an opportunity to submit its own questions to Dr. Laken for use during the test or to observe the testing procedures.

Dr. Semrau traveled to Massachusetts to undergo the fMRI tests with Dr. Laken on December 30, 2009. After they met at the scanner at 6:00 a.m. that morning, Dr. Laken explained the fMRI testing procedure to Dr. Semrau, had him review the questions,[7] and conducted several preliminary tests to ensure he was a suitable test candidate. 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.

[7]Dr. Laken explained that telling subjects the questions before the test is important for two reasons. First, it allows the subject to determine if a question might lead to a misleading response in the brain by reminding the subject of a similar, but unrelated, thought or occurrence. Second, it reduces the "surprise factor" because the brain responds differently to new things.

Once this preparation was completed, Dr. Semrau was placed in the scanner and a display was positioned over his head that flashed the questions. The order of the questions was made random and each the response was recorded. Each scan took around sixteen minutes. During a brief break between scans, Dr. Semrau expressed some fatigue but did not request a longer break. After the second scan, however, Dr. Semrau complained about becoming "very fatigued" and having problems reading all the questions.

On January 4, 2010, Dr. Laken analyzed the scans using his fMRI testing protocol and found that Dr. Semrau answered an appropriate number of questions, responded correctly, and had no excess movement. From the first scan, which included SIQs relating to upcoding, 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." Dr. Laken's report noted, however, that "testing indicates that a positive test result in a person reporting to tell the truth is only accurate 6 percent of the time and may be affected by fatigue."[8] Based on his findings for the second test, Dr. Laken suggested that Dr. Semrau be administered another fMRI test on the AIMS tests topic, but with shorter questions and conducted later in the day to reduce the effects of fatigue. Dr. Laken developed the revised set of SIQs for the third scan.

The third scan was conducted on January 12, 2010 at around 7:00 p.m. 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's brain activity showed he was "not deceptive" in his answers. He further testified that, based on his prior studies, the third test was "more valid" because Dr. Semrau "didn't have fatigue" and the data produced "has a very high probability of being correct." In fact, Dr. Laken's report stated that "a finding such as this is 100% accurate in determining truthfulness from a truthful person."

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[8]Dr. Laken acknowledged on cross-examination that the fatigue Dr. Semrau expressed after the first scan could mean that test was also inaccurate.

During cross-examination at the *Daubert* hearing, Dr. Laken agreed that the test results do not indicate whether Dr. Semrau responded truthfully as to any specific question but rather show only whether he was generally truthful as to all of his answers collectively. Accordingly, Dr. Laken conceded that it is "certainly possible" that Dr. Semrau was lying on some of the particularly significant questions. Dr. Laken was unable to state the percentage of questions on which Dr. Semrau could have lied while still producing the same result. He also acknowledged that the scan results only show whether someone believes what he is saying at the time of the test rather than what his mental state was at the time of the events discussed, and that there is no research on the effect of a "long-term lie."

**2. Standard of Review**

We review a district court's decision regarding the admissibility of expert testimony under an abuse-of-discretion standard. *Best v. Lowe's Home Cntrs., Inc.*, 563 F.3d 171, 176 (6th Cir. 2009). "A district court abuses its discretion if it bases its ruling on an erroneous view of the law or a clearly erroneous assessment of the evidence." *Id.* (quoting *Brown v. Raymond Corp.*, 432 F.3d 640, 647 (6th Cir. 2005)). We may not look to facts or research outside of the record, including studies or articles that have since been published, because doing so would result in a de novo determination rather than a review of the district court's admissibility ruling. *United States v. Bonds*, 12 F.3d 540, 553 (6th Cir. 1993).

**3. Admissibility Under Rule 702**

**a. Applicable Law**

Federal Rule of Evidence 702, which contains the standard for admissibility of expert testimony, provides as follows:

> A witness who is qualified as an expert by knowledge, skill, experience, training, or education may testify in the form of an opinion or otherwise if:

> (a) the expert's scientific, technical, or other specialized knowledge will help the trier of fact to understand the evidence or to determine a fact in issue;
> (b) the testimony is based on sufficient facts or data;
> (c) the testimony is the product of reliable principles and methods; and
> (d) the expert has reliably applied the principles and methods to the facts of the case.

In *Daubert v. Merrell Dow Pharmaceuticals, Inc.*, the Supreme Court explained that Rule 702 confers a "gatekeeping role" on trial judges to "ensur[e] that an expert's testimony both rests on a reliable foundation and is relevant to the task at hand." 509 U.S. 579, 597 (1993). The inquiry is "a flexible one" focused on "principles and methodology." *Id*. at 594–95. There is "no definitive checklist or test" for balancing the liberal admissibility standards for relevant evidence and the need to exclude misleading "junk science." *Best*, 563 F.3d at 176. However, the Court did identify four factors that normally bear on the inquiry: "(1) whether a theory or technique can be or 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 in using a particular scientific technique and the standards controlling the technique's operation; and (4) whether the theory or technique has been generally accepted in the particular scientific field."[9] *Bonds*, 12 F.3d at 558. Shortly after *Daubert* was decided, the Sixth Circuit applied that new test in *Bonds* and held that DNA test results, a new type of forensic evidence, could be admitted in court. *Id*. at 565–67. In advocating for the admissibility of fMRI lie detection results, Dr. Semrau relies heavily upon some of the broader language in *Bonds* and its willingness to consider cutting-edge scientific evidence. *See id.* at 561 ("[N]either newness nor lack of absolute certainty in a test suffices to render it inadmissible in court. Every useful new development must have its first day in court." (citation omitted)).

