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Article

***283 ENHANCING THE FIGHTING FORCE: MEDICAL RESEARCH ON AMERICAN SOLDIERS**

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Be all that you can be, and a lot more.

- DARPA's revision of a U.S. Army recruiting slogan.

During President Barack Obama's first primetime press conference, reporters asked primarily about the state of the economy and terrorism. Wedged between questions on these two vital issues was a query from the *Washington Post's* Michael Fletcher:

Question: What is your reaction to Alex Rodriguez's admission that he used steroids as a member of the Texas Rangers?

Obama: You know, I think it's depressing news And if you're a fan of Major League Baseball, I think it--it tarnishes an entire era, to some degree. And it's unfortunate, because I think there are a lot of ballplayers who played it straight. And, you know, the thing I'm probably most concerned about is the message it sends to our kids. What I'm pleased about is Major League Baseball seems to finally be taking this seriously, to recognize how big a problem this is for the sport, and that our kids hopefully are watching and saying, "You know what? There are no shortcuts, that when you try to take shortcuts, you may end up tarnishing your entire career, and that your *284 integrity's not worth it." That's the message I hope is communicated. [\[FN1\]](#)

Situating the use of steroids by baseball players on the same level as the economic meltdown in the U.S. and the war in Afghanistan may seem strange, but less than two weeks later in his weekly Op-Ed column in the Sunday *New York Times*, Frank Rich produced a similar list of what he saw as the major evils that were denied during the Bush administration: "Steroids, torture, lies from the White House, civil war in Iraq, even recession" [\[FN2\]](#) As to steroid denial in particular, Rich noted, "[a]nyone with eyes could have seen that Sammy Sosa and Mark McGwire resembled Macy's parade balloons in their 1998 home-run derby" [\[FN3\]](#) And in its February 23rd issue, the cover of the *New Yorker* featured a portrait of Alex Rodriguez signing autographs for young children whose arms were bloated like balloons.

As we will explore in this Article, some ethicists think that the concern about drugs used for "enhancement," including steroids used by baseball players to increase their strength, is misplaced, and that adult athletes should be able to use whatever enhancers they want, so long as they are not dangerous to their health. [\[FN4\]](#) Putting aside for a moment the health dangers of steroids on adults--which are contested--the other two primary reasons for banning the use of performance enhancers in baseball are that they are, as President Obama noted, a form of cheating that undermines the integrity of the game, and that they encourage emulation by children.

Sports has been the primary arena in which what might be termed the “enhancement debate” has played out, and, at least until the publication of the Mitchell report in late 2007, most of the attention focused on the Olympics and devising ways to detect cheating by athletes who were using drugs. [\[FN5\]](#) In George Mitchell's recounting, as well as a recent survey by the *Wall Street Journal*, the two teams that had the most players who used steroids were George W. Bush's old team, the Texas Rangers, and the New York Yankees. [\[FN6\]](#) As Red Sox fans, we can, of course, be accused of prejudice, especially against the Yankees. So it is probably best we leave the sports debate to others. Instead, our focus in this Article is on the use of performance enhancing drugs in the arena that bracketed the Alex Rodriguez question to the president: the war against terrorism, and specifically the unasked question regarding the use of “enhancement” drugs by U.S. soldiers in combat.

MILITARY ENHANCEMENTS: SCIENCE OR SCIENCE FICTION?

In his 1959 novel *Starship Troopers*, Robert Heinlein envisions a future in which soldiers take drugs to eliminate fear and wear “powered armor” body suits. The suits, as described by a soldier in the book, “give us better eyes, better ears, stronger backs ... better legs, more intelligence ... more firepower, greater endurance, less vulnerability.” [\[FN7\]](#) The suit is said to make the soldier “look like a big steel gorilla, armed with gorilla-sized weapons.” [\[FN8\]](#) It weighs a ton, “yet from the very first time you are fitted into one you can immediately walk, run, jump, lie down, pick up an egg without breaking it ... and jump right over the house next door The secret lies in negative feedback and amplification.” [\[FN9\]](#) Military physicians remain essential, because “if my suit gets really sick, I call the doctor—a doctor of science (electromechanical engineering) who is a staff Naval officer” [\[FN10\]](#)

Heinlein's body suit remains in the realm of science fiction, but since Sputnik and the formation of the Defense Advanced Research Projects Agency (DARPA), research has continued on enhancing America's soldiers. In his 2007 novel *Breakpoint*, published fifty years after *Starship Troopers*, former counterterrorism official Richard Clarke envisions what the results of DARPA's current research might look like as soon as 2012. The combat suits under development enable their wearer to jump eight feet in the air or bounce twenty feet ahead, they are flexible and lightweight yet capable of stopping bullets, and can also give the wearer a sedative or call for an ambulance when necessary:

The standard medicine kit can keep you awake for seventy two hours with no side effects. You could lift a small car with one arm. You don't have X-ray vision, but you do have telescopic and night vision. You're directly wired to the Internet, so all the knowledge in the *286 world is instantly available to you and you can talk, chat, text, or e-mail anyone anywhere. You are part of the connected consciousness. [\[FN11\]](#)

Washington Post reporter Joel Garreau summarized DARPA's current “super soldier” projects based on interviews with DARPA personnel. DARPA researcher Michael Goldblatt described the future soldier:

Soldiers having no physical, physiological, or cognitive limitations will be the key to survival and operational dominance in the future Indeed, imagine if soldiers could communicate by thought alone Imagine the threat of biological attack being inconsequential. And contemplate, for a moment, a world in which learning is as easy as eating, and the replacement of damaged body parts as convenient as a fast-food drive-through ... these visions are the everyday work of the Defense Services Office [of DARPA]. [\[FN12\]](#)

DARPA's projects include a program called “Persistence in Combat” that aims to create soldiers who are “unstoppable” because pain, wounds and bleeding are kept under their control. Specifics include a search for a “pain vaccine” that will block intense pain within ten seconds, using photobiomodulation to accelerate wound healing, and designing a chemical cascade to stop bleeding within minutes. Other projects seek to promote limb regeneration, attempt to emulate dolphin and whale brain activity in order to “create a ‘24/7’ soldier-- one that can easily navigate, communicate and make good decisions for a week without sleep,” to help produce “operational dominance,” and to create a universal pathogen killer that can neutralize any known pathogen. [\[FN13\]](#)

Although these projects seek to create a new kind of soldier, the most frequent model used for enhancements in existing literature is the athlete, specifically top Olympic athletes. For example, the “metabolically dominant soldier” project aims to make soldiers the metabolic equivalent of Olympic athletes: “to have strength and endurance that doesn't quit. The Energizer Bunny in fatigues kind of does it. Keeps going and going.” [FN14] The slogan for the project is “Be all that you can be and a lot more.” [FN15] Other projects involve brain to computer interfaces, and a wearable suit that would provide the soldier with greatly enhanced strength, and enable the wearer to run at Olympic sprinter speed for hours and do seven foot vertical leaps. [FN16]

*287 The motto of the American military physician is “to conserve the fighting force.” [FN17] This means caring for the physical and mental health needs of soldiers in combat so they are fit to fight, to continue fighting, or to return to the battlefield after treatment. [FN18] Although the motto is unmodified, today there is a notable shift in emphasis in the American military toward “enhancing the fighting force.” The primary enhancement is technological, and includes not only improved military weapons, planes, tanks, and armored vehicles, but also new body armor and sensors, as well as a new generation of combat robots. These robots are to act as force multipliers and to perform missions deemed too dangerous or complicated for human soldiers. The ethics of fighting robots is only beginning to be explored, although science fiction cautions us that artificial intelligence is likely to overtake human intelligence in the not too distant future. [FN19]

Unlike Heinlein, Clarke assumes that enhancements developed by the U.S. military will be quickly adopted for civilian use. [FN20] With this assumption, Clarke raises a central question in the entire enhancement debate: are military enhancements different in kind and rationale such that they should only be applied to soldiers fighting wars, or are they part of a continuum of enhancements that should have broad application to all humans? Of course, if military enhancements are seen as unique, we will need to find a way to prevent their use in the civilian world, or not pursue them at all if such prevention is impossible. Related to this question is the role of the military physician, specifically with regard to whether the military physician's role is *288 the same in the realm of enhancements as it is in the realm of treatment. If there are differences, what are they and on what basis can they be justified? We begin by summarizing the enhancement debate, examining the major supporting cases used in it--soldiers and surgeons. We conclude with a discussion of enhancement research in the military and make recommendations regarding the role of military physicians, which we suggest should be applied to physicians generally-- including in the area of enhancements.

