



Lethal Injection's Fatal Flaws

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The method of execution was supposed to be quick, painless and humane. So why is it suddenly so troubling?

For decades, most states with capital punishment used a standard combination of three drugs in lethal injections: a sedative, often sodium thiopental; pancuronium bromide as a paralytic agent; and potassium chloride to stop the heart. The drugs in the cocktail were easy to come by and effective, allowing for a relatively standard lethal-injection protocol throughout the U.S. These days, the ways states are choosing to kill their most heinous criminals are anything but uniform.

Background

In 1977, Dr. Jay Chapman, Oklahoma's chief medical examiner, was tasked by an Oklahoma legislator with finding a more humane way of executing prisoners. Chapman, whose job was investigating deaths, not causing them, felt compelled to respond because he thought there was no reason we should put animals to death more humanely than people. Within days, Chapman had an idea for an injectable mix of drugs that he thought would do the job as painlessly as possible.

Lethal injection was first adopted in Oklahoma in 1977, with the understanding that it would be more humane than the electric chair, the gas chamber, the firing squad, or hanging. More than 1,200 people have since been put to death using the protocol Chapman recommended.

When Texas was considering whether to adopt the Oklahoma protocol in the late 1970s, the medical director of Texas' corrections department, Dr. Ralph Gray, consulted a veterinarian in Huntsville, Tex., Dr. Gerry Etheredge.

"I told him," Dr. Etheredge recalled, "that in veterinary medicine when we euthanized an animal most of us used pentobarbital, a general anesthetic, which is very potent and long-lasting, and we overdosed it and everything went smoothly. It was very safe, very effective and very cheap."

Dr. Gray had only one objection, Dr. Etheredge recalled. "He said it was a great idea except that people would think we are treating people the same way that we're treating animals. He was afraid of a hue and cry."

Texas adopted Oklahoma's three-chemical combination and it became the first state to use it to execute inmates in 1982 with the execution of Charles Brooks on Dec. 2, 1982.

These days, opponents of that protocol make the opposite argument of the one Dr. Gray feared. They say that death row inmates deserve to be treated at least as well as animals.

Baze v. Rees

Controversy around the lethal injection started in 2006 when Florida Governor Jeb Bush halted executions in his state after an inmate took twice as long to die by lethal injection.

Bush said he needed to be sure that the method of death did not constitute "cruel and unusual punishment".

The move came after Angel Nieves Dias, convicted of murder, took 34 minutes to die, when the usual time is 15 minutes, and was given a second lethal dose.

In California, a judge ruled death by lethal injection violates a state ban on cruel and unusual punishment.

Other states soon followed.

When the Supreme Court began to hear arguments in January 2008 in *Baze v. Rees*, the Kentucky case that led to a de facto seven-month national moratorium on executions, it was concerned not with whether lethal injection is unconstitutional, but with the possibility of the specific formula that may be "cruel and unusual punishment."

In this specific case, Ralph Baze was convicted of the shooting murders of a sheriff and a deputy sheriff in Kentucky in 1992 when they were trying to serve felony warrants on him from Ohio. Thomas C. Bowling was convicted of the shooting murders of a couple, and wounding their two-year-old son, as the victims sat inside their car in a business parking lot in Kentucky in 1990. Bowling had run into their car with his vehicle, got out and shot the three, and then fled the scene.

In the *Baze* case, lawyers for John D. Rees, the Kentucky corrections commissioner, said the three-chemical combination was safe and painless and produced a dignified death. Using only a single barbiturate, they said, was untested, could result in distressing and disruptive muscle contractions, and might take a long time. The method is the one most commonly used for pets, sometimes in combination with a sedative.

The state of Kentucky contends that there has been no showing of a substantial risk of pain and suffering using the current lethal injection protocol.

Lawyers for the Kentucky inmates, Ralph Baze and Thomas C. Bowling, said a single barbiturate would bring on fatal cardiac arrest "within a matter of minutes." They conceded that muscle contractions were possible, but said that inmates were strapped

down and that witnesses could be told that the movements did not indicate pain. And they said the three-chemical combination, which is not used in veterinary euthanasia, was itself once untested.

Critics charged that the three-drug cocktail poses an unnecessary risk of pain and suffering that can be easily avoided. The current 3-drug routine calls for the following:

- The first drug (usually sodium thiopental) is a barbiturate meant to put the condemned prisoner to sleep deeply enough that he feels nothing afterwards.
- The second drug (usually pancuronium) is a paralytic that prevents the prisoner from twitching, convulsing, or indicating discomfort. It is because of this drug that the prisoner must wear a diaper to the execution. Anesthesiologists and end-of-life doctors contend in briefs filed with the court, that if a person is not properly anesthetized, the paralytic will prevent him from being able to indicate any distress, and pancuronium can make him feel as if he is suffocating.
- The third drug (usually potassium chloride) stops the heart. But, again, if the prisoner is not properly anesthetized, medical experts say the drug will be excruciatingly painful. It will make the prisoner feel as if his veins are on fire.

