The Forensic and Legal Implications of Water, Wet, or Fry

Susan M. Chlebowski, MD, and Cecilia Leonard, MD

Embalming fluid applied to marijuana cigars or cigarettes, with or without the addition of phencyclidine (PCP), has several names, such as water, wet, illy, and fry. Individuals who commit crimes under the influence of this substance are often violent and may appear psychotic, with symptoms resembling schizophrenia or delirium. Currently, there are no case reports or case law involving the use of this substance. Wet may impair one's competency to stand trial (CST). The authors present a composite case of a man who abused wet for three years and had been sober for three months when he presented for a CST evaluation. The authors posit that individuals who use wet may raise settled (fixed) insanity or defenses of not guilty by reason of insanity in the future.

J Am Acad Psychiatry Law 40:270–8, 2012

Water, wet, and fry are some of the names used to describe marijuana cigars or cigarettes to which embalming fluid (EF) has been applied, with or without the addition of phencyclidine (PCP). Under the influence of these substances, individuals may appear psychotic and engage in violent behavior. Their presentations may mimic a psychotic disorder or delirium. As a result, they may be referred by the court for evaluation to determine their competency to stand trial (CST).

Wet-induced changes in mental status are variable and often result in stark discrepancies among the findings in serial examinations performed over time. The initial clinical evaluation and the diagnosis may vary significantly from subsequent evaluations. Since individuals often abuse multiple substances and may not be forthcoming regarding their use, it may be difficult to determine the exact substance that they have ingested.

It is important for forensic psychiatrists to consider the timing of the CST evaluations; the type of substance and the timing and duration of ingestion; the pharmacokinetics of the substance; and underlying mental disorders. Phencyclidine, for example, may be detected in the urine for up to seven days.

Drs. Chlebowski and Leonard are Assistant Professors, Department of Forensic Psychiatry, State University of New York, Upstate Medical University, Syracuse, NY. Address correspondence to: Susan M. Chlebowski, MD, Department of Forensic Psychiatry, SUNY Upstate Medical University, 750 East Adams Street, Syracuse, NY 13210. E-mail: chlebows@upstate.edu.

Disclosures of financial or other potential conflicts of interest: None.

Chronic use of these neurotoxic substances has effects on brain function that have been demonstrated on functional magnetic resonance imaging (fMRI) and diffusion tensor imaging (DTI).[1–5] Despite the duration of abstinence, users may have waxing and waning changes in their mental status or persistent symptoms of psychosis. Permanent changes in mental status due to substance use have been the basis in criminal court for rulings of settled (fixed) insanity in some jurisdictions. Given the increase in the prolonged abuse of wet, individuals with substance-induced persistent psychiatric symptoms who have been charged with crimes will present for CST evaluations and may use insanity as a defense in criminal court.

In this article, we review this combination of substances, its pronounced effects on the presentation of the individual, and the legal ramifications. All of the substances, collectively called wet, if used independently are known to induce changes in mental status. However, the combination of substances can produce a more potent and prolonged effect. The abuser of wet may be diagnosed with a mental disorder despite abstinence, thus complicating the CST evaluation, diagnosis of a mental order, and the use of settled insanity as an affirmative defense.

The following is a composite case presentation of two individuals that illustrates a typical presentation of a defendant with a history of wet abuse. The Institutional Review Board at SUNY Upstate Medical University limits its reviews to case reports involving

more than three individuals and thus did not review this composite case report.

Case

A young adult male was arrested for attempted murder. At the arraignment, he was paranoid and argumentative, and the judge ordered a CST evaluation.

The defendant had started drinking alcohol and smoking marijuana in early adolescence followed by ingesting MDMA, a so-called club drug, weekly. In his last year of high school, he discovered smoking water and found that it gave him a sense of confidence. A year later, he was involved in a motor vehicle accident that occurred while he was under the influence of multiple substances, resulting in serious injury and prolonged hospitalization. During the first month, he was extremely agitated and paranoid and was placed on an alcohol withdrawal protocol. One evening, he tried to open the window in the hospital, saying that he was going to "fly home." He received risperidone for episodic agitation and paranoia.

Although he remained sober during the hospital stay, he continued occasionally to hear voices and to have out-of-body experiences once or twice a month. He also had paranoid thoughts regarding some of the staff and his friends. He was discharged home, and one day, after three months of sobriety, he became acutely agitated. He became paranoid about his neighbors and scrutinized their activities. He was convinced that a neighbor would attack soon, and he went out and illegally purchased a handgun.