THE ENHANCEMENT DEBATE

The two primary goals of medicine have always been to treat disease and alleviate suffering. Human embryonic stem cell research has been the most politically controversial medical research because it involves the destruction of human embryos to obtain stem cells. Nonetheless, most Americans see this as acceptable because the potential benefits are so large: the treatment of a variety of currently incurable serious diseases through regenerative medicine. [FN21] Treating individuals who are sick or “abnormal” to return them to “normal” functioning is uncontroversial. Nonetheless, it is worth noting that the “norm” referred to here is both a fact (as in a normal human being), and a value (how the individual sees him or herself). [FN22]

Enhancements are often said to be different in kind because they attempt to take a normal or well human being and make him or her “better.” And the term itself seems to prejudge the conclusion, rather than state one possible outcome of research. In this regard it is similar to using the term “therapy” in the phrase “gene therapy” since this is a hope, not a reality: we are currently limited to doing gene transfer experiments, which may one day result in therapeutically useful genetic interventions. Likewise, the term “enhanced” has come to mean not better, but something altogether different in contemporary politics. The best (or worst) example is probably the Bush administration's use of the term “enhanced interrogation” to refer to torture. President George W. Bush's Council on Bioethics was thus correct to observe that the term “enhancement” is itself “highly problematic ... abstract, and imprecise,” and that “all successful therapies are enhancing, even if not all enhancements enhance by being therapeutic.” [FN23] The Council *289 worried most that enhancements would be effective and would be used to such an extent that they would ulti-

mately change what it meant to be human--and in a negative way. In the Council's words:

We might come to see human running and dog races, singers and synthesizers, craftsmen and robots, as little different from one another. Human beings, here mostly for our entertainment or our use, might become little more than props or prop-makers. We might lose sight of the difference between real and false excellence, and eventually not care. And in the process, the very ends we desire might become divorced from any idea of what is humanly superior, and therefore humanly worth seeking or admiring. We would become a society of spectators, and our activity mere spectacle. Or a society of parasites, needing and talking, but never doing or acting. Worst of all, we would be in danger of turning our would-be heroes into slaves [\[FN24\]](#)

The Council was particularly worried about enhancements that make us look and act younger to try to cheat death, and how we might use enhancements on our children to make them "better." As to drugs, the Council's concern was that we would all wind up drugging ourselves to feel good, not unlike the "soulless," contented-cow characters from Huxley's *Brave New World*. [\[FN25\]](#)

The Council did not address in any detail the possible military applications of enhancements, even though these are the ones under the most intense development, the ones most likely to be used, and following initial use and some evidence of safety, the ones most likely to find application in the civilian population. Of course, with the country engaged in two unpopular wars, perhaps the Council did not want to say or do anything that might offend the Bush administration that created and nurtured the Council. Nonetheless, the Council did ask some relevant questions on this topic:

When the very existence of the human agent or human society is at stake, certain special superior performances are not only edifying but urgent: for example, the superior performance of soldiers or doctors. What guidance, if any, does our analysis provide for such moments of extreme peril and consequence, in war or in medicine, when superior performance is *a matter of life or death*? *Are some biotechnical interventions to enhance performance justified in these activities (war, surgery) while not justified in the other activities of human life (sports, music, test-taking)*? In these circumstances, might we treat men as alterable artifacts--or willingly become artifacts ourselves--in order to 'get the job done'? [\[FN26\]](#)

***290** Aside from the remarkable conflation of surgeons and soldiers, the Council ignores these questions by answering a different one, arguing that we should break out of our "boundaries" even for serious reasons, "only with disquiet, overriding boundaries rather than abandoning them, and respecting certain ultimate limits to ensure that we remain human even in moments of great crisis." [\[FN27\]](#) The Council then goes on to undercut its own basic argument by seeming to say that as long as soldiers do become de facto robots, enhancements are acceptable:

Even if they existed, and even in times of great peril, we might resist drugs that eliminate completely the fear or inhibition of our soldiers, turning them into 'killing machines' (or 'dying machines'), without trembling or remorse. Such biotechnical interventions might improve performance in a just cause, but only at the cost of making men no different from the weapons they employ. [\[FN28\]](#)

The Council's report was published in 2003, and since then the Council has itself been characterized as anti-science and embryo-centric to the point of being out of touch with both science and society. [\[FN29\]](#) Thus, it was no great surprise that when in late 2008 a highly-discussed commentary encouraging the use of drugs to produce "cognitive enhancement" (primarily in students and other test-takers) appeared in a leading science journal, *Nature*, the authors dismissed the Council's entire enhancement report (and similar arguments by others) in three sentences. [\[FN30\]](#) The first sentence summarized the major objections to enhancements generally (short circuiting personal agency and undermining the value of human effort), the second sentence restated the Council's observation that there are important differences between traditional and biotechnological means of human enhancement, and the third sentence concluded, without argument, and based on a sole citation to a highly opinionated work of one of the co-authors, "[s]uch arguments have been persuasively rejected." [\[FN31\]](#)

***291** According to the *Nature* commentators, only three issues are relevant to the use of drugs such as Ritalin and Adderall to improve concentration and test-taking ability: a risk-benefit analysis that lets competent adults make

their own decision regarding use; concerns about coercion involving children, soldiers, and employees; and (assuming they work) a fairness principle that would provide access to everyone who wanted them to minimize “enhancement-related socioeconomic disparities.” [FN32] Although the commentators reject the report of the President's Bioethics Council, they ultimately wind up in the same space by their almost identical use of examples without discussion or analysis: soldiers and surgeons. In their words:

Questions of coercion and autonomy are particularly acute for military personnel and for children. Soldiers in the United States and elsewhere have long been offered stimulant medications including amphetamine and modafinil to enhance alertness, and in the United States *are legally required to take medications if ordered to for the sake of their military performance*. For similar reasons, namely the safety of the individual in question and others who depend on that individual in dangerous situations, one could imagine other occupations for which enhancement might be justifiably required. A hypothetical example is an extremely safe drug that *enables surgeons to save more patients*. Would it be wrong to require this drug for risky operations? [FN33]

We leave it to others to comment on whether it is more offensive to equate the situation of soldiers to that of children, or the situation of a surgeon taking care of massive casualties on the battlefield to one simply doing a “risky” operation. We can, however, draw at least one clear conclusion from both the President's Bioethics Council and the *Nature* commentators: although they see themselves as radically different, both of them use the case of soldiers and surgeons without data and with little or no thought, and neither seem to have any idea of what the law is regarding physicians and soldiers in the United States Armed Forces. We will examine the relevant law on the military, and especially physicians in the military, in the final section of this Article. First, we explore an area all commentators agree is critical, but none have spent much effort exploring--the question of safety *292 and how it might be determined in the area of enhancements. Our primary concern is with the two recurring examples (used by the President's Council as possible exceptions to their general prejudice against enhancers, and used by the *Nature* commentators as prime examples of uncontroversial uses of enhancers) of what seem to be candidates for quasi-mandatory enhancement: soldiers and surgeons.

ENHANCEMENT AND SAFETY: ENHANCING ALERTNESS IN SOLDIERS AND SURGEONS

Perhaps the enhancement most sought after by the widest variety of populations is the ability to remain alert for long periods of time. At the extreme, this ability has been celebrated in science fiction, with one author suggesting that people genetically-engineered to require no sleep at all would quickly take over the world. [FN34] In the real world, a number of population groups are susceptible to the use of amphetamines to stay awake during work or other tasks: college students cramming for exams, [FN35] athletes, [FN36] commercial pilots during long shifts, [FN37] physicians, [FN38] and military personnel. The military and medical justifications for using amphetamines in this way are more persuasive than a student or an athlete-- soldiers are in life-threatening situations where their senses need to be sharp, and surgeons holds the lives of others in their hands. Nonetheless, there are also compelling safety considerations when talking about amphetamine use by professionals such as surgeons or, to use a specific military example, military pilots. These safety risks should not simply be assumed away, even, we think, for the sake of argument.

