In the August issue (2015) of Lancet Psychiatry, Hall et al make a case that the brain disease model of addiction (BDMA) is not supported by the evidence and has not delivered on its promises [1]. They assert this partly by using the example of the spontaneous recovery of many heroin-addicted US veterans of the Vietnam War when they returned stateside [2]. But their argument is predicated on their mistakes: recreational drug use with the disease of addiction. Simple recreational use of drugs is not addiction. The ability of an individual to spontaneously extinguish recreational drug use cannot be used to support their position that addiction is not a brain disease. The accepted diagnostic criteria of the process of addiction include a compulsion to use the chemical, loss of control over the quantity consumed, and continued use despite the harm caused by the substance. The disease of addiction often has a relapsing-remitting course with predictable, devastating consequences. Additionally, in the same issue of Lancet Psychiatry, Vollow and Koob put forth a correct counterpoint that clinical studies have consistently delineated specific molecular and functional neuroplastic changes at the synaptic circuitry level that are triggered by repeated drug exposure. They go on to say that these findings, along with ongoing research, are helping us to understand the neurobiological processes associated with the loss of control, compulsive drug-taking, inflexible behavior, and negative emotional states associated with addiction [3]. Additionally, there is ample evidence suggesting addiction is a biological disease of the human reward system. The neurochemical basis of the reward is the release of dopamine in the nucleus accumbens (NAc), and it is intimately connected to the ventral tegmental area, amygdala, hippocampus, orbitofrontal cortex, and prefrontal cortex. Repeated use of substances of abuse results in this system being hijacked and a phenomenon of tolerance developing. It has been demonstrated in animals that such tolerance develops with the release of brain-derived neurotrophic factor (BDNF) and nerve growth factor (NGF) that causes changes in the dendritic structures in or near the NAc [4,5,6,7]. As well as being supported by animal studies, it is also backed by neuroimaging studies in humans. In patients who have the diagnosis of addiction, it appears that it is a clear-cut brain disease implicating the reward system. This disease appears to have about a fifty percent contribution of genetics [8].

Understanding what causes a relapse in a subject who has remained abstinent for a period is the Holy Grail in addiction treatment. In the reinstatement model, the animals are trained to self-administer drugs by pressing a lever for intravenous drug infusion in an operant conditioning chamber. Eventually, the drug-reinforced behavior is extinguished by substituting the drug solutions with saline or by disconnecting the infusion pump. The re-exposure to the drug results in the reemergence of addictive behaviors. This is called “priming” [9,10,11]. Addiction as a disease cannot be diagnosed in animals since it is impossible to fulfill the criterion of the disease that is the compulsion to use the chemical. However, the phenomenon of priming, preferring alcohol over water, and many other animal traits are comparable to the human disease of addiction [12].

US National Institutes on Drug Abuse (NIDA) Chief Volkow and Koob in their response, however, go on to say that the uncovering of molecular targets and circuits underlying addiction has already resulted in several effective medications. This type of assertion by the NIDA Chief has resulted in significant use of “medication-assisted treatments (MAT)” in the field of addiction medicine; leading the pack is intramuscular long-acting opioid antagonist naltrexone (Vivitrol®) marketed by Alkermes. Unfortunately, studies with weak outcome measures force us to take issue with her assertion. The primary outcome measures of success that Vivitrol® manufacturer Alkermes uses are curious. In the case of opioids they include the following: (1) had significantly more days of complete abstinence, (2) stayed in treatment longer, (3) reported less craving, (4) were less likely to relapse to physical dependence. For Vivitrol’s efficacy on alcohol addiction, the outcome measure used was reduced number of heavy drinking days per month based on more than four drinks for women and more than five drinks for men [13,14]. These are short-term studies; there has been a single long-term study that demonstrates success when complete abstinence is used as an outcome measure. These outcome measures are at odds with the underlying neurobiology of addiction that shows an animal will rapidly resume self-administration when they are given a dose of drugs in a setting of being primed. The neurobiological cascade that occurs in the course of addiction and the diagnostic criteria of addiction suggest the recommended outcome measure utilized must be complete abstinence over a specified period. In subjects primed through a previous history of addiction, drug use escalates quickly when the substance is reintroduced. Therefore anything less than complete abstinence seems an inadequate outcome measure.

One of the diagnostic criteria of addiction is a loss of control over the quantity consumed. If subjects, when exposed to reinforcing substances, can control their disease and not deteriorate to a full-blown relapse, they will not qualify for the diagnosis of addiction in the first place. This is a prima facie evidence against using less-than-complete abstinence as a primary outcome in addiction. Complete abstinence from all reinforcing substances needs to be the primary goal of addiction treatment. Vivitrol® in clinical studies must have failed to demonstrate sustained abstinence from alcohol or opioids. Otherwise, why would you choose convoluted outcome measures to demonstrate the efficacy of this drug in the first place? The cost...
of Vivitrol® is in excess of $15,000 per annum. This cost does not justify its use. We feel that many MAT therapies are ineffective, expensive, and scientifically unsound. The push by the past head of the National Institutes on Alcohol Abuse and Alcoholism (NIAAA), Enoch Gordis, that “treatment works” may also have resulted in trying to find secondary outcomes to demonstrate that the treatment is effective. Furthermore, expensive medications developed by financially motivated pharmaceutical companies create an underlying bias of developing outcome measures that are short of complete abstinence but nonetheless superficially appear reasonable for FDA approval of these medications. The existence and further maintenance of expensive budgets of NIAAA and NIDA may also have created yet another bias to accept less than complete abstinence as a reasonable model of recovery.

One need not look far to find evidence for support of abstinence as the primary outcome measure in the treatment of addiction, and for therapeutic techniques that allow for long-term success. Physicians enjoy a success rate of complete abstinence from addictive substances for five years at 80-85 percent when contingency contracting is employed as part of the treatment model. Under this paradigm, if they have to find a relapse on a substance they are likely to lose their license to practice medicine. This type of program, underutilized in the general population, uses contingency contracting as a “prefrontal braking mechanism” to induce abstinence rather than relying on MATs.

Not a single physician health program in the US requires MATs to treat physicians with the diagnosis of addiction; on the other hand, nearly all the programs mandate participation in the twelve-step meetings coupled with random tissue sample monitoring [15-19].

In conclusion, there is no doubt that addiction is a chronic brain disease. There is ample neurobiological evidence of such. However, we are currently using questionably effective and very expensive drugs such as Vivitrol® under the rubric of MATs, while underutilizing in the general population the very effective contingency contracting models, such as co-opting employers in the treatment of addicted employees, which are used by physician health programs. The MAT movement is not a panacea and is currently being used without a scientific rationale.

References