[9]Although the *Daubert* Court overruled the *Frye* Test, in which "general acceptance" was the "absolute prerequisite to admissibility," *Daubert*, 509 U.S. at 585–89, the Court did observe that "[w]idespread acceptance can be an important factor in ruling particular evidence admissible," *id.* at 594. "[A] known technique which has been able to attract only minimal support within the community may properly be viewed with skepticism." *Id.* (internal citation and quotation marks omitted).

**b. Analysis**

The magistrate judge's R&R, which was adopted by the district court, weighed several factors in Dr. Semrau's favor: "[T]he 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." *Semrau*, 2010 WL 6845092, at *10. The Government does not appear to challenge these findings, although it does point out that the bulk of the research supporting fMRI research has come from Dr. Laken himself.

The magistrate judge determined that Dr. Semrau could not satisfy the rate of error and controlling standards factor: "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." *Id.* at *11. Dr. Semrau first challenges the finding that there are "no known error rates." As in *Bonds*, however, the party opposing the testimony produced evidence challenging the adequacy of the error rate calculations, at least for the particular way in which the test was conducted. 12 F.3d at 560. For example, Dr. Peter Imrey, a statistician, testified: "There are no quantifiable error rates that are usable in this context. The error rates [Dr. Laken] proposed are based on almost no data, and under circumstances [that] do not apply to the real world [or] to the examinations of Dr. Semrau." Dr. Imrey also stated that the false positive accuracy data reported by Dr. Laken does not "justify the claim that somebody giving a positive test result . . . [h]as a six percent chance of being a true liar. That simply is mathematically, statistically and scientifically incorrect."

Based on Dr. Imrey's testimony, there was a reasonable and objective basis for the magistrate judge to reject Dr. Laken's stated error rates. Moreover, the magistrate judge qualified his conclusion by specifying such rates are unknown specifically for fMRI-based lie detection in the "real world" as opposed to the "laboratory." *Semrau*, 2010 WL 6845092, at *11. Thus, Dr. Semrau's argument on this point is merged with

his second argument, that the magistrate judge erroneously "created" a distinction between "laboratory" and "real world" testing.

A review of the record demonstrates the laboratory/real world distinction was not "created" by the magistrate judge. As Magistrate Judge Pham recognized, federal courts have long appreciated that certain kinds of analyses may have different rates of error depending on the setting because of the difficulties of simulating realistic conditions. *See United States v. Crisp*, 324 F.3d 261, 280 (4th Cir. 2003) (handwriting analysis); *United States v. Cordoba*, 194 F.3d 1053, 1059–60 (9th Cir. 1999) (polygraph testing). More importantly, studies by Dr. Laken and other fMRI researchers have recognized this distinction and expressed caution about it. For example, the "Mock Sabotage Crime" article stated:

> 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 . . . . Future studies will need to be performed involving these populations.

Kozel et al., *Mock Sabotage Crime*, *supra*, at 228. Other articles have similarly highlighted the difference between laboratory and real world testing while stressing the need for more testing. *See Semrau*, 2010 WL 6845092, at *12.

More significantly, there are concerns with not only whether fMRI lie detection of "real lies" *has* been tested but whether it *can* be tested. *See Daubert*, 509 U.S. at 593; *Bonds*, 12 F.3d at 558–59. Dr. Laken testified that "the issue that one faces with lie detection, is what is the real world baseline truth[?]" *See Cordoba*, 194 F.3d at 1059 ("[T]he error rate of real-life polygraph tests is not known and is not particularly capable of analyzing."). In this case, for example, only Dr. Semrau knows whether he was lying when he denied intentional wrongdoing, so there is no way to assess with complete certainty the accuracy of the two results finding he was "not deceptive" (not to mention

the one finding that he *was* deceptive). The same is presumably true for many other "real world" scenarios in which a person may be trying to conceal something which is not already known or easily verifiable.

Due to the recognized lack of real world testing, this same laboratory/real world distinction applies to the other facet of the third factor, the existence and maintenance of standards, as well as the fourth factor, general acceptance. There was simply no formal research presented at the *Daubert* hearing demonstrating how the brain might respond to fMRI lie detection testing examining potential deception about real world, long-term conduct occurring several years before testing in which the subject faces extremely dire consequences (such as a prison sentence) if his answers are not believed. *See* Fed. R. Evid. 702(c) (requiring expert testimony to be the "product of reliable principles and methods").