*293 Amphetamine's common side effects include fast heartbeat, tremors, headache and dizziness. [FN39] Insomnia is another side effect. When used by military personnel, these “go pills,” which are used to keep personnel awake and alert during missions that are particularly long or conducted during normal sleeping hours, [FN40] must often be counterbalanced by the use of “no-go” pills (or sedatives) to allow the personnel to sleep when they have the time to do so in between missions. [FN41] GlaxoSmithKline notes in its prescribing information for Dexedrine, an amphetamine officially sanctioned by the U.S. Air Force for pilot use, that “[a]mphetamines may impair the ability of the patient to engage in potentially hazardous activities such as operating machinery or vehicles” [FN42]

Military Pilots

Looking only at amphetamine use during missions (and setting aside the issue of long-term effects in post-military life), safety questions persist. [FN43] For example, are there predictable side effects of drug use such as “tremors” or “dizziness” that could be counter-productive to a mission? We want military personnel to be alert and awake as much as possible in order to protect themselves, their comrades, and to carry out their missions in the most effective way. The question is whether those goals are diminished by use of amphetamines. [FN44] While documentation of cases of preventable death caused by use of drug enhancements in the military is rare, the case of Tarnak Farms is unusually well-documented, which is why we adopt it for review.

***294** Tarnak Farms refers to a friendly fire incident that occurred during the first year of the war in Afghanistan. [FN45] The incident involved two U.S. Air Force F-16 pilots who were flying over Afghanistan. [FN46] The pilots were just about to return to their base in Kuwait after a ten-hour patrol. One of the pilots believed that he saw surface-to-air fire. He sought clearance from flight control to drop a bomb, and about thirty-five seconds later dropped a 500 pound bomb onto the site. Soon after, flight control answered his request with a denial of authorization and information that “friendlylies” were in the area. Those “friendlylies” were Canadian soldiers conducting a firing exercise at the site, Tarnak Farms. Tragically, four of the Canadian soldiers were killed and eight were wounded in this incident. [FN47]

Air Force pilots routinely need to make split-second decisions such as the one made by the pilot in this case. But in this particular situation, there were built-in safety procedures that might have prevented this tragedy had they been followed. [FN48] The pilot thought he was being fired on. There was also testimony that he and his partner had not been briefed about “friendlylies” conducting exercises in that area prior to their mission. [FN49] In addition, U.S. ***295** Air Force pilots had been warned about Taliban surface-to-air fighting in that area, and had also been provided information about the beheading of captives by the Taliban.

Given these facts, it is conceivable that this pilot's judgment was reasonable under the circumstances. In fact, five F-16 pilots testified during an Article 32 hearing to investigate the incident that the pilot had followed reasonable procedure under the circumstances. [FN50] However, the letter of reprimand accompanying the pilot's dereliction of duty finding (part of his final punishment [FN51]) noted that he “rashly decided that the target was an enemy firing position” and that he had “exhausted his patience” waiting for clearance from flight control to drop the bomb. [FN52] During the investigation, the pilot presented as a defense that he and the other pilot in the incident had been told by superiors to use amphetamines during their missions. [FN53]

Although the use of Dexedrine may have affected their behavior, this friendly fire incident cannot be explained away simply because the pilots were on “speed.” Many other safety lapses in the military patrol system contributed to the incident. For example, a number of communications failures occurred that night, including the critical detail that the pilots had not been briefed prior to that mission about any planned live fire drills by coalition forces in the area. [FN54] They had, however, recently been briefed to beware of Taliban ambushes in the Kandahar area. [FN55] Since Air Force policy supported and arguably encouraged the use of Dexedrine, it is possible that Air Force officials thought they had to vigorously defend their “enhancement” policy and to ensure that the incident was not blamed on drug use. This would have given them a motive to scapegoat the two pilots, who ultimately became victims of this catastrophe themselves.

Colonel Peter Demitry, Chief of the United States Air Force Surgeon General's Science and Technology Division, has referred to prescribing ***296** amphetamines for pilots as the “gold standard for anti-fatigue.” [FN56] From a hypothetical viewpoint (since there is no proof that the Air Force actually tried to use the two pilots as scapegoats), if an investigation into the incident focused more on the communications failures and “forced” use of amphetamines, rather than the specific actions of the pilot in a very short period of time, the Air Force may have had much more of a problem with both the Canadian government in explaining this major error, and with the medical community for its continued use of a potentially hazardous drug during missions. It is much more convenient in a case like this to brush the incident off as rash pilots behaving in an arrogant way, rather than perform a complete system review that might raise more generic safety problems.

There are also problems with the pilot error or overreaction scenario. These pilots had years of experience, and one is a former “Top Gun” instructor. [FN57] While no pilot is perfect, it is possible that the pilot's reaction time and loss of patience in this case could have been partially affected by the cumulative effect on the brain that *repeated* use of amphetamines at the direction of supervisors may have taken. [FN58]

If the military's use of amphetamines was sporadic or not recommended by the top ranks, and just a tool that individual pilots or soldiers could use in limited circumstances, any potential harm might be outweighed by the benefits. The benefits of alertness that these drugs bring can be very useful for both the pilots and the Air Force in general, and therefore for the American people overall in terms of protection. Nonetheless, safety risks should be given at least as high a consideration as the benefits. Given that the military is overstretched [FN59] and with anecdotal evidence of rising *297 amphetamine use in the military, it may be that the military is at a point where there is no choice but to ask pilots or soldiers to use such drugs when their sleep/wake cycles must be manipulated because of added missions.

Nonetheless, it is reasonable to conclude that there are real safety risks associated with the use of alertness drugs in the military. Real research on both the short and long-term effects of these drugs should be conducted before they become part of routine medical use in the military. Such research should examine not only the effect of drugs on the pilot's ability to execute his or her mission, but also on whether the long-term effects of the drug negatively affect the pilot's ability to return to civilian life.

Physician Fatigue

Those whose performance is most closely linked to military pilots, as suggested by both the President's Bioethics Council and the *Nature* commentators, are physicians, especially surgeons who must endure long operations. This is due to the fact that performing their professional duties is directly linked to the lives and safety of their patients. Before focusing on the special circumstances of surgeons, it is worth reviewing a famous case of physician fatigue that encouraged policy-makers to focus on patient safety.

In 1984, eighteen-year-old Libby Zion died in the Emergency Room at Cornell Medical Center in New York. [FN60] As the result of this tragedy, the Bell Commission was formed to review resident duty hours and recommended that resident duty hours in New York be limited. [FN61] This was the first widely-publicized case where a patient death could have been the direct result of actions by overtired, overworked, and under-supervised medical residents. It began a long policy discussion between those who argue that patient safety is adversely impacted by fatigue caused by long work schedules of residents and nurses, and those who argue that the educational, training and continuity-of-care benefits of long hours outweigh the risks.

In 2003, the Accreditation Council for Graduate Medical Education (ACGME) issued resident duty hour limitations. [FN62] However, work hours are *298 not the only factor that increases fatigue in the hospital work setting. Resident workloads have also become more intense in the last few decades. [FN63] Although work hour limitations most likely decrease the level of fatigue among residents to some degree, fatigue still remains a problem in the hospital setting and a potential for risk to patients. For example, a study of nurse working hours found that almost two-thirds of the study's participants worked overtime “10 or more times during the 4-week study period.” [FN64] In addition, although some experts believe work hours should be limited even further, system factors such as financial constraints on hospitals and workforce shortages serve as barriers to that goal. [FN65]

One study using focus groups of medical residents to find out how they combat fatigue found that drug use was not a major factor. [FN66] However, in this study, when the issue of prescribed stimulants as a way to combat fatigue arose in discussions, residents most often reported that they were not talking about themselves, but had heard of other residents taking stimulants. [FN67] This could show hesitancy to admit such use for fear of discipline or

loss of respect among peers.

Some hospitals randomly test employees for drugs; for example, Massachusetts General Hospital and the Cleveland Clinic randomly test their resident anesthesiologists for drugs. [\[FN68\]](#) However, these drug tests are designed to identify impaired anesthesiologists so they can be rehabilitated and do not harm their patients if they are under the influence of drugs. We know of no studies on the risks to patients of having physicians use stimulants to increase alertness, or of the long-term effects on physicians of stimulant use, although it seems likely that these affects would depend largely on frequency and dose.