One afternoon, his neighbor was standing outside with others. The defendant was convinced that they were planning an attack. He got his gun and shot at them through a second-floor window; several of them sustained nonfatal wounds. He told the police that they were hired assassins.

Upon arrest, he was taken to the local jail, but no urine drug screen was obtained. Oral risperidone 1.0 mg twice daily was started on admission to a medical hospital. One week later, the psychiatrist opined that the defendant lacked the capacity to stand trial. Two different psychiatrists, after evaluations were performed at four and six weeks after his arrest, opined that he had the capacity to proceed to trial and was no longer paranoid.

His psychiatric history revealed multiple admissions to the psychiatric emergency room for paranoia and violence with urine drug screens positive for PCP, cannabis, and cocaine over the four years preceding his arrest. Urine drug screens within the two months preceding arrest were negative. He had been admitted to inpatient psychiatric wards three times in the previous three years for psychosis NOS or to rule out paranoid schizophrenia. The case raises the question of forensic evaluations of CST and settled insanity.

Use of Wet, Water, or Fry

In 1985, Dr. Ivan Spector described five cases of "AMP" marijuana in the *Journal of Clinical Psychiatry*.[6] In this new combination, marijuana was soaked in formaldehyde and dried. Individuals using the substance demonstrated marked psychomotor retardation, poor attention, anxiety, thought disturbances, and decreased speech production. As it gained popularity during the 1990s, the names for this combination of substances varied by geographic location. Embalming fluid, which contains formaldehyde, was soon incorporated in this form of marijuana use.

In Chicago, the combination is called happy sticks; in Cleveland it is referred to as sherm, wet, sheba, and takow; and in Connecticut it is called illie. In New York and Philadelphia, the terms hydro and wet, are used, while in Texas it is known as fry or whack. In Washington, DC, the combination is called loveboat or boat, and in Los Angeles, it is called sherm.

According to the Texas Commission on Alcohol and Drug Abuse, the use of fry was reported in the early 1970s in and around Trenton, New Jersey.[7] Use of the substance made its way up from New York City to Connecticut where it acquired the name clickems or illy (from Philly blunt cigars, or from the knowledge that the combination can make one ill). The epidemic peaked in 1993 and 1994.[8] In fact, the use of illy among Connecticut adolescents became so problematic that a gang, the Latin Kings, asked the Connecticut State Department of Public Health to intervene to prevent the devastating results.[9]

At the same time, Los Angeles reported the use of PCP-sprayed tobacco, parsley, or marijuana, and Chicago reported the use of sherm sticks and happy sticks, which were home-rolled marijuana or tobacco cigarettes sprayed with PCP, known on the street as water.[10] In New York City, PCP was sprinkled on mint or parsley leaves and sold by the bag. Dealers

would also allow individuals to dip a cigarette into a small container of EF for $20 per dip.[11]

Reports indicate that children from the ages of 14 to 16 years are the most frequent abusers of this substance.[12] Peters *et al.*[13] conducted a drug assessment of 494 students in grades 7 through 12 and demonstrated that 11 percent had used fry at least once.[13] In his investigation of crack cocaine abusers in Houston, he found that fry was used among those trading sex for drugs. In this population, fry provided the individual with feelings of security in high-risk situations.[13] This effect is especially troubling, given the increasing evidence that the use of cannabis before the age of 17 years may be associated with greater and prolonged neurocognitive deficits. Adolescence is a period of brain reorganization and maturation, predisposing the user to more untoward effects.[14]

Embalming Fluid Abuse

Embalming fluid (EF) alone is also known as wet, leak, tecal, dip, hemey, illy, or dust. Adding EF increases the length of time that the PCP can be smoked. It is made and distributed locally in most cities by dealers, and it may be smoked, snorted or injected by mixing with other substances. The active ingredients of EF are 5 to 29 percent formaldehyde, methanol, 9 to 56 percent ethanol, and other solvents.[15]

Embalming fluid is often purchased mixed with marijuana, tea, or mint leaves. It is sold in a wet, sticky, or dry state. EF in the dried state is called dust. The term is not derived from PCP or angel dust. The wet formulation has a black ashy appearance. If mint leaves are placed in a microwave, the EF can be sprinkled on the blackened leaves creating a dusty substance that can be wrapped into papers for smoking. Another option is to smoke cigarettes dipped directly into EF or to freeze the mint, tea, or marijuana leaves after soaking them in formaldehyde. The product is crushed and sold directly or sprinkled onto marijuana or cigarettes. The reported sources of EF include the Internet and theft from funeral homes.[16,17]