There were also aspects of Dr. Semrau's particular tests that differed from those employed in the studies discussed at the hearing. Most obviously, at sixty-three years of age, he was significantly older than the eighteen- to fifty-year-old subjects who participated in the studies.[10] Also problematic was Dr. Semrau's participation in a third study after the first two yielded different results, a tactic that does not appear to have been followed in any of the studies performed or cited by Dr. Laken. As the magistrate judge observed, Dr. Laken's "decision to conduct a third test begs the question whether a fourth scan would have revealed Dr. Semrau to be deceptive again." *Semrau*, 2010 WL 6845092, at *13. The decision to conduct an fMRI "best two out of three re-test" as to the AIMS charges suggests testing on Dr. Semrau was itself part of Dr. Laken's research to refine and better understand how the brain can reveal deception and truthfulness. Particularly troubling was Dr. Laken's explanation of why the initial "deceptive" result was untrustworthy—"the chances of calling a truth teller a truth teller

[10]Dr. Laken testified that he "made the assumption that there wasn't going to be an age effect on the scans . . . because we didn't see any age effect" in the research. However, he also stated that the application of fMRI technology to a sixty-three-year-old is "unknown." *See also* Kozel et al., *Mock Sabotage Crime*, *supra*, at 228 ("[W]hether fMRI deception testing would work is unknown for participants who are . . . outside the 18-50 year age range. Future studies will need to be performed involving these populations.").

was only roughly six percent"—because this "huge false positive problem" could potentially justify continual re-testing on anyone until a "not deceptive" result is obtained. *See* Fed. R. Evid. 702(d) (requiring expert testimony to have "reliably applied the principles and methods to the facts of the case").

Although Dr. Laken offered various plausible sounding explanations and theories for why these distinctions from his prior studies should be irrelevant, the record reveals uncertainty from the relevant scientific community as to whether and to what extent the distinctions may, in fact, matter. It is likely that jurors, most of whom lack advanced scientific degrees and training, would be poorly suited for resolving these disputes and thus more likely to be confused rather than assisted by Dr. Laken's testimony. *See* Fed. R. Evid. 702(a) (requiring expert testimony "will help the trier of fact to understand the evidence or to determine a fact in issue). Accordingly, we conclude that the district court did not abuse its discretion in excluding Dr. Laken's testimony about Dr. Semrau's fMRI lie detection results under Rule 702.

**4. Admissibility Under Rule 403**

The magistrate judge's R&R, as adopted by the district court, also excluded Dr. Laken's testimony under Federal Rule of Evidence 403, which permits a court to exclude relevant evidence if its probative value is substantially outweighed by a danger of confusing the issues or misleading the jury, among other things. "A district court has 'very broad' discretion in making this determination." *United States v. Smithers*, 212 F.3d 306, 322 (6th Cir. 2000) (quoting *United States v. Hawkins*, 969 F.2d 169, 174 (6th Cir. 1992)). Rule 403 offers a basis for excluding evidence independent of Rule 702 and *Daubert*. *United States v. Thomas*, 167 F.3d 299, 308 (6th Cir. 1999); *United States v. Sherlin*, 67 F.3d 1208, 1217 (6th Cir. 1995). Although a consideration of Rule 403 is included in the *Daubert* analysis, *Smithers*, 212 F.3d at 322, Rules 403 and 702 "address different aspects of evidence," *United States v. Ramirez-Robles*, 386 F.3d 1234, 1246 (9th Cir. 2004).

The magistrate judge recommended excluding the fMRI evidence under Rule 403 for three reasons. *Semrau*, 2010 WL 6845092, at *14–16. First, the test was unilaterally

obtained without the Government's knowledge, so the Government had no supervision of the testing and Dr. Semrau risked nothing because the results would never have been released had he failed. *See Thomas*, 167 F.3d at 308-09 (citing *Sherlin*, 67 F.3d at 1216–17). Second, this court has held that the use of lie detection test results "solely to bolster a witness' credibility is 'highly prejudicial,' especially where credibility issues are central to the verdict." *Sherlin*, 67 F.3d at 1217 (quoting *Barnier v. Szentmiklosi*, 810 F.2d 594, 597 (6th Cir. 1987)); *see also United States v. Scheffer*, 523 U.S. 303, 313–14 (1998) ("[J]urisdictions may legitimately determine that the aura of infallibility attending polygraph evidence can lead jurors to abandon their duty to assess credibility and guilt.").[11] Finally, a jury would not be assisted by hearing that Dr. Semrau's answers were truthful "overall" without learning which specific questions he answered truthfully or deceptively.