***299 Surgeons and Fatigue**

Alertness is important for all physicians, but may be particularly important for surgeons, especially those who perform long operations. A study using a virtual reality surgical simulator to test the performance of surgical residents during acute sleep deprivation found that fatigue was associated with “increased errors” in performing surgical skills on the simulator. [\[FN69\]](#) A study by researchers from Arizona State University found that pre-operative “warm up exercises” can be useful to surgeons in combating fatigue. [\[FN70\]](#)

There is also some evidence that surgeons have a lower level of awareness regarding the effect fatigue can have on performance. In a survey of residents at University of Toronto teaching hospitals, surgical residents were more likely to report working more hours than non-surgeon residents. In addition, surgical residents were more likely to score higher on a sleepiness scale and lower on a scale showing perception of sleep deprivation on performance. [\[FN71\]](#)

As with pilots, the use of stimulants by surgeons poses safety risks that support the need for serious research on risks to both surgeons and patients before it is adopted or accepted as practice. [\[FN72\]](#) Such studies will need first to determine whether use by surgeons is safe for patients, at least when compared to the risks associated with fatigue. Next, studies should consider the effects of short-term and long-term use on the individual surgeon. Clinicians should be cautious in turning to a drug option as a solution to fatigue. As noted, fatigue is a consequence of an overstressed healthcare system, and the long-term solutions for this problem are likely to be found in reforming the healthcare system itself. Moreover, if drug use is valorized, we risk further distraction from the main issue--which is providing solutions for surgeons to benefit from the most effective treatment of fatigue--sleep.

***300 RESEARCH ON THE UNENHANCED SOLDIER**

We have suggested that there are serious safety issues that have not been adequately addressed in the enhancement debate, especially where drug enhancements promoted to increase alertness and decrease the need for sleep are concerned. This means that more research on such enhancements is necessary if they are to be pursued at all. Although many commentators want to take safety for granted so they can discuss what they see as more interesting questions involving enhancements, there does seem to be basic agreement that any enhancement that is to be promoted or adopted widely should meet basic safety standards. Safety can only be proven by well-designed research trials. What rules should enhancement research follow?

The *Nature* commentators cite Jonathan Moreno as exclusive support for the proposition that soldiers are “legally required to take medications if ordered to” [\[FN73\]](#) This considerably overstates not only what Moreno wrote, but also the actual law as it pertains to soldiers. First, what Moreno actually stated was as follows:

Soldiers aren't normally asked for their informed consent before accepting what their command regards as the best preparation for battle. If the question is a purely moral one, then it's difficult to see why these AugCog [augmenting cognition] enhancements should be regarded differently from anything else a soldier can be legally ordered to do. [\[FN74\]](#)

Elsewhere in his book, Moreno notes, “freedom-of-choice arguments have more traction in an all-volunteer army than in a force of draftees.” [\[FN75\]](#) But the issue of a soldier's consent to enhancements is much more complex than either the *Nature* commentators or Moreno make it; the issue involves not only the autonomy of soldiers in this context, but also the ethics of military physicians as well. This is an issue that has received additional scrutiny in the context of the global war on terror.

Military Medical Ethics

The global war on terror has brought renewed attention to the question of whether physicians in the U.S. military are physicians first, soldiers first, or physician-soldiers--or whether some other formulation best describes their medical-ethical obligations. The chair of the President's Council on Bioethics, Edmund Pellegrino, has insisted that medical ethics are and must ***301** be the same for civilian and military physicians, “except in the most extreme exigencies.” [\[FN76\]](#) Pellegrino argues that there are no special medical ethics for active-duty military physicians any more than there are for Veterans Affairs physicians, National Guard physicians, public health physicians, prison physicians, or managed care physicians. The only question is whether there are “extreme exigencies” that justify physicians' suspension of their medical-ethical obligations; an analogous question to another asked (but not answered) by the President's Council: are there life and death situations that justify the use of “enhancements” in soldiers and surgeons?

It is not surprising that wars have produced battlefield situations in which suspending patient-centered medical ethics has seemed reasonable, at least to military commanders. Perhaps the best-known example from World War II is the decision during the North African campaign to provide penicillin first to troops with sexually transmitted diseases, rather than to seriously wounded troops, because the former could be quickly returned to combat. In the first Gulf War, the primary medical-ethical problem was whether military necessity justified physicians in prescribing investigational drugs without the informed consent of troops. In the war on terror, controversy has centered on the participation of physicians in prisoner interrogations and hunger strikes and, most recently, on the use of psychotropic medications to retain soldiers in combat areas or return them for another tour of duty. What role can ethical military physicians play in each of these situations, and how do they inform the question of enhancement experimentation and enhancement preparation for battle?

The editors of the textbook *Military Medical Ethics* conclude that a military physician is a “Physician First, Officer Second” and that “instances of significant conflict” between civilian and military medical ethics are “very rare.” [\[FN77\]](#) This formulation states the problem rather than the solution, since it is only these “rare” cases involving “military necessity” that could require military physicians to betray medical ethics in favor of military or national security concerns. The use of the investigational drug pyridostigmine bromide as a chemical warfare “pre-treatment” during the first Gulf War illustrates this point. In seeking a Food and Drug Administration (FDA) “waiver of informed consent” for use of the drug, the Department of Defense (DOD) confused military necessity with medical ethics. [\[FN78\]](#) In that case the ***302** DOD thought that the FDA had granted permission to use an investigational drug without informed consent because the drug was seen as safe by the FDA, whereas the FDA thought that DOD had sought permission to use the drug without informed consent because they believed the use was required by military necessity. [\[FN79\]](#)

In the war on terror, military physicians have faced at least three major challenges to medical ethics: orders that direct them to help interrogate terrorist suspects using “enhanced interrogation” methods; force-feeding prisoner hunger strikers at Guantanamo; and certifying soldiers as fit to be redeployed to Iraq or Afghanistan. The medical-ethics rule in the first two instances is clear and is reinforced by international human rights standards: no physician can take part in any action involving torture or cruel or inhumane treatment, or use medical knowledge or skills for punishment. The extensive use of physicians by the CIA in torture it conducted in the so-called black sites was one of the major horrifying findings of a leaked report of the International Committee of the Red Cross on the interrogations conducted there with the approval of the president and vice-president. [\[FN80\]](#)

As noted previously, the use of the “enhancement” framework was used here to disguise what was actually happening and to make it look like an improved method of questioning suspects, rather than a resort to the war crime of torture. Nor was it just the CIA. In direct contravention of the ethical standards of the World Medical Association (WMA), the DOD’s post-9/11 interrogation policy required physicians to certify prisoners as fit for interrogation. Moreover, instructions issued in 2006 explicitly authorize physicians to certify prisoners as fit for “punishment” and even administer the punishment if it is “in accordance with applicable law,” as interpreted by the DOD’s civilian lawyers. [\[FN81\]](#)

***303** The second example, force-feeding hunger strikers at Guantanamo, has been justified on the basis of military necessity, and military physicians have been ordered to force-feed prisoners “for the good of the country.” Additional rationales are: that the prison is an extension of the battlefield; that hunger strikers are engaged in asymmetric warfare; that allowing them to die by starvation would be widely viewed as a military failure in the war on terror that could force the closure of Guantanamo; that physicians should not allow their patients to die by starvation; and that the prisoners are incapable of making either an informed refusal (because they are incompetent) or a voluntary refusal (because of peer pressure). Current DOD instructions on force-feeding directly contradict the explicit ethical positions of both the American Medical Association (AMA) and the WMA. [\[FN82\]](#) Yet supporters of the practice have argued that force-feeding, even with restraint chairs, is consistent with civilian medical ethics as applied in the U.S. federal prison system; a justification that recognizes that there are no special medical ethics for the military but fails to acknowledge that many aspects of medical care in U.S. prisons—including involuntary force-feeding—may also violate basic standards of medical care and ethics, as well as the Geneva Conventions, even if they are viewed by U.S. courts as consistent with the Eighth Amendment. [\[FN83\]](#)