Embalming fluid contains formaldehyde, which is well known to the medical community as a tissue preservative. It is also a neurotoxin, a highly reactive one-carbon compound with a characteristic odor. In the presence of water, it reacts with the active hydrogen of many compounds such as ammonia, amines, amides, thiols, phenols, and nitroalkanes and condenses with hydrogen chloride (HCl) in the presence of water to form bis(chloromethyl)ether (BCME), an acknowledged carcinogen in humans. It is rapidly metabolized in both liver and blood to produce formate, which is then excreted in the urine or converted to carbon dioxide and excreted via the lungs. Small amounts of formaldehyde enter the one-carbon pool and can be incorporated into protein and nucleic acid molecules (DNA). Smoking EF induces bronchitis, brain and lung damage, poor coordination, and inflammation of the mucosa of the upper respiratory tree, throat, and esophagus, and the inhaled smoke is a carcinogen.

Subjects report that smoking wet gives them a numbing buzz and a fiery feeling in the lungs. Studies of inhalation of industrial formaldehyde demonstrated a reduction in cognitive performance, including a reduction in attention span and concentration. Amnesia, sleep disturbances, impaired coordination, psychomotor agitation, mood variability, and sympathetic nervous system stimulation were also reported.[18] A letter in the *Journal of Neuropsychiatry and Clinical Neurosciences*[19] reported dysmetria, the inability to assess distances associated with action properly, causing an individual to over- or underestimate the motion needed to move the arms or legs correctly during voluntary movement. Two smokers of wet who underwent neuropsychiatric testing demonstrated temporal disorientation and memory impairment.[19] Kilburn *et al.*[20] demonstrated changes in concentration and memory in histology workers exposed to formaldehyde during work hours. Drinking formaldehyde has been associated with sedation, seizures, and loss of consciousness.

Embalming fluid also contains methanol or wood alcohol, a solvent that is used as antifreeze. When consumed, methanol results in severe lactic acidosis, vision loss, and neurotoxicity associated with lesions in the occipital, parietal, and temporal cortices; the pons; the basal ganglia; and the thalamus.[21]

Cannabis Abuse

Cannabis used at high doses can induce hallucinations, visual distortions, dissociative symptoms, and amnesia and can impair learning ability. It can cause anxiety and panic attacks. Chronic use increases the risk of cancer of the head and neck. It can precipitate a psychotic disorder in individuals who are vulnerable to its effects because of a personal or family history of schizophrenia.[22,23] The predisposition may be in part genetically mediated. The risk of develop-

ing schizophrenia increases from 0.7 per 1000 to 1.4 per 1000 in those with a family history of schizophrenia or unusual experiences with the use of cannabis.[24]

Tetrahydrocannabinol (THC), which is the active ingredient in cannabis, is lipid soluble. This compound activates the cannabinoid (CB1) receptor, which is present in the highest density in the basal ganglia, substantia nigra, globus pallidus, hippocampus, limbic cortex, and cerebellum.[25] As a result, the effects of cannabis abuse are diffuse.

Phencyclidine Abuse

PCP is a Schedule II drug that was used in the 1950s as an anesthetic in humans, but was discontinued because of side effects that included disorientation and agitation. It can be obtained as a crystalline powder, a tablet, a capsule, or a bitter-tasting liquid that can be swallowed, injected, sniffed, or sprinkled on the cigarettes and smoked. The effects of PCP are paranoia, hallucinations, loss of coordination, tendency toward aggression and violence, seizures, and respiratory arrest. Because PCP induces the perception of being in a trance, out of body, or detached from the environment, it has been labeled as a dissociative anesthetic. However, delirium, agitation, and anxiety also occur.

PCP is an addictive drug that often results in psychological cravings and compulsive drug-seeking behaviors. Long-term abuse results in emotional lability, social incompetence, overt impulsiveness, impaired social judgment, and reduced attention span and concentration. There is a persistent reduction in cerebral blood flow to the frontal cortex, resulting in hypofrontality, similar to that in schizophrenia. Neurotoxicity is a consequence of repeated exposure to NMDA (*N*-methyl-D-aspartic acid) antagonists.[25] Repeated or prolonged use is associated with a withdrawal syndrome that includes symptoms of memory loss that can persist for up to one year after chronic use is discontinued.[26–28]

In youth, PCP can adversely affect hormones associated with growth and normal development and, during adolescence, can impair cognitive function. PCP can alter pituitary and steroid hormone biotransformation and elimination, which can adversely affect reproductive function. This biotransformation occurs after only short-term exposure.[29–32]