Dr. Semrau offers two reasons for Rule 403 admissibility, neither of which address the magistrate judge's concerns. First, Dr. Semrau states that the evidence "does not confuse the issues" but rather "corroborates his testimony." However, because the test results do not purport to corroborate any particular statement of fact, such evidence is of little help in a case where, as here, the jury is asked to determine a defendant's culpability for dozens of discrete acts over several years. Indeed, it would seem that Dr. Laken's conclusion that Dr. Semrau was "not deceptive" as to the entirety of the alleged criminal conduct is fully consistent with the jury's determination that he was guilty of only a small part of that conduct. Second, Dr. Semrau relies on our holding in *Bonds* that DNA evidence was admissible pursuant to Rule 403. *See* 12 F.3d at 567–68. *Bonds* does not address the unique legal issues stemming from lie detection evidence. *See Scheffer*, 523 U.S. at 313 ("Unlike other expert witnesses who testify about factual matters outside the jurors' knowledge, such as the analysis of . . . DNA found at a crime scene, a polygraph expert can supply the jury only with another opinion, in addition to its own, about whether the witness was telling the truth."); *see also* Julie A. Seaman,

[11]Although *Thomas* and *Sherlin* involved polygraph tests rather than fMRI tests, the magistrate judge concluded that the concerns are the same regardless of the technology employed. *Semrau*, 2010 WL 6845092, at *15.

*Black Boxes*, 58 Emory L.J. 427, 488 (2008) ("[W]ere an accurate lie detector developed, the jury's unique role in determining witness credibility would be called into question.").

We hold that the district court did not abuse its discretion in excluding the fMRI evidence pursuant to Rule 403 in light of (1) the questions surrounding the reliability of fMRI lie detection tests in general and as performed on Dr. Semrau, (2) the failure to give the prosecution an opportunity to participate in the testing, and (3) the test result's inability to corroborate Dr. Semrau's answers as to the particular offenses for which he was charged.[12]

**B. Sufficiency of the Evidence**

Dr. Semrau contends that the evidence was insufficient to support a conviction. "For sufficiency of the evidence challenges, 'the relevant question is whether, after viewing the evidence in the light most favorable to the prosecution, *any* rational trier of fact could have found the essential elements of the crime beyond a reasonable doubt.'" *United States v. Kernell*, 667 F.3d 746, 756 (6th Cir. 2012) (quoting *Jackson v. Virginia*, 443 U.S. 307, 319 (1979)). "This is a very heavy burden for the convicted defendant to meet." *Id.* (citation and internal quotation marks omitted).

In order to establish a violation of the healthcare fraud statute, 18 U.S.C. § 1347, the prosecution had to prove beyond a reasonable doubt that Dr. Semrau "(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. Martinez*, 588 F.3d 301, 314 (6th Cir. 2009) (quoting *United*

[12]The prospect of introducing fMRI lie detection results into criminal trials is undoubtedly intriguing and, perhaps, a little scary. *See* Daniel S. Goldberg, *Against Reductionism in Law & Neuroscience*, 11 Hous. J. Health L. & Pol'y 321, 324 n.6 (2012) (reviewing literature that "challenges the very idea that fMRI or other novel neuroimaging techniques either can or should be used as evidence in criminal proceedings."). There may well come a time when the capabilities, reliability, and acceptance of fMRI lie detection—or even a technology not yet envisioned—advances to the point that a trial judge will conclude, as did Dr. Laken in this case: "I would subject myself to this over a jury any day." Though we are not at that point today, we recognize that as science moves forward the balancing of Rule 403 may well lean toward finding that the probative value for some advancing technology is sufficient.

*States v. Hunt*, 521 F.3d 636, 645 (6th Cir. 2008)). Dr. Semrau argues that two of his witnesses, Drs. Chester Schmidt and Jennie Campbell, gave "unrebutted opinion evidence that the services Barnes testified he actually performed each and every time for each patient could reasonably qualify as 99312." Under this theory, there was no fraud because the codes selected by Dr. Semrau were "objectively reasonable and appropriate" such that Medicare rightfully paid for the services actually rendered.

The district court properly identified evidence which could have supported a rational jury's decision to disregard this defense. The prosecution's expert, Dr. Richard Baer, testified that the documentation accompanying the services charged in Counts 16-18 did not support billing under *any* code. Further, the 2002 CIGNA audit provided Dr. Semrau with notice that Dr. Barnes's services, at least as documented, were often insufficient to qualify under 90862, let alone the higher code 99312. The evidence did not show that Dr. Barnes regularly provided additional services beyond those documented.

There was also evidence to refute the defense that the codes at issue are interchangeable for billing purposes. Although Dr. Schmidt testified that 90862 and 99312 are "essentially the same" in terms of "work value," he also admitted that a ten-minute evaluation—slightly longer than the standard care rendered by Dr. Barnes—is most appropriately classified under 99311. He further agreed that 99311 and 99312 are not equivalent because they have different elements and time components. Based on this testimony and that of Dr. Baer, the jury could have reasonably concluded that Dr. Barnes's evaluations were simply too minimal to classify as a 99312 service.