After the election of President Obama and his almost immediate promise to close Guantanamo within a year, a federal judge accepted the DOD’s argument that continued force-feeding of prisoners at Guantanamo in restraint chairs was not only consistent with the U.S. Constitution, but also necessary to protect the safety of the physicians and soldiers doing the force-feeding. [\[FN84\]](#) Judge Gladys Kessler did not consider whether use of the restraint chairs could be considered unlawful medical research, [\[FN85\]](#) or whether such use violated Common Article 3 of the Geneva Conventions, or even whether the fact that the military considered the force-feeding of hunger strikers a risk to them indicated that force-feeding was by definition medically unnecessary. [\[FN86\]](#)

***304** A third example of such an ethical conflict is provided by military psychiatry. The duration of the wars in Iraq and Afghanistan and the shortage of troops have required that more troops receive mental health treatment for serious mental disorders than in previous wars, and suicide rates of both enlisted personnel and veterans is at an all time high. Increasingly, soldiers’ depression, post-traumatic stress disorder and anxiety are being treated with newer psychotropic medications, especially selective serotonin-reuptake inhibitors (SSRIs). There is no military doctrine on the use of SSRIs in combat situations, but some military psychiatrists have recommended that their colleagues in Iraq “should consider having one SSRI in large quantities, to be used for both depressive disorders and anxiety disorders” to, in the words of the motto of the Army medical corps, “conserve the fighting strength.” [\[FN87\]](#) This strategy is consistent with medical ethics only if the treatment is part of an overall treatment plan, is medically indicated, and is provided with the voluntary and informed consent of the soldier-patient.

At a press conference called to announce the DOD’s new policies regarding the treatment of prisoners on June 7, 2006, then Assistant Secretary of Defense for Health Affairs William Winkenwerder said:

We operate under principles of medical ethics. There is no conflict medically, ethically speaking, in our view, between what we are doing and what’s laid out in a variety of ethical documents in the medical ***305** world [As for hunger strikes,] we view what we are doing as largely consistent with that [the WMA’s Malta] declaration. [\[FN88\]](#)

Of course, “largely consistent” means that there must be parts that are inconsistent. As Winkenwerder went on to say, the new policy specifically authorizes physicians to violate the WMA’s Malta Declaration on torture and hunger strikes when ordered to do so. [\[FN89\]](#) It may be understandable that the DOD does not want an international

organization to set standards for the U.S. military. But because medical-ethics standards are universal, the DOD position should not be acceptable to the medical profession, and the AMA has appropriately objected to it. [\[FN90\]](#)

The DOD's new position that its physicians need not follow nationally and internationally accepted medical ethics represents a major policy change. Until now, and at least since Nuremberg, the U.S. military has consistently operated under the assumption that its physicians are required to follow not only U.S. medical ethics but also internationally recognized medical ethics. The U.S. Army's policy concerning medical research on soldiers is consistent with international medical ethics standards, although Moreno has argued that the military's description of "exempt" activities leaves room for possible problems. [\[FN91\]](#) At Nuremberg, the U.S. military went even further, asking the AMA to select an expert witness to explain the standards of medical ethics to the judges at the Nazi doctors' trials. Under existing military practice, ethics enforcement seems to have been left primarily to state medical licensing boards, which have tried to avoid investigating ethics complaints against active-duty military physicians. Unless and until there is a special federal medical license for the military (not, we believe, a good idea), state licensing boards should take their responsibility to uphold ethical *306 principles much more seriously, as the California legislature has recently urged. [\[FN92\]](#)

Pellegrino has emphasized that "medical ethics begins and ends in the patient-physician relationship" and that there is no military exception to this rule. [\[FN93\]](#) Thus, in the case of using SSRIs to prepare troops for redeployment, the military psychiatrist's loyalty must be to the patient-soldier's mental health and the prevention of further psychological injury. This conclusion does not mean that physicians can or should purposely undermine the military mission by always recommending that their patients not be returned to combat. Rather, it is based on another judgment: that the U.S. military is likely to be healthier, both physically and ethically, when its physicians can consistently follow medical ethics by treating their soldier-patients with dignity and honor.

There are battlefield and prison conflicts that military physicians must resolve, but these conflicts are not captured by oversimplified expressions such as "mixed agency" or "dual loyalty." These frames set up a false choice. Basic human-rights violations, including torture, inhumane treatment, and experimentation without consent, can never be justified. Other conflicts should be analyzed as possible exceptions in extremis to the rule that medical ethics are universal. The "physician first" guidance is only half the story; the other half should be "last and always."

These considerations have direct application to research on enhancements, as well as the use of enhancements in the military that have proven to be safe. Performing research on humans without their informed consent is a violation of both current military doctrine and international human rights law. [\[FN94\]](#) Soldiers (and military and civilian surgeons) cannot be used as *307 subjects for research projects without their informed consent--now or ever. [\[FN95\]](#) Although there are some horrific examples of military experimentation on enlisted personnel, such as the LSD experiments, the military has, at least since World War II and the Nuremberg Doctors' Trial, had a policy against experimenting on soldiers without their consent. [\[FN96\]](#)

This is of little concern to DARPA, because DARPA does not conduct any experiments on humans itself, but rather contracts out this work to the civilian sector (where, nonetheless, standard rules governing research on humans apply). DARPA was created to respond to Sputnik, and its greatest achievement is the Internet. Side excursions into physical enhancements of soldiers seem now to be at least as important to DARPA as computer hardware and software once was. Fifty years after its founding, it also seems reasonable to suggest a complete review of DARPA's research agenda, especially one that asks just what kind of war does DARPA envision its "enhanced" soldiers will be fighting? And what reasonable alternatives exist to changing the physical and mental characteristics of future soldiers for these future wars?

Heinlin's starship troopers, for example, were specifically designed to fight a race of aliens that looked (and behaved) like giant bugs. Who does DARPA think our future enemies are, and why does DARPA think that a soldier who could control pain, go without sleep for three days or more, and not need to eat during this time would be useful in fighting this enemy? Our claim here is not that DARPA is necessarily wrong, but that given our consistent

inability to predict the future of warfare, an open audit of DARPA's work to date and plans for the future is prudent. This also underlines the point that the most important question to ask when planning to conduct research on humans is whether the research study should be done at all.

CONCLUSION

In this setting we have suggested that standard safety considerations should continue to apply, as should standard research rules for informed consent. We have also noted, using the analogy of physician fatigue and the patient safety movement, that many problems sought to be solved by current use of so-called "cognitive enhancers" are actually systems problems, not *308 people problems, and as such drugs cannot solve them. Finally we have suggested that the main driver of the soldier enhancement movement in the U.S. is DARPA and its science-fiction based research agenda, and therefore, it makes sense to conduct a public review of DARPA's own view of its mission, including its view of the future it is trying to design.

This leaves one area of concern suggested by both the President's Bioethics Council and the *Nature* commentators: supposing an "enhancement" has been proven safe in the military or civilian sector, can a soldier be ordered to take it in preparation for battle, like the soldiers in Heinlin's *Starship Troopers*? It seems likely that most soldiers will volunteer, especially in an all volunteer army, to take whatever their superior officers recommend. But we do not believe that American soldiers, sent into battle to uphold American ideals, should ever be compelled to take drugs they object to. The military rule should be that prescription medications should never be forced on soldiers, but should be taken only voluntarily, and only on the advice of a physician who cannot be ordered to prescribe it.

That there is ambiguity in current practice means that adoption of this rule as doctrine will require a specific directive from the President or the Secretary of Defense. We recommend a simple one as a conclusion to this Article: No military physician should ever be obligated to follow any order that he or she believes in good faith would require a violation of medical ethics. Put another way, any order that requires a physician to violate medical ethics is *ipso facto* an unlawful order.

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[FN1]. Transcript: Obama Takes Questions on Economy, CNNPolitics.com (Feb. 9, 2009), <http://www.cnn.com/2009/POLITICS/02/09/obama.conference.transcript>.

[FN2]. Frank Rich, Op-Ed., *What We Don't Know Will Hurt Us*, N.Y. TIMES, Feb. 22, 2009, at WK10.

[FN3]. *Id.* See also, Michael S. Schmidt, *Inside a Tempting World of Easy Steroids*, N.Y. TIMES, April 12, 2009, at A1.

[FN4]. See *infra* notes 30-32 and accompanying text.

[FN5]. See GEORGE J. MITCHELL, REPORT TO THE COMMISSIONER OF BASEBALL OF AN INDEPENDENT INVESTIGATION INTO THE ILLEGAL USE OF STEROIDS AND OTHER PERFORMANCE ENHANCING SUBSTANCES BY PLAYERS IN MAJOR LEAGUE BASEBALL (Dec. 13, 2007), http://assets.espn.go.com/media/pdf/071213/mitchell_report.pdf [hereinafter MITCHELL REPORT].