Water, Wet, or Fry Abuse

The use of wet with or without PCP results in symptoms similar to those of PCP ingestion alone, including panic, paranoia, disorientation, and memory impairment. In a report from The Hartford Hospital in Connecticut, users presented with a toxic delirium with psychotic features.[33] In the Yale New Haven Hospital Emergency Room, some patients were alternately catatonic and extremely violent. Other patients were delirious with auditory hallucinations.[33]

The acute symptoms of wet intoxication usually subside in 24 to 36 hours, but the course may vary, depending on the half-lives of the drugs used in a particular mixture. Some acute effects include visual impairment, headache, and amnesia. Because PCP and THC are stored in adipose tissue, they are slowly released into the blood stream, causing recurrence of symptoms. Although the long-term effects of wet are unknown, cognitive deficits may persist.[34]

Phencyclidine and marijuana have reinforcing effects on each other. The formaldehyde in the EF enhances the absorption of marijuana and reduces the rate at which the marijuana burns. Embalming fluid itself produces an uninhibited ability to express aggression and anger.[16,17] Wet induces psychosis including hallucinations and delusions, panic, paranoia, hypersexuality, and loss of consciousness.[35] It also induces a feeling of invulnerability, a higher pain tolerance, and feelings of increased strength.[12]

The effects of smoking wet can last from hours to months. The long-term effects have not been as well studied. However, the long-term effects of PCP, such as memory loss, dysarthria, difficulty with thought, and depression can persist up to a year.[35,36] In a small study of wet users, Marceau *et al.*[18] demonstrated impairment in remembering vocabulary and in abstract thinking with chronic use.[18]

Forensic and Legal Implications of Intoxication

The use of wet may affect the criminal proceedings in three ways: waxing and waning competency in serial CST evaluations; raising a settled insanity defense in some jurisdictions; and raising a *mens rea* insanity defense.

Based on the individual's mental status at the time of the arraignment, the court may request a CST evaluation. In *Dusky v. United States*, the test for determining whether a criminal defendant is competent to stand trial is "whether he has sufficient present ability to consult with his lawyer with a reasonable degree of rational understanding, and whether he has

a rational as well as factual understanding of the proceedings against him " (Ref. 37, p 1). A trial cannot proceed if a defendant has been found incompetent to stand trial. In cases where the mental status of the defendant waxes and wanes, a series of CST evaluations is indicated. The temporal relationship between substance use and the evaluation as well as treatment with an antipsychotic medication can result in discrepancies in findings in successive competency evaluations.

The term settled or fixed insanity describes a mental disorder that is present before and after any single episode of intoxication.[38] According to Carter-Yamauchi,[38] a voluntary state of intoxication cannot cause the type of insanity that would exculpate a defendant from criminal responsibility. However, courts in some jurisdictions have recognized that the voluntary, chronic use of substances can result in settled insanity. An individual who has mental disease that has been caused by the use of substances may rely on settled insanity as a complete defense, provided that it meets the jurisdiction's definition of insanity. Criteria were identified by the court in *People v. Skinner*[39] and include the following: the insanity is fixed and stable; it has a reasonable duration; it is not solely dependent on the ingestion and duration of effect of the drug; and it must meet the jurisdiction's legal definition of insanity.[38]

Common law does not recognize a defense of temporary insanity based on intoxication when the defendant's intoxication was voluntary. Allowing evidence of voluntary intoxication is not a traditional, well-founded principle of American law. Defining a crime's *mens rea* without regard to intoxication does not offend a fundamental principle of justice. Therefore, not allowing voluntary intoxication into evidence has not been considered a violation of the defendant's Fourteenth Amendment's due process rights, as noted in *Montana v. Engelhoff*.[40]

The Insanity Defense Reform Act of 1984 defines insanity as a "severe mental disease or defect. . .[that causes a defendant to be] unable to appreciate the nature and quality or the wrongfulness of [his] acts."[41] However, some jurisdictions recognize a defense based on settled insanity, which results from long-term use of drugs or alcohol, such as dementia due to chronic alcoholism. Courts have used settled insanity when the defendant's psychosis resulted from either a permanent mental condition due to substances or a permanent mental condition triggered by substance use.

Settled insanity may be allowed as an acceptable threshold condition for the insanity defense. Voluntary intoxication has been considered a partial defense when specific intent under *mens rea* is not present.[41] For example, voluntary intoxication may be the basis for a finding of diminished capacity and a reduced charge from first- to second-degree murder.