Dr. Semrau's arguments downplay the significance of the documentation entered by Dr. Barnes on his log sheets. This court has held that "a rational jury could infer a failure to perform [medical services] from a failure to document," particularly when the importance of chart documentation is stressed heavily during trial. *United States v. Canon*, 141 F. App'x 398, 405 (6th Cir. 2005); *see also United States v. Jones*, 641 F.3d 706, 710 (6th Cir. 2011) (jury could rationally conclude that undocumented services were not rendered). Here, the importance of documentation for both filing and

defending Medicare claims had been brought to Dr. Semrau's attention by specific directions and warnings from the CIGNA audit letter. Documentation was also significant in this case because Dr. Semrau did not personally observe most of the treatment sessions performed by his companies, so his primary source of knowledge as to the nature of those services was the progress notes submitted by the contracting psychiatrists.

Even if *some* of the psychiatric services may have been properly billable under 99312 (despite the lack of documentation), criminal intent could also have been inferred from Dr. Semrau's instructions to bill *all* evaluations under that code regardless of the documentation. A Superior billing officer testified that Dr. Semrau told her to bill every service marked as "62" under code 99312 because 90862 "was not a billable code anymore." Dr. Semrau denied her request to update the log sheets to remove the supposedly invalid code, so doctors continued reporting under it as they saw appropriate without knowing that their codes were later being changed when billed. This court has held that instructing staff to bill certain CPT codes regardless of the code documented by the treating physician is evidence that may support a healthcare fraud conviction. *See United States v. Raithatha*, 385 F.3d 1013, 1021 (6th Cir. 2004), *judgment vacated on other grounds*, 543 U.S. 1136 (2005) (citing *United States v. Booker*, 543 U.S. 220 (2005)). As explained by the Government's investigator, these changes in billing codes tended to directly follow external events including the CIGNA audit, changes in Medicare reimbursement rates, and the grand jury subpoena. Such cessation of coding practices after law enforcement action is also evidence that may support a healthcare fraud conviction. *Id.* This evidence collectively could have rationally led the jury to conclude that Dr. Semrau's billing decisions were based on obtaining the highest reimbursement amounts rather than a good faith attempt to report the actual services rendered. Accordingly, we hold that the evidence was sufficient to support the conviction.

**C. Jury Instructions**

Dr. Semrau next argues that the district court erred in declining to charge the jury with two instructions generally indicating that they could vote to acquit Dr. Semrau if they found that his billing decisions were either objectively reasonable or made in good faith. His proposed instruction #2 was: "When reasonable persons can disagree regarding whether a service was properly billed to the Government, claims for payment for such a service cannot be considered false." His proposed instruction #5 was: "In a case where the truth or falsity of a statement centers on an interpretive question of law, the government bears the burden of proving beyond a reasonable doubt that the defendant's statement is not true under a reasonable interpretation of the law."

After the final witness's testimony, the district court held a charge conference with the attorneys. The court noted that it had received the proposed instructions but told the parties to look at the instructions it had prepared for use as a "template" or "central document to work from." Upon discussing various instructions, the court stated: "I think most of these others are included or have been given in preparatory instructions," in response to which Dr. Semrau's attorney asked to "draw the court's specific attention to" his proposed instruction #2. After reading the instruction, the court replied, "I would have to look at that. . . . I think the language was pretty confusing, but we can look at it some more." Following further discussion about other instructions, the court stated that, because it was late in the day, it would look over the proposed good faith defense instruction that evening. Just before adjourning, the court stated:

> Now, on the instructions that are duplicative within the material that we have got, unless the instruction is raised again after you come in tomorrow morning and say, Judge, you know, I really realize that I really should have pushed on submittal number 19, I didn't do that and I should have, then we can talk about it. But otherwise, those will be regarded as simply ones that were advisory to the court and helpful for guidance, but they're already included in the material and not necessarily rejected, but regarded as already covered in the existing instructions, that's how that will be.

During proceedings the next morning, Dr. Semrau's attorney brought three pairs of proposed instructions to the court's attention: #23 and #26; #15 and #16; and #18 and #19. The instructions at issue in this appeal, #2 and #5, were not discussed at the morning charge conference. Neither party objected after the instructions were given to the jury.

**1. Standard of Review**

The Government contends that we should review for plain error because objections to the denial of Dr. Semrau's proposed instructions #2 and #5 were not adequately preserved. Under Federal Rule of Criminal Procedure 30(d), "[a] party who objects to any portion of the instructions or to a failure to give a requested instruction must inform the court of the specific objection and the grounds for the objection before the jury retires to deliberate." Fed. R. Crim. P. 30(d). The failure to properly raise an objection allows this court to review only for plain error. *Id.* Despite Dr. Semrau's contention, the record shows he did not request his proposed instruction #5 at either charge conference and did not object to its omission from the jury charge before or after it was given. Accordingly, any objection to #5 was not preserved and we must review for plain error. *See United States v. Carmichael*, 232 F.3d 510, 523 (6th Cir. 2000) (citing *Pena v. Leombruni*, 200 F.3d 1031, 1035 (7th Cir. 1999)) (holding that proposing an instruction is insufficient to preserve an objection); *cf. United States v. Burchard*, 580 F.3d 341, 345 (6th Cir. 2009) (holding that an objection was preserved when the defendant objected to the court's failure to read proposed jury instruction).