[FN6]. See *id.*; Matthew Fetterman, *Why Everything is Bigger in Texas*, WALL ST. J., Feb. 20, 2009, at W5. See also Tyler Kepner, *As Team Looks On, Rodriguez Details His Use of Steroids*, N.Y. TIMES, Feb. 18, 2009, at B1 & B15.

[FN7]. ROBERT A. HEINLEIN, STARSHIP TROOPERS 81 (Ace Books 1987) (1959).

[FN8]. *Id.* at 80.

[FN9]. *Id.* at 101.

[FN10]. *Id.* at 82.

[FN11]. RICHARD A. CLARKE, BREAK POINT 144 (2007).

[FN12]. JOEL GARREAU, RADICAL EVOLUTION: THE PROMISE AND PERIL OF ENHANCING OUR MINDS, OUR BODIES--AND WHAT IT MEANS TO BE HUMAN 22-23 (2005).

[FN13]. *Id.* at 26-29.

[FN14]. *Id.* at 32.

[FN15]. *Id.*

[FN16]. *Id.* at 36-41. See generally Defense Advanced Research Projects Agency, <http://www.darpa.mil> (last visited April 3, 2009).

[FN17]. George J. Annas, *Military Medical Ethics--Physician First, Last, Always*, 359 NEW ENG. J. MED. 1087, 1089 (2008).

[FN18]. See generally OFFICE OF THE SURGEON GENERAL, U.S. ARMY, MILITARY MEDICAL ETHICS (Thomas E. Beam & Edmund G. Howe eds., 2003) [hereinafter MILITARY MEDICAL ETHICS].

[FN19]. See, e.g., Noel Sharkey, *The Ethical Frontiers of Robotics*, 322 SCIENCE 1800 (2008). It is worth noting that we have moved a long way since Isaac Asimov first proposed “laws” for robots to ensure that they would always work with humans and not against them, and that they were absolutely prohibited from ever killing or even harming a human:

- (1) a robot may not injure a human being, or through inaction, allow a human being to come to harm;
- (2) a robot must obey the orders given to it by human beings except where such orders would conflict with the first law; and
- (3) a robot must protect its own existence as long as such protection does not conflict with the first or second laws.

ISAAC ASIMOV, *Runaround*, in 1, ROBOT 40 (1950). See also Asimov's robot novels: THE CAVES OF STEEL (1953); THE NAKED SUN (1957); and THE ROBOTS OF DAWN (1983). See also HANS MORAVEC, MIND CHILDREN: THE FUTURE OF ROBOT AND HUMAN INTELLIGENCE (1988).

[FN20]. CLARKE, *supra* note 11, at 142-43.

[FN21]. *See, e.g.*, GEORGE P. SMITH, II, DISTRIBUTIVE JUSTICE AND THE NEW MEDICINE 52-54 (2008). *See also* Larry Rohter, *Back and Forth on Stem-Cell Research Energizes Race*, N.Y. TIMES, Sept. 10, 2008, at A20.

[FN22]. GEORGES CANGUILHEM, THE NORMAL AND THE PATHOLOGICAL 125 (Zone Books 1989) (1966).

[FN23]. PRESIDENT'S COUNCIL ON BIOETHICS, BEYOND THERAPY: BIOTECHNOLOGY AND THE PURSUIT OF HAPPINESS 15-16 (2003). *See also* ERIK PARENS, ED., ENHANCING HUMAN TRAITS: ETHICAL AND SOCIAL IMPLICATIONS (Georgetown U. Press 1998).

[FN24]. *Id.* at 155-56.

[FN25]. *See generally* ALDOUS HUXLEY, BRAVE NEW WORLD (HarperCollins Pub. 2006) (1932).

[FN26]. PRESIDENT'S COUNCIL ON BIOETHICS, *supra* note 23, at 154 (emphasis added).

[FN27]. *Id.*

[FN28]. *Id.* at 154-55. Elsewhere in the report the Council worries about how the use of drugs that induce fearlessness would undermine character traits we now value, writing, “[p]eople who take pills to block out from memory the painful or hateful aspects of a new experience will not learn how to deal with suffering or sorrow. A drug that induces fearlessness does not produce courage.” *Id.* at 291.

[FN29]. *See generally* George J. Annas & Sherman Elias, *Politics, Morals and Embryos: Can Bioethics in the United States Rise Above Politics?*, 431 NATURE 19 (2004).

[FN30]. Henry Greely et al., *Towards Responsible Use of Cognitive-Enhancing Drugs by the Healthy*, 456 NATURE 702, 703 (2008).

[FN31]. *Id.* Co-author John Harris's book is ENHANCING EVOLUTION: THE ETHICAL CASE FOR MAKING BETTER PEOPLE (2007). Other *Nature* co-authors seem much less enthusiastic about the future of brain “enhancement” drugs when interviewed separately. Martha Farah, for example, told Margaret Talbot, “I’m a little concerned that we could be raising a generation of very focused accountants.” Talbot herself concluded, “Neuroenhancers are perfectly suited for the anxiety of white-collar competition in a floundering economy ... Neuroenhancers don’t offer freedom. Rather they facilitate a pinched, unromantic, grindingly efficient form of productivity.” Margaret Talbot, *Brain Gain: The Underground World of ‘Neuroenhancing’ Drugs*, THE NEW YORKER, April 27, 2009, 32, 40, 43.

[FN32]. Greely et al., *supra* note 30, at 704.

[FN33]. *Id.* at 703 (emphasis added).

[FN34]. *See generally* Nancy Kress's “sleepless trilogy”: NANCY KRESS, BEGGARS IN SPAIN (1993), BEGGARS AND CHOOSERS (1994), and BEGGARS RIDE (1996).

[FN35]. *See* Christian Teter et al., *Illicit Use of Specific Prescription Stimulants Among College Students: Prevalence, Motives and Routes of Administration*, 26 PHARMACOTHERAPY 1501 (2006).

[FN36]. Amphetamine use among professional athletes has been rumored for years. “Amphetamine like stimulants” were connected to the deaths of Corey Stringer of the Minnesota Vikings and Steve Bechler of the Baltimore Orioles. MITCHELL REPORT, *supra* note 5, at 22.

[FN37]. Use of amphetamines by commercial pilots is prohibited. [14 C.F.R. Part 121 Appendix I \(2008\)](#) defines “prohibited drug” as “marijuana, cocaine, opiates, phencyclidine (PCP), and amphetamines” [53 Fed. Reg. 40,724 \(Nov. 1, 1988\)](#) (establishing the Final Rule codified at [14 C.F.R. Part 121 Appendix I](#) and describing the purpose of the drug testing program as the identification of individuals in safety-sensitive positions who may have used “prohibited drugs”).

[FN38]. Michael Wilkes, *Are Doctors Using Performance Enhancing Drugs?*, SACRAMENTO BEE, Oct. 19, 2008, at 5L.

[FN39]. GLAXOSMITHKLINE, DEXEDRINE PRESCRIBING INFORMATION 10 (July 2008), http://us.gsk.com/products/assets/us_dexedrine.pdf.

[FN40]. Greg Miller, *Air Force May Have a Bitter Pill to Swallow in ‘Friendly Fire’ Incident*, L.A. TIMES, Jan. 4, 2003, at A16 (including discussion by Col. Alvina Mitchell, a U.S. Air Force spokesperson, on this use of amphetamines).

[FN41]. MICHAEL FRISCOLANTI, FRIENDLY FIRE: THE UNTOLD STORY OF THE U.S. BOMBING THAT KILLED FOUR CANADIAN SOLDIERS IN AFGHANISTAN 25 (2005).

[FN42]. GLAXOSMITHKLINE, *supra* note 39, at 4. For an excellent description of the major friendly fire incident in the Iraq war, and an explanation of it as a systems failure, see generally SCOTT SNOOK, FRIENDLY FIRE: THE ACCIDENTAL SHOOTDOWN OF U.S. BLACK HAWKS OVER NORTHERN IRAQ (2000).

[FN43]. The U.S. Air Force prescribes dextroamphetamines to pilots to stay awake during missions. FRISCOLANTI, *supra* note 41, at 24.