In *Montana v. Egelhoff*, the appellant argued that he should have been allowed to present evidence of voluntary intoxication to show that he did not commit premeditated murder in the killing of two persons whom he had met earlier in the day.[40] James Allen Egelhoff claimed that extreme intoxication rendered him physically incapable of committing or recalling the crimes. Montana law did not allow Mr. Egelhoff's intoxicated condition to be considered. Subsequently, Mr. Egelhoff was found guilty. The Supreme Court of Montana reversed the decision. It held that Mr. Egelhoff had a due process right to present all relevant evidence. Moreover, it held that the denial of such a presentation relieved the state from part of its burden of proof needed to prove premeditation. The U.S. Supreme Court reached the decision that a state can restrict the elements of a defense in criminal prosecution, consistent with the Fourteenth Amendment Due Process Clause. Justice Antonin Scalia, who delivered the majority opinion of the Court, declared that defendants do not have an absolute constitutional right to present all relevant evidence in their defense.

In *Herbin v. Commonwealth of Virginia*, [42] Jervon Lamont Herbin appealed his conviction for attempted rape, malicious wounding, abduction, and two counts of forcible sodomy on the basis of having used crack cocaine a week before the crime. Mr. Herbin testified that he felt disturbed on the day of his criminal act and had amnesia for the event except for seeing the victim sitting in a pool of blood. Mr. Herbin was under numerous stressors and introduced into evidence a history of physical and sexual abuse, drug abuse, suicide attempts, and a lengthy hospitalization. The state of Virginia allows for drug-induced settled insanity as a defense for a crime, but draws a distinction between intoxication and long-term substance abuse. To qualify for this defense, Mr. Herbin was required to provide substantial evidence of the presence of a mental disorder and the connection between it and the substance abuse. Mr.

Herbin provided evidence of recent drug abuse. He had taken Halcion, and witnesses provided evidence of his behavior on the day of the offense.

The appeals court held that a settled-insanity defense requires substantial evidence of not only long-term and heavy substance abuse, but convincing evidence of a mental disorder that is related to the substance abuse. Although Mr. Herbin provided evidence of substantial drug abuse, he was unable to provide expert witness testimony of a serious mental disorder. The court held that the substance abuse did not serve as evidence for a settled-insanity defense alone without the link to a mental disorder. Although lay witnesses testified to his behavior, the court held that the witnesses were not in a position to provide testimony on the question of settled insanity. In addition, although Mr. Herbin provided an extensive history of drug and sexual abuse, the court said no evidence showed that either was a cause or the result of a mental disorder. Therefore, the appeals court upheld his conviction.

In *People v. Grant*,[43] Egbert Grant, 18 years old, appealed his conviction related to an incident in which he attacked three others with a knife. Mr. Grant was smoking marijuana daily one month before the crime and began experimenting with LSD. During that period, he had a bad experience with LSD that resulted in his becoming very scared and claiming that the devil was after him. He said that he was having visual hallucinations involving the devil. He told authorities that he knew he was stabbing bodies and that he repeatedly and intentionally stabbed his neighbor. However, he stated that his neighbor was changing into a devil or a dragon at the time.

Psychiatrists who talked to Mr. Grant described him as believing that the neighbor was under the influence of, infested by, inhabited by, or turning into the devil or a dragon. At trial, defense and prosecution psychiatrists alike opined that Mr. Grant was psychotic at the time of the incident. Psychiatrists retained by the defense attributed his psychosis to schizophrenia that either predated or was unrelated to his use of drugs; thus, they posited that he was legally insane during the incident. Psychiatrists retained by the prosecution, however, attributed Mr. Grant's psychosis to his use of LSD, marijuana, and amphetamines; thus, they posited that he was legally sane at the time.

Mr. Grant asserted that, even if he were legally sane, his mental condition was such that he lacked the requisite culpable mental state for the more serious charges. The jury found him guilty.

A little more than a month before trial, the prosecution moved for an order requiring Mr. Grant to submit to further mental examinations. The prosecution asserted that, although the parties had long been aware of his drug use, none of the examining experts had, until recently, considered whether his hallucinations could have been caused by his use of LSD even though it was not detected in his blood after the incident. This possibility, the prosecution asserted, had been raised only after the doctor who conducted the most recent examination, for which there had been no objection, recommended further examination by an expert for a condition known as hallucinogen persisting perception disorder.