Review of Dr. Semrau's proposed instruction #2 is more complicated. Although Dr. Semrau did mention that instruction during the afternoon charge conference, the court did not make a ruling but instead stated it "would have to look at that" and later specified that any proposed instructions not "raised again" the next day would be considered to be "advisory to the court" and "already covered in the existing instructions." Dr. Semrau did not raise instruction #2 the next morning and the court did not revisit it. He also did not object to its omission before or after the charge was read to the jury.

In his appellate brief, Dr. Semrau simply states that he requested the instruction at the afternoon charge conference, the trial court ruled against its inclusion the next morning, and "no exception to the [district court's] ruling is required." Federal Rule of Criminal Procedure 51 states that "[e]xceptions to rulings or orders of the court are unnecessary" and provides that parties may preserve claimed error "by informing the court—when the court ruling or order is made or sought—of the action the party wishes the court to take."[13] We conclude that Dr. Semrau's objection was forfeited by a failure to properly object pursuant to Rule 30(d), not by a failure to take exception.

Merely proposing a jury instruction is insufficient to preserve an objection. *Carmichael*, 232 F.3d at 523. Dr. Semrau's attempt to "draw the court's specific attention to" his proposed instruction also does not satisfy Rule 30(d)'s requirement to "inform the court of the specific objection and the grounds for the objection." Moreover, district courts have some discretion to direct how and when objections to jury instructions should be made. *See United States v. Blood*, 435 F.3d 612, 625 (6th Cir. 2006) (upholding court's request for parties to make post-charge objections where court gave "reasonable notice of what was required to preserve the objection" and asked for objections after the charge); *cf. United States v. Theunick*, 651 F.3d 578, 589 n.8 (6th Cir. 2011) (holding objection preserved when party objected during pre-charge instruction and responded in the negative when the court asked if he had any objections "other than the objections we have already stated to the instruction[.]"). Even liberally construing Dr. Semrau's pending jury instruction request as an attempted objection, we conclude that he failed to make a proper objection or inform the court of the action he wished it to take either the following morning when the court made clear that objections would be "sought" and its ruling would be "made," or after the jury was charged. Thus, we review the failure to give both proposed instructions for plain error.

"In the context of challenges to jury instructions, plain error requires a finding that, taken as a whole, the jury instructions were so clearly erroneous as to likely

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[13]For a discussion on the purpose and abolition of the exception requirement, see Benjamin K. Raybin, Note, *Objection: Your Honor is Being Unreasonable! Law and Policy Opposing the Federal Sentencing Order Objection Requirement*, 63 Vand. L. Rev. 235, 251–52 (2010).

produce a grave miscarriage of justice." *United States v. Morrison*, 594 F.3d 543, 546 (6th Cir. 2010) (quoting *United States v. Newsom*, 452 F.3d 593, 605 (6th Cir. 2006)). Reversal is only proper "if the instructions, viewed as a whole, were confusing, misleading, or prejudicial," *id.* (quoting *United States v. Harrod*, 168 F.3d 887, 892 (6th Cir. 1999)), and "the error seriously affected the fairness, integrity, or public reputation of the judicial proceedings," *United States v. Aaron*, 590 F.3d 405, 408 (6th Cir. 2009) (quoting *United States v. Vasquez*, 560 F.3d 461, 470 (6th Cir. 2009)). "It is clear that omitting instructions that are . . . [related] to elements that go to the question of guilt or innocence is plain error." *United States v. Damra*. 621 F.3d 474, 498 (6th Cir. 2010) (quoting *Glenn v. Dallman*, 686 F.2d 418, 421 n.2 (6th Cir. 1982)).

**2. Application**

Dr. Semrau argues that both of his proposed instructions would have properly allowed the jury to acquit him if it agreed that he did not "knowingly" submit a fraudulent claim because his billing decisions were either objectively reasonable or, if erroneous, were based on reasonable differences of interpretation. We conclude that the jury instructions as given adequately presented these defenses to the jury. The jury was told that, in order to convict under the healthcare fraud statute, the prosecution must have proven beyond a reasonable doubt that Dr. Semrau "knowingly and willfully executed . . . a scheme . . . to defraud a healthcare benefit program" and "had the intent to defraud." Immediately thereafter, the jury was provided with a lengthy good faith defense instruction taken directly from Sixth Circuit Pattern Jury Instruction § 10.04. *See United States v. Darma*, 621 F.3d 474, 499–500 (6th Cir. 2010) ("We regularly look to whether jury instructions mirror or track the pattern instructions as one factor in determining whether any particular instruction is misleading or erroneous."). These instructions were sufficient to convey the essential legal elements contained in the proposed instructions at issue in this appeal. Accordingly, we hold that the court did not err in failing to include Dr. Semrau's proposed instructions in the jury charge.