Baze and Bowling argued that a paralyzing drug can leave an inadequately anesthetized inmate with the ability to feel severe pain as another drug stops the heart, but without the ability to move or call for help. This suffering that amounts to cruel and unusual punishment, in violation of the Eighth Amendment, according to the two men.

Indeed, death penalty opponents note that the cocktail used for executions today was long ago abandoned by an American veterinary association for use in killing animals because it was deemed unnecessarily cruel.

This was the first time in more than a century the court has examined a method of execution. The last time the Supreme Court ruled on an Eighth Amendment issue involving a method of execution was on March 17, 1879, in the case of *Wilkerson v. Utah*, when it upheld the use of a firing squad. The most recent ruling on any constitutional challenge to a method of execution was on May 19, 1890, in the case of *In re Kimmler*, when it upheld the use of the electric chair.

By the 20th century, states moved to electrocution, gas, and, finally, lethal injection.

The Supreme Court did not allow any executions via lethal injection to take place since they decided to hear the case in September 2007, placing a de facto moratorium on capital punishment, delaying executions nationwide, while it considers the constitutional question over how lethal injection is administered.

It raised three questions, seeking review of (1) the legal standard to be used in judging whether this particular protocol violates the “cruel and unusual punishment” ban in the Eighth Amendment, (2) whether it does so because there are alternatives with less risk of

pain and suffering, and (3) whether the continued use of the method, knowing its risks of pain and suffering, is itself an Eighth Amendment violation.

Their petition argued that there was “undisputed evidence” in this record “that any and all of the current lethal injection protocols could be replaced with other chemicals that would pose less risk of pain while causing death than the tri-chemical cocktail currently used.”

They stated: “An execution procedure creates unnecessary risk where, taken as a whole, it presents a significant risk of causing severe pain that could be avoided through the use of a *reasonably available* alternative or safeguard.”

The Court was focusing on the *manner* of lethal injection, not the validity of the lethal injection as such.

In April 2008, the US Supreme Court ruled in the *Baze* case 7-2 that the three-drug cocktail for lethal injection was not in violation of the 8th Amendment, thus was constitutional, ending the seven-month moratorium on executions.

Chief Justice John Roberts wrote: "Some risk of pain is inherent in any method of execution -- no matter how humane. It is clear, then, that the Constitution does not demand the avoidance of all risk of pain in carrying out executions."

Drug Controversy

In Ohio in December 2009, condemned killer Kenneth Biros became the first person in the country put to death with a single dose of an intravenous anesthetic instead of the usual — and faster-acting — three-drug process.

The switch from three drugs to one was ordered in November 2009 in Ohio because of the state's botched attempt on Sept. 15, 2009 to execute convicted rapist and killer Romell Broom. His executioners tried unsuccessfully for two hours to find a usable vein for injection, painfully hitting bone and muscle in as many as 18 needle sticks. Gov. Ted Strickland halted the execution.

One difference is clear between the one-drug and three-drug methods: Biros died more slowly than inmates put to death with the three-drug method, which includes a drug that stops the heart.

The anesthetic used was sodium thiopental, which kills by putting people so deeply asleep they stop breathing. Paradoxically, the executioners again struggled for up to half an hour to find a vein in Biros in which to put the IV through which his single anesthetic was administered, and it took nine attempts to find a vein in his prisoner's left arm.

His lawyers, who had made numerous attempts to persuade the courts to postpone his execution on grounds that the technique was untried and amounted to human experimentation, said the procedure had proven flawed.

It took about 10 minutes to end Biros' life. Ohio inmates have typically taken about seven minutes to die after the three-drug IV injection.

In December 2010, John David Duty, who was executed for the 2001 slaying of his cellmate in Oklahoma, became the first person to be executed using a sedative commonly used to euthanize animals. They used pentobarbital as opposed to sodium thiopental, which is the anesthetic normally used in the state's lethal injection formula.

A nationwide shortage of sodium thiopental led Oklahoma to alter its three-drug cocktail.

The nationwide shortage got worse in January 2011 when the sole U.S. manufacturer of sodium thiopental – Hospira Inc. -- said it was ending production because of death-penalty opposition overseas — a move that could delay executions across the United States.

Hospira Inc. said it decided in to switch manufacturing from its North Carolina plant to a more modern Hospira factory in Italy. Italian authorities demanded a guarantee the drug would not be used to put inmates to death.

States used to buy lethal-injection drugs from the same large, multinational pharmaceutical companies that make cholesterol medication and sleep aids. But in 2011, the European Union tightened controls on the sale of drugs for use in executions elsewhere. Most leading drugmakers are based in Europe, and every European country except Belarus outlaws capital punishment.

As stockpiles dwindled in the US, states scrambled for alternative sources: manufacturers in developing countries, lightly regulated compounding pharmacies, even prison wardens buying drugs under their own names.