The defense objected to any further examination because of the timing of the examination in relation to the scheduled trial date. They asserted that Mr. Grant would be prejudiced because of his inability to assess the results of the new examination and, if necessary, prepare a rebuttal case for trial. He did not object, as he did later on appeal, on the grounds that he would be prejudiced by being required to supply yet more statements that could be used to assess his mental condition. Colorado had not abolished the traditional insanity defense, but continued to hold that a person who has voluntarily impaired his own faculties should be responsible for the consequences. The court concluded:

> If a defendant is found to have been sane at the time of the offense, the prosecution must still prove, beyond a reasonable doubt, any applicable *mens rea element*. . . (Legal sanity is not a proxy for *mens rea*). . . .[I]f [an accused] was under the delusion that he was shooting two gerbils rather than two human beings, he could not be guilty of murder [Ref. 43, p 806].

The court found Mr. Grant guilty of the crime charged beyond a reasonable doubt.

Carter-Yamauchi[38] and Feix and Wolber[44] reported that most jurisdictions in the United States have recognized a defense in which long-term voluntary intoxication has caused a settled insanity that is distinct from and independent of the period of intoxication. The state of Connecticut and the District of Columbia allow the insanity defense in the context of voluntary intoxication when the defendant has a well-established mental illness that in itself would account for the mental disease or defect.

In *Hawaii v. Tome*[38,45] the defendant was acquitted by reason of insanity, with a preponderance of the evidence showing that she had either schizophrenia exacerbated by methamphetamine or a methamphetamine-induced psychotic disorder. She was charged with having committed the offenses of providing a place to keep a pistol or revolver and promoting a dangerous drug in the third degree. She had waived a jury trial and relied on an insanity defense. The First Circuit Court of Hawaii concluded that the preponderance of the evidence indicated that, at the time of the crime, she had schizophrenia exacerbated by the chronic use of methamphetamine or that she had a methamphetamine-induced psychotic disorder. Both could cause her to lack substantial capacity to appreciate the wrongfulness of her act or to conform her conduct to the requirements of the law.[45]

California Criminal Law states: "settled insanity produced by long term intoxication affects criminal responsibility in the same way as insanity and not merely as a mental condition produced by the recent use of intoxicating liquor" (Ref. 39, p 2). California law recognizes settled insanity (Criminal Law § 40) but distinguishes between the effects of long-term use qualifying as insanity and a temporary mental state resulting from recent use of an intoxicant, which would not qualify as insanity.

In *People v. Skinner*, [39] the California Supreme Court specified the criteria for settled insanity. The insanity is settled if it is fixed and stable for a reasonable duration, but it need not be permanent. The period of insanity may be months or hours. Therefore, under California law, the important question is whether insanity is present at the time of the offense. The person must meet the legal criteria for insanity and have a mental disorder that is settled or stable and is not related to the duration of the substance abuse. It was suggested by Feix and Wolber[44] that the court was implying a threshold condition for the insanity defense when there is a permanent impairment caused by chronic substance abuse. This individual would also be required to have a preexisting mental illness unrelated to substance abuse that was aggravated or set off by voluntary intoxication. An example of such a person would be a patient with schizophrenia and alcohol- or inhalant-induced dementia who became acutely psychotic with the use of additional substances.

In *People v. Kelly*,[46] a woman with personality defects was believed to have been made susceptible to the development of psychosis. Under the M'Naughten test, a person is insane if he is incapable of knowing or understanding the nature of his actions. Long-term drug use can render a person incapable and can produce permanent changes in the function of the brain. According to the California court, Valerie Dawn Kelly, who was 18 years old and charged with the nonfatal stabbing of her mother, never understood the nature of her actions and was entitled to use the insanity defense. Ms. Kelly's symptoms on the day of the offense were not due to intoxication alone. One expert said that she would have had schizophrenia, even if she had never taken drugs. A defendant can advance an insanity defense in a general-intent crime if that insanity is the consequence of voluntary drug use that has produced lasting psychotic effects. Settled insanity produced by chronic intoxication affects responsibility, as does insanity produced by any other cause. However, the substance-induced effects need not be permanent. Since chronic substance abuse can produce permanent changes in brain function, the defendant was found not guilty by reason of insanity because, in accordance with the M'Naughten rule, she did not know right from wrong at that time of the offense. It did not matter that her insanity was caused by voluntary drug use. It was settled insanity and in effect separate from the drug use, although not necessarily permanent.

Discussion

The acknowledged use of wet by individuals who are charged with a criminal act may affect the criminal trial in several ways. The individual may demonstrate fluctuating changes in mental status and may engage in violent behavior; such changes would influence serial CST evaluations. The expert must consider that competency evaluations may wax and wane, depending on the defendant's substance of abuse as well as the duration and combination of drugs used. Serial CST evaluations may be needed to determine whether the individual has the capacity to stand trial.