[FN44]. Retired Admiral Eugene Carroll, former Vice President of the Center for Disease Information, who took amphetamines during his service in World War II, was quoted in 2003 as saying: “If pilots are pushed so hard they have to take these drugs on a regular basis, they are going to get stressed out and have an unsafe result.” Elliot Borin, *The U.S. Military Needs its Speed*, WIRED, Feb. 10, 2003, available at <http://www.wired.com/medtech/health/news/2003/02/57434>.

[FN45]. FRISCOLANTI, *supra* note 41, at 44-49. The incident took place in the Tarnak Farms area of Afghanistan, just outside of Kandahar, on April 17, 2002.

[FN46]. The pilots are Harry Schmidt and William Umbach. The focus of this article's brief synopsis of the incident will be on Major Schmidt's actions. He will be referred to in the body of the paper as “the pilot.” The purpose is to explore the possible effects of amphetamine use on the performance of military pilots in general, and not to seek to determine Major Schmidt's guilt or innocence in this case. Although that issue has been officially resolved according to the U.S. Air Force, there are a number of factors that implicate the failings of the military that night as much as or more so than the specific actions of Major Schmidt. See FRISCOLANTI, *supra* note 41, at 4; Miller, *supra* note 40.

[FN47]. FRISCOLANTI, *supra* note 41, at 3-7.

[FN48]. Air Force procedure in such a situation calls for a pilot to exit the area to reassess if danger is perceived but clearance for bombing has not yet been given. The pilot in this case was a “wingman,” and not in command of the mission. Therefore, his only option for non-clearance or non command action was to proceed in “self defense.” Under procedures, this option gives the pilot authority to proceed, and the pilot in this case did radio that those were his intended actions. Although there was disagreement in this case about whether the Standing Rules of Engagement for the U.S. Forces requires such evacuation and re-evaluation under the circumstances, Col. John Odom, who was the lead prosecutor in the case, acknowledged that if Major Schmidt felt he was acting in self defense that would allow him to ignore that requirement. FRISCOLANTI, *supra* note 41, at 477.

[FN49]. During their debriefing after the incident both pilots said they had not been briefed about friendlies in the area. FRISCOLANTI, *supra* note 41, at 82. In addition, during the investigation, Major Marshall Scott Woodson, III, who was the defensive duty officer the night of April 17, testified that he did not know that there were friendlies around Kandahar that night. *Id.* at 379.

[FN50]. The events of that night (April 17, 2002), as well as the subsequent investigations and their aftermath, are examined extensively in FRISCOLANTI, *supra* note 41.

[FN51]. The other major part of the pilot's punishment was that he was no longer allowed to fly Air Force aircraft. FRISCOLANTI, *supra* note 41, at 480.

[FN52]. The Letter of Reprimand was issued on July 6, 2004. Major Schmidt's appeal was denied by Air Force General Hal Hornburg on August 3, 2004. Harry Levins, *Punishment for Pilot Involved in Friendly Fire Bombing Upheld*, ST. LOUIS POST DISPATCH, Aug. 3, 2004; Harry Levins, *Pilot Loses Appeal in Fatal Friendly Fire*, ST. LOUIS POST DISPATCH, Aug. 4, 2004, at A7. *See also* FRISCOLANTI, *supra* note 41, at 478-80.

[FN53]. FRISCOLANTI, *supra* note 41, at 432.

[FN54]. *Id.* at 421, 428.

[FN55]. *Id.* at 420.

[FN56]. Lianne Hart, *Air Force Rushes to Defend Amphetamine Use*, THE AGE, Jan. 18, 2003, <http://www.theage.com.au/articles/2003/01/17/1042520778665.html>.

[FN57]. FRISCOLANTI, *supra* note 41, at 16.

[FN58]. Pilots for whom “go pills” are prescribed are required to sign a consent form that lists the risks and contains the following language: “It has been explained to me and I understand that the U.S. Food & Drug Administration has not approved the use of dextroamphetamine to manage fatigue My decision to take dextroamphetamine is/will be voluntary. I understand that I am not being required to take the medication.” *Id.* at 25. This form was signed by the pilots involved in the Tarnack Farms incident. *See* INFORMED CONSENT FOR OPERATIONAL USE OF DEXEDRINE, found in PERFORMANCE MAINTENANCE DURING CONTINUOUS FLIGHT OPERATION: A GUIDE FOR FLIGHT SURGEONS, NAVVED P-6410, Jan. 1, 2000.

[FN59]. In 2008, 31% of active duty Army personnel served more than one tour in Iraq or Afghanistan. BROOKINGS INSTITUTION, IRAQ INDEX: TRACKING VARIABLES OF RECONSTRUCTION & SECURITY IN POST-SADDAM IRAQ 28 (Feb. 19, 2009), <http://www.brookings.edu/saban/~media/Files/Centers/Saban/Iraq%20Index/index.pdf>. The Iraq Index is updated weekly. The longer exposures to combat situations is also reflected in increasing rates of posttraumatic stress disorder, suicide, divorce and use of prescription narcotics among combat veterans. *See, e.g.*, THOMAS E. RICKS, THE

GAMBLE: GENERAL DAVID PETRAEUS AND THE AMERICAN MILITARY ADVENTURE IN IRAQ, 2006-2008, at 304 (Penguin Press 2009); INST. OF MED., TREATMENT OF POSTTRAUMATIC STRESS DISORDER (Washington, D.C., National Academies Press 2008).

[FN60]. INST. OF MED. OF THE NAT. ACAD., RESIDENT DUTY HOURS: ENHANCING SLEEP, SUPERVISION AND SAFETY 20 (Cheryl Ulmer, Dianne Miller Wolman & Michael M.E. Johns eds., 2008).

[FN61]. *Id.*

[FN62]. *Id.* These standards were revised in 2007. ACCREDITATION COUNS. FOR GRAD. MED. EDUC., COMMON PROGRAM REQUIREMENTS (2007).

[FN63]. Susan Okie, *Becoming a Physician: An Elusive Balance-- Residents' Work Hours and the Continuity of Care*, 356 NEW ENG. J. MED. 2665, 2665 (2007).

[FN64]. Linda Scott et al., *Effects of Critical Care Nurses' Work Hours on Vigilance and Patients' Safety*, 15 AM. J. CRITICAL CARE 30, 35 (2006).

[FN65]. INST. OF MED. OF THE NAT. ACAD., *supra* note 60, at 30. A recent Institute of Medicine report estimated that the cost associated with needed shifting of work loads in order to further limit resident work hours to be approximately \$1.7 billion per year. *Id.* at 2.

[FN66]. Eleanor Stoller et al., *Strategies Resident-Physicians Use to Manage Sleep Loss and Fatigue*, MED. EDUC. ONLINE [serial online] 2005; 10:9, at 4, <http://www.med-ed-online.org/pdf/res00120.pdf>.

[FN67]. *Id.* at 4-5.

[FN68]. Lauren Cox, "Urine Drug Tests For Doctors?" ABC News, November 12, 2008.

[FN69]. Brian Eastridge et al., *Effect of Sleep Deprivation on the Performance of Simulated Laparoscopic Surgical Skill*, 186 AM. J. SURGERY 169, 173 (2003).

[FN70]. Kanav Kahol et al., *Effect of Short-Term Pretrial Practice on Surgical Proficiency in Simulated Environments: A Randomized Trial of the "Preoperative Warm-Up" Effect*, 208 J. AM. C. SURGEONS 255, 255 (2009).

[FN71]. Sarah I. Woodrow et al., *Differences in the Perceived Impact of Sleep Deprivation Among Surgical and Non-surgical Residents*, 42 MED. EDUC. 459, 459 (2008).

[FN72]. Oliver Warren et al., *The Neurocognitive Enhancement of Surgeons: An Ethical Perspective*, 12 J. SURGICAL RESEARCH 761, 763 (2008).

[FN73]. Greely et al., *supra* note 30, at 703.

[FN74]. JONATHAN D. MORENO, MIND WARS: BRAIN RESEARCH AND NATIONAL DEFENSE 53 (2006).

[FN75]. *Id.* (citing, among others, Dr. Evan G. DeRenzo & Richard Szafranski, *Fooling Mother Nature: An Ethical Analysis of and Recommendations for Oversight of Human-Performance Enhancements in the Armed Forces*, AIRPOWER J., at 30 (Summer 1997)).