**D. Motion to Compel Evidence**

Dr. Semrau next challenges the denial of his requests to require the prosecution to produce telephone billing records of all calls made to six CIGNA toll-free provider support lines from two Tennessee area codes during the entire period covered by the Second Superseding Indictment. Dr. Semrau contends that these records—which he alleges exist only for the owner (rather than callers) of the toll-free line and are in control of the Government through CMS—would have corroborated his testimony that he called the support lines to receive guidance on the use of CPT codes.

Federal Rule of Criminal Procedure 16 requires the government, upon a defendant's request, "to permit the defendant to inspect and to copy" evidence within the government's control which is, *inter alia*, "material to preparing the defense." Fed. R. Crim. P. 16(a)(1)(E). "Rule 16 is intended to prescribe the minimum amount of discovery to which the parties are entitled, and leaves intact a court's discretion to grant or deny the broader discovery requests of a criminal defendant." *United States v. Richards*, 659 F.3d 527, 543 (6th Cir. 2011) (citation and internal quotation marks omitted). Accordingly, appellate courts review this evidentiary determination for abuse of discretion. *Id.* The Supreme Court has held that this rule "applies only to 'shield' claims that 'refute the Government's arguments that the defendant committed the crime charged.'" *United States v. Robinson*, 503 F.3d 522, 531–32 (6th Cir. 2007) (quoting *United States v. Armstrong*, 517 U.S. 456, 462 (1996)); *see also United States v. Lykins*, 428 F. App'x 621, 624 (6th Cir. 2011) ("In assessing materiality, we consider the logical relationship between the information withheld and the issues in the case, as well as the importance of the information in light of the evidence as a whole.").

In its response to Dr. Semrau's motions, the Government asserted that CIGNA could not locate any of the requested material. Accordingly, it is unclear whether the telephone records existed at the time they were requested. In any event, as the magistrate judge found upon reference from the district court, these records would be of questionable relevance even if the records did exist:

> At most, they would only list the incoming telephone number and the date and time that the call was made, but obviously would not indicate who called or describe the substance of the call. The records would do no more than confirm that someone had called CIGNA from one of the telephone numbers associated with Semrau during the relevant time period, a fact that is not in dispute as the government concedes that it has knowledge from Semrau's employees that calls were made to those numbers on a regular basis (albeit for reasons other than to obtain coding instructions or guidance from CIGNA). Thus, even if CIGNA's telephone records show that calls were made to and received from numbers associated with Semrau, they would not be material to the defense under Rule 16.

Accordingly, we hold that the district court did not abuse its discretion in declining to order the Government to produce the telephone records.

**E. Exclusion of Reports**

Dr. Semrau argues that the district court erred in excluding two reports from the Government Accountability Office ("GAO") that purportedly show that "carriers, including CIGNA, provided erroneous information up to 85% of the time to providers who called the toll-free numbers." According to Dr. Semrau, "[t]his evidence would have made [his] account of what he was told and his frustrations with the information he received from CIGNA credible and his choice, under the circumstances, reasonable." We review this evidentiary determination for abuse of discretion. *United States v. Kelsor*, 665 F.3d 684, 696 (6th Cir. 2011). "Even when the district court has abused its discretion in admitting evidence, we do not reverse a conviction if the error is harmless, meaning that 'it appears beyond a reasonable doubt that the error complained of did not contribute to the verdict obtained.'" *Id.* (quoting *United States v. Lopez-Medina*, 461 F.3d 724, 741 (6th Cir. 2006)).

The district court excluded the reports at trial under Federal Rule of Evidence 403 primarily because there was no evidence that CIGNA or CAHABA were among the carriers surveyed. After learning post-trial that these carriers were in fact among the thirty-five reviewed in one of the studies, Dr. Semrau filed a motion to alter or amend the previous ruling. The district court denied the motion after conducting a thorough

analysis under *United States v. Barlow*, 693 F.2d 954, 966 (6th Cir. 1982), upon finding that the questions asked in the survey that formed the basis of the reports were "policy-oriented" rather than "code driven" such that they were "completely unrelated to the issues in this case." We agree and find no error because the probative value of the reports would have been substantially outweighed by the likelihood of jury confusion.

**F. Criminality of CPT Code Misuse**

Finally, Dr. Semrau contends that the district court erred in denying his attempts to prevent the Government from arguing that the CPT codes and related documentation have "the force and effect of law." This position—which is comprised of a series of arguments pertaining to prosecutorial misconduct, the due process right to fair warning, and the nondelegation doctrine—is premised on the theory that misuse of CPT codes cannot constitute criminal conduct because they are the product of a private organization and have not been formally promulgated by the government.