The psychotic state induced by wet may be prolonged, and despite abstinence, users may have persistent psychosis. The chronic use of wet superimposed on an underlying psychiatric diagnosis may meet the standards for settled insanity in some jurisdictions. Expert testimony would be necessary to determine whether a mental illness was present before the ingestion of substances or was triggered by the ingestion. A substance-induced psychosis or delir-

ium must be considered in the differential diagnosis. The California Supreme Court recognized settled insanity in *People v. Kelly*,[46] ruling that chronic intoxication affects responsibility, just like insanity that is due to another cause. The expert who provides an opinion in a case involving the use of wet must be familiar with that jurisdiction's standard for the insanity defense and the availability of settled insanity as an affirmative defense. Mental status changes induced by the use of wet may cause an increase in cases of settled insanity because of its persistent neuropsychiatric effects.

A criminal offense requires a *mens rea* or culpable intent. As in the criminal case of *Hawaii v. Tome*,[45] the court may find that a substance did or did not contribute to the psychotic state that potentially affected the *mens rea* or the conditions necessary for an insanity defense.

References

1. Abdullaev Y, Posner MI, Nunnally R, *et al*: Functional MRI evidence for inefficient attentional control in adolescent chronic cannabis abuse. Behav Brain Res 215:45–57, 2010
2. Ashtari M, Cervellione K, Cottone J, *et al*: Diffusion abnormalities in adolescents and young adults with a history of heavy cannabis use. J Psychiatr Res 43:189–204, 2009
3. Gozzi A, Large CH, Schwarz A, *et al*: Differential effects of antipsychotic and glutamatergic agents on the phMRI response to phencyclidine. Neuropsychopharmacology 33:1690–703, 2008
4. Hackler EA, Byun NE, Jones CK, *et al*: Selective potentiation of the metabotropic glutamate receptor subtype 2 blocks phencyclidine-induced hyperlocomotion and brain activation. Neuroscience 168:209–18, 2010
5. Rojas R, Riascos R, Vargas D, *et al*: Neuroimaging in drug and substance abuse part I: cocaine, cannabis, and ecstasy. Top Magn Reson Imaging 16:231–8, 2005
6. Spector I: AMP: a new form of marijuana. J Clin Psychiatry 46: 498–9, 1985
7. French J: The drug scene in Newark, in Trends, Patterns and Issues in Drug Use. Community Epidemiology Work Group Proceedings (vol 2). Rockville, MD: National Institute on Drug Abuse, 1983, pp 1–6
8. D'Onofrio G, McCausland JB, Tarabar AF, *et al*: Illy: clinical and public health implications of a street drug. Subst Abus 27:45–51, 2006
9. Elwood WN: TCADA Research Brief. Fry: a study of adolescents' use of embalming fluid with marijuana and tobacco. Behavioral Research Group. Houston, TX: NOVA Research Company, University of Texas School of Public Health, 1998. Available at www.utexas.edu/research/cswr/gcattc/documents/fry.pdf. Accessed April 10, 2011
10. National Institute on Drug Abuse: Epidemiologic Trends in Drug Abuse. Highlights and Executive Summary (vol 1). Rockville, MD: National Institute on Drug Abuse, 1994, pp 64–5
11. Frank G, Galea G: Current drug use trends in New York City, in Epidemiologic Trends in Drug Abuse. Community Epidemiology Work Group Proceedings (vol 2). Rockville MD: National Institute on Drug Abuse, 1994, pp 145–53
12. Moriarty AL: What's "new" in street drugs: "illy". J Pediatr Health Care 10:41–3, 1996
13. Peters RJ, Williams M, Ross MW, *et al*: The use of fry (embalming fluid and PCP laced cigarettes or marijuana sticks) among crack cocaine smokers. J Drug Educ 38:285–95, 2008
14. Schneider M: Puberty as a highly vulnerable developmental period for the consequences of cannabis exposure. Addict Biol 13: 253–63, 2008
15. Connecticut Clearinghouse: Embalming Fluid: Illy, Fry, Wet. Plainville, CT: Connecticut Clearinghouse, 2002. Available at http://www.ctclearinghouse.org/topics/customer-files/Embalming-Fluid-Ily-Wet-Fry.pdf. Accessed March 13, 2011
16. Singer M, Clair S, Schensul J, *et al*: Dust in the wind: the growing use of embalming fluid among youth in Hartford, CT. Subst Use Misuse 40:1035–50, 2005
17. Singer M, Mirhej G, Shaw S, *et al*: When the drug of choice is a drug of confusion: embalming fluid use in inner city Hartford, CT. J Ethn Subst Abuse 4:73–96, 2005
18. Marceaux JC, Dilks LS, Hixson S: Neuropsychological effects of formaldehyde use. J Psychoactive Drugs 40:207–10, 2008
19. Hawkins KA, Schwartz-Thompson J, Kahane AI: Abuse of formaldehyde-laced marijuana may cause dysmnesia. J Neuropsychiatry Clin Neurosci 6:67, 1994
20. Kilburn KH, Seidman BC, Warshaw R: Neurobehavioral and respiratory symptoms of formaldehyde and xylene exposure in histology technicians. Arch Environ Health 40:229–33, 1985
21. Karayel F, Turan AA, Sav A, *et al*: Methanol intoxication: pathological changes of central nervous system (17 cases). Am J Forensic Med Pathol 31:34–6, 2010
22. Degenhardt L, Hall W: Is cannabis use a contributory cause of psychosis? Can J Psychiatry 51:556–65, 2006
23. Hall W, Degenhardt L: Cannabis use and the risk of developing a psychotic disorder. World Psychiatry 7:68–71, 2008
24. Hall W: Is cannabis use psychotogenic? The Lancet 367:193–5, 2006
25. Jentsch JD, Roth RH: The neuropsychopharmacology of phencyclidine: from NMDA receptor hypofunction to the dopamine hypothesis of schizophrenia. Neuropsychopharmacology 20:201–25, 1999
26. Carlin AS, Grant I, Adams KM, *et al*: Is phencyclidine (PCP) abuse associated with organic mental impairment? Am J Drug Alcohol Abuse 6:273–81, 1979
27. Cosgrove J, Newell TG: Recovery of neuropsychological functions during reduction in use of phencyclidine. J Clin Psychol 47:159–69, 1991
28. Schroeder U, Schroeder H, Schwegler H, *et al*: Neuroleptics ameliorate phencyclidine-induced impairments of short-term memory. Br J Pharmacol 130:33–40, 2000
29. Contreras PC, Jacobson AE, Rice KC, *et al*: Phencyclidine increased release of beta-endorphin from anterior lobe of the pituitary. J Pharmacol Exp Ther 258:837–41, 1991
30. Louise G, Parks LG, LeBlanc GA: Reductions in steroid hormone biotransformation/elimination as a biomarker of pentachlorophenol chronic toxicity. Aquat Toxicol 34:291–303, 1996
31. Pechnick RN, Bresee CJ, Poland RE: The role of antagonism of NMDA receptor-mediated neurotransmission and inhibition of the dopamine reuptake in the neuroendocrine effects of phencyclidine. Life Sci 78:2006–11, 2006
32. Wolfe SA Jr, Culp SG, De Souza EB: Sigma-receptors in endocrine organs: identification, characterization, and autoradiographic localization in rat pituitary, adrenal, testis, and ovary. Endocrinology 124:1160–72, 1989
33. Holland JA, Nelson L, Ravikumar PR, *et al*: Embalming fluid-soaked marijuana: new high or new guise for PCP? J Psychoactive Drugs 30:215–9, 1998