[FN76]. Edmund D. Pellegrino, *The Moral Foundations of the Patient-Physician Relationship: The Essence of Medical Ethics*, in MILITARY MEDICAL ETHICS, *supra* note 18 at 17. This section of our Article, "Military Medical Ethics," is adapted from Annas, *supra* note 17. Pellegrino's term expires with the Council in September 2009.

[FN77]. Pellegrino, *supra* note 76.

[FN78]. See, e.g., George J. Annas, *Protecting Soldiers from Friendly Fire: The Consent Requirement for Using Investigational Drugs and Vaccines in Combat*, 24 AM. J. LAW & MED. 245, 246-47 (1998); *contra* William Fitzpatrick & Lee Zwanziger, *Defending Against Biochemical Warfare: Ethical Issues Involving the Coercive Use of Investigational Drugs and Biologics in the Military*, 3 J. PHIL., SCI. & L. (2003), <http://www6.miami.edu/ethics/jpsl/archives/papers/drugs.html>. The long-term effect of investigational drugs used on veterans of the first Gulf War is still being studied. See, e.g., RES. ADVISORY COMM. ON GULF WAR VETERANS' ILLNESSES, GULF WAR ILLNESS AND THE HEALTH OF GULF WAR VETERANS: SCIENTIFIC FINDINGS AND RECOMMENDATIONS (2008).

[FN79]. Annas, *supra* note 78.

[FN80]. See INTERNATIONAL COMMITTEE OF THE RED CROSS, REPORT ON THE TREATMENT OF FOURTEEN 'HIGH VALUE DETAINEES' IN CIA CUSTODY (Feb. 14 2007), <http://www.nybooks.com/icrc-report.pdf>. See also Mark Danner, *The Red Cross Torture Report: What it Means*, N.Y. REV., Apr. 30, 2009, at 48-56; Scott Shane, *Report Outlines Involvement of Medical Workers in Abusive C.I.A. Interrogations*, N.Y. TIMES, Apr. 7, 2009, at A6.

[FN81]. U.S. DEPT' OF DEF., INSTRUCTION NO. 2310.08E, MEDICAL PROGRAM SUPPORT FOR DETAINEE OPERATIONS (2006).

[FN82]. Susan Crosby et al., *Hunger Strikes, Force-feeding, and Physicians' Responsibilities*, 298 JAMA 563, 565 (2007) (citing [Hamdan v. Rumsfeld](#), 548 U.S. 557 (2006)); George J. Annas, *Hunger Strikes at Guantanamo: Medical Ethics and Human Rights in a "Legal Black Hole"*, 335 NEW ENG. J. MED. 1377, 1377-82 (2006).

[FN83]. *Id.* at 565-66.

[FN84]. Al-Adahi v. Obama, Civil No. 05-280 (D.D.C. Feb. 10, 2009) (Kessler, J.).

[FN85]. See George J. Annas, *Human Rights Outlaws: Nuremberg, Geneva, and the Global War on Terror*, 87 B.U. L. REV. 427, 456 (2007).

[FN86]. *Id.* at 456-57; Crosby et al., *supra* note 82, at 564-65. These issues were also dodged in a special DOD task force's recent report to President Obama on whether conditions at Guantanamo met the requirements of Common Article 3 of the Geneva Conventions. See generally U.S. DEPT OF DEF., REVIEW OF DEPARTMENT COMPLIANCE WITH PRESIDENT'S EXECUTIVE ORDER ON DETAINEE CONDITIONS OF CONFINEMENT (Feb. 20, 2009), http://www.defenselink.mil/pubs/pdfs/REVIEW_OF_DEPARTMENT_COMPLIANCE_WITH_PRESIDENTS_EXECUTIVE_ORDER_ON_DETAINEE_CONDITIONS_OF_CONFINEMENTa.pdf. (concluding that force-feeding practices currently in use at Guantanamo do not violate Common Article 3 of the Geneva Conventions, while conceding that they do violate medical ethics as set forth by the World Medical Association, at 56-58).

[FN87]. See, e.g., David Benedek, Brett Schneider & John Bradley, *Psychiatric Medications for Deployment: An Update*, 172 MIL. MED. 681, 683 (2007); see also *Mentally Ill Troops Sent to Combat, Report Says*, BOSTON GLOBE, May 15, 2006, at A3. It is of some interest that of the two most often used “enhancement” medications in the current wars in Iraq and Afghanistan, one has no scientific basis for helping soldiers perform their duties, and the other is a commonly used medication for civilians that has no particular military application. The first is the drug Artan, which is reportedly used by large numbers of Iraqi soldiers for stress. Mudhafer Al-Husaini & Erica Goode, *Increasingly, Iraqi Soldiers are Abusing Prescription Drugs to Endure Stress of War*, N.Y. TIMES, Dec. 21, 2008, at A28. The other is the very popular drug Viagra, which is being made available to elderly tribal heads in Afghanistan by the CIA to promote good will. Joby Warrick, *CIA Buys Afghan Chief's Loyalty with Viagra*, S.F. CHRON., Dec. 26, 2008, at A12.

[FN88]. U.S. DEPT. OF DEFENSE, NEWS TRANSCRIPT, WILLIAM WINKENWERDER, ASSISTANT SEC Y OF DEF. FOR HEALTH AFFAIRS, MEDIA ROUNDTABLE (June 7, 2006), <http://www.defenselink.mil/Transcripts/Transcript.aspx?TranscriptID=33>.

[FN89]. *Id.*

[FN90]. Crosby et al., *supra* note 82. See Leslie London et al., *Dual Loyalty Among Military Health Professionals: Human Rights and Ethics in Times of Armed Conflict*, 15 CAMBRIDGE Q. HEALTHCARE ETHICS 381, 381-83 (2006); *contra* MICHAEL GROSS, *BIOETHICS AND ARMED CONFLICT: MORAL DILEMMAS OF MEDICINE AND WAR* (2006).

[FN91]. Jonathan Moreno, *Bioethics and the National Security State*, 32 J. L. MED. & ETHICS 198, 205 (2004) (citing the exemptions the U.S. military claims to human research rules in its Appendix F, including subsection f: “Individual or group training of military personnel such as combat readiness, effectiveness, proficiency, or fitness exercise (for example, Army Training and Evaluation Program (ARTEP), Skill Qualification Test (SQT)).”). See also U.S. DEPT OF THE ARMY, *ARMY REGULATION 70-25, USE OF VOLUNTEERS AS SUBJECTS OF RESEARCH* 12 (1990).

[FN92]. A Resolution passed by the California legislature in 2008 reads in part:

The Legislature hereby requests that when California licensed health professionals have reason to believe that Interrogations are coercive or ‘enhanced’ or involve torture or cruel, inhuman, or degrading treatment or punishment, they shall report their observations to the appropriate authorities [and if no action is taken] ... those health professionals are ethically obligated to report those practices to independent authorities that have the power to investigate and adjudicate those allegations No law, regulation, order, or exceptional circumstance, whether induced by state of war or threat of war, internal political instability, or any other public emergency, may be invoked as justification for torture or cruel, inhuman, or degrading treatment or punishment.

S.J. Res. 19, 1st Sess. (Cal. 2008).

[FN93]. Pellegrino, *supra* note 76, at 5.

[FN94]. George J. Annas, *The Nuremberg Code in U.S. Courts: Ethics versus Expediency*, in *THE NAZI DOCTORS AND THE NUREMBERG CODE* 216 (George J. Annas & Michael A. Grodin eds., 1992). See generally INSTITUTE OF MEDICINE, *MILITARY MEDICAL ETHICS* (2009); PRESIDENT'S ADVISORY COMMITTEE, *THE HUMAN RADIATION EXPERIMENTS* (1996).

[FN95]. See Annas, *supra* note 94; INSTITUTE OF MEDICINE, *MILITARY MEDICAL ETHICS*, *supra* note 94; PRESIDENT'S ADVISORY COMMITTEE, *THE HUMAN RADIATION EXPERIMENTS*, *supra* note 94.

[\[FN96\]](#). See THE NAZI DOCTORS AND THE NUREMBERG CODE 216 (George J. Annas & Michael A. Grodin eds., 1992).

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