As an initial matter, it seems clear that the CPT codes themselves create no laws or liability but are merely a government-sanctioned means of summarizing several pieces of information into a concise, standardized number. Congress directed the Secretary of Health and Human Services to "prescribe such regulations as may be necessary to carry out the administration of" Medicare, 42 U.S.C. § 1395hh(a)(1), and to "establish a uniform procedure coding system for the coding of all physicians' services," *id.* § 1395w-4(c)(5). The Secretary acted on this authority by adopting the CPT code set drafted by the AMA. 45 C.F.R. § 162.1002. Dr. Semrau's attorney himself acknowledged during the trial that CPT codes "are simply a shorthand way of incorporating the description of the service." Thus, when Dr. Semrau submitted a claim for "99312," he was effectively submitting a claim for the services associated with that number in the AMA's CPT code set, as defined above.

It is illogical to suggest that a person could escape liability because a claim comes in the form of a number instead of the words directly associated with that number. This is particularly true for the statute in question because "[t]he broad language of § 1347 shows that Congress intended for this statute to include within its scope a wide

range of conduct so that all forms of health care fraud would be proscribed, regardless of the kind of specific schemes unscrupulous persons may concoct." *United States v. Lucien*, 347 F.3d 45, 51 (2d Cir. 2003). In short, § 1347 "is simply a fraud statute." *United States v. Franklin-El*, 554 F.3d 903, 911 (10th Cir. 2009). "Although the health care fraud statute does not (and could not) specify the innumerable fraud schemes one may devise," *id.* at 910–11, it is difficult to imagine a more obvious way to commit healthcare fraud than billing for services not actually rendered. Indeed, this court and other circuits have previously upheld convictions for CPT "upcoding." *See e.g.*, *Jones*, 641 F.3d at 710; *Raithatha*, 385 F.3d at 1021; *United States v. Boesen*, 541 F.3d 838, 849–50 (8th Cir. 2008); *United States v. Janati*, 237 F. App'x 843, 847 (4th Cir. 2007); *United States v. Singh*, 390 F.3d 168, 187–189 (2d Cir. 2004).

As the district court found in denying Dr. Semrau's motion for a new trial:

> Contrary to Semrau's allegations, the gravamen of the offense charged is not that the use of one CPT code over another is itself illegal, but that the claims for federal reimbursement arising from the upcoding of services were fraudulent and materially misleading in the nature of the services that had been provided . . . . Simply put, Defendant is not charged with violating CPT codes. Semrau's attack on the CPT codes which formed the factual backdrop that made his statements materially false is ultimately an attack on the sufficiency of the evidence, but not grounds for sustaining a constitutional challenge to § 1347.

Although portions of the record taken in isolation could arguably suggest some argument by the Government that the CPT codes themselves had the "force of law," it seems clear in context of the full record that the jury understood that Dr. Semrau's prosecution stemmed not from the coding decisions themselves but from requests for financial reimbursement that contained those coding decisions. Indeed, the indictment clearly charged him with "caus[ing] to be submitted" fraudulent reimbursement claims, not simply writing down an inaccurate code without further action.

To the extent that Dr. Semrau contends the statute is too complicated to warrant criminal punishment, this court rejected similar arguments about a different healthcare fraud statute in *United States v. Anderson*, 605 F.3d 404, 413 (6th Cir. 2010). The

applicable statute in *Anderson*, like the one here, contained a scienter requirement of intent to defraud, which minimizes the chance of penalizing innocent conduct. *Id.* (citing *Vill. of Hoffman Estates v. Flipside, Hoffman Estates, Inc.*, 455 U.S. 489, 499 (1982); *United States v. Baker*, 197 F.3d 211, 219 (6th Cir. 1999)). "The fact that the statute does not specifically enumerate" possible violations of a complex nature is not determinative here because individuals within a particular industry may be imputed with "particularized knowledge" of related statutes and regulations not known to the public at large when a statute regulates only that industry. *Anderson*, 605 F.3d at 413. Moreover, specific regulations on conduct are unnecessary when the statute sufficiently makes clear what is proscribed. *Id.* at 414.

As reviewed under his sufficiency-of-the-evidence claim, there was ample evidence that Dr. Semrau was well aware of the accepted definitions of the CPT codes at issue and the central role they play in the government's Medicare reimbursement scheme. Indeed, Dr. Semrau expressly agreed to abide by all "program instructions [made] available through the Medicare contractor[s]" when he applied for Medicare certification; he also agreed not to "knowingly present or cause to be presented a false or fraudulent claim for payment by Medicare" and not to "submit claims with deliberate ignorance or reckless disregard of their truth or falsity." Thus, Dr. Semrau cannot claim to have been surprised that he could be prosecuted for violating these agreements, particularly after CIGNA advised him in 2002 that his billing practices subjected him to that possibility.

## III. CONCLUSION

For the reasons stated above, Dr. Semrau's conviction is **AFFIRMED**.