34. Modesto-Lowe V, Petry NM: Recognizing and managing "illy" intoxication. Psychiatr Serv 52:1660, 2001
35. Klein M, Kramer F: Rave drugs: pharmacological considerations. AANA J 72:61–7, 2004
36. National Institute on Drug Abuse InfoFacts: Hallucinogens—LSD, Peyote, Psilocybin and PCP. Rockville, MD: National Institute on Drug Abuse, 2009
37. Dusky v. United States, 362 U.S. 402 (1960)
38. Carter-Yamauchi C: Drugs, Alcohol and the Insanity Defense: The Debate Over "Settled" Insanity. Legislative Reference Bureau. Report 7, 1998. Available at http://state.hi.us/lrb/rpts98/settled.pdf/. Accessed September 17, 2010
39. People v. Skinner, 228 Cal. Rptr. 652 (Cal. Ct. App. 1986)
40. Montana v. Egelhoff, 518 U.S. 37 (1996)
41. The Federal Insanity Defense Reform Act of 1984, 18 U.S.C. § 17 (1984)
42. Herbin v. Commonwealth, 503 S.E.2d 226, 231 (Va. Ct. App. 1998)
43. People v. Grant, 174 P.3d 798, 806 (Colo. Ct. App. 2007)
44. Feix J, Wolber G: Intoxication and settled insanity: a finding of not guilty by reason of insanity. J Am Acad Psychiatry Law 35: 172–82, 2007
45. State v. Tome, Cr. No. 96-1451 (Haw. Ct. App. 1998)
46. People v. Kelly, 516 P.2d 875 (Cal. 1973)