Hospira has long deplored the drug's use in executions but said it regretted having to stop production because sodium thiopental has legitimate medical purposes as an anesthetic used in hospitals. Hospira was the only sodium thiopental-maker approved by the Food and Drug Administration.

Texas is among the active death-penalty states scrambling to find new lethal injection protocols after European-based manufacturers banned U.S. prisons from using their drugs in executions.

There are other, similar drugs on the market, but substituting one drug for another would require new laws or lengthy administrative processes in some states, and could also lead to lawsuits from death row.

Brian Stull of the American Civil Liberties Union (ACLU) says states have been left "scrambling for drugs", and have become increasingly secretive, leading to some states turning to compounded drugs. Compounding pharmacies are private pharmacies which mix small amounts of drugs to order and which are not regulated by the federal

government. Without FDA oversight, the quality of drugs can differ from one pharmacy to another. At least seven states have obtained execution drugs or announced plans to get them from compounding pharmacies since 2012.

"If you are using drugs that have never been used to kill a human being and are by no means created for that purpose, and those drugs are being used by someone who is ill-trained and doesn't know much about drugs and injections to begin with, then you're creating a particularly high risk process," Deborah Denno, a professor at Fordham Law School and death penalty expert, says.

As of 2014, nine states now shield the identity of their lethal-drug suppliers, including Arkansas, Colorado, Georgia, Oklahoma, and South Dakota. These states have enacted laws guaranteeing anonymity to suppliers of lethal-injection drugs.

In January 2014, Oklahoma injected convicted murderer Michael Lee Wilson with a combination of pentobarbital, vecuronium bromide and potassium chloride. As the cocktail was administered, Wilson reportedly said, "I feel my whole body burning," before dying.

Nearly four months later, Oklahoma tried a different mix. On April 29, the state executed Clayton Lockett – convicted in 2000 of murdering a 19-year-old woman by shooting her and then burying her alive – with midazolam, vecuronium bromide and potassium chloride obtained from an undisclosed source. The midazolam was supposed to render Lockett unconscious before he received fatal doses of the other two drugs. Yet after seeming to pass out, Lockett opened his eyes and started mumbling and thrashing against the gurney. Believing he would survive, the warden sought to have the execution stayed and resumed at a later date. But it was too late. Forty-three minutes after the execution began, Lockett died of a heart attack. In the aftermath, Oklahoma Governor Mary Fallin suspended all executions pending a review of the state's lethal-injection protocol.

Arkansas Attorney General Dustin McDaniel, whose state has not carried out an execution since 2005, has described the system in the US as "completely broken".

"Let's say that there was magically a vapor, a mist, a pill, a fatal hypnotic stare. You still have to find American manufacturers who are willing to produce it and courts who are willing to accept it," he recently told the National Journal. "I don't see any of that happening."

So which form of execution is most humane?

"To me," Professor Denno said, "the firing squad is the most humane and perceived to be the most brutal."

The only state that still had electrocution as their sole method of execution – Nebraska – decided in February 2008 that it constituted "cruel and unusual punishment." Nebraska's

state supreme court thus outlawed the electric chair as a method of capital punishment in the state.

The court made the ruling in the case of Raymond Mata Jr., convicted for the 1999 kidnapping and killing of Adam Gomez, his ex-girlfriend's three-year-old son. He dismembered the body and fed part of the remains to his dog. But when sentenced to death he appealed. His state, Nebraska, planned to send him to the electric chair. He considered that a cruel and unusual way to go. On February 8, 2008, the state's highest court agreed. It declared the electric chair unconstitutional.

In its 6-1 ruling, the Nebraska high court said the evidence shows that electrocution inflicts "intense pain and agonizing suffering" and that "(electrocution) has proven itself to be a dinosaur more befitting the laboratory of Baron Frankenstein than the death chamber" of state prisons.

"Contrary to the State's argument, there is abundant evidence that prisoners sometimes will retain enough brain functioning to consciously suffer the torture high voltage electric current inflicts on a human body," Judge William Connolly wrote in the opinion.

The decision marks the end of electrocution in America. When the electric chair was first used, in 1890, it was considered a humane alternative to hanging. But not anymore. Nine other states still have it as an option, but those all have lethal injection, too, which is now the preferred method of execution.

So if electrocution and lethal injection are considered "cruel and unusual," what is the most humane form of execution, if there is one?

- **The guillotine**, made famous during the French Revolution, was last used in France as a method of execution in 1977 as the only legal execution method, until France outlawed the death penalty in 1981. As a device used for carrying out executions by decapitation, it consists of a tall upright frame from which a heavy blade is suspended. This blade is raised with a rope and then allowed to drop, severing the victim's head from his or her body. Perceived to deliver an immediate death without risk of misses, it was designed for its humane nature. The guillotine has never been used in the United States as a legal method of execution, even though it had been considered in the 19th century before introduction of the electric chair.
 - *Last execution in the US:* Never used in the US
 - *Argument to bring it back:*
 - In 1996 Georgia state legislator Doug Teper proposed the guillotine as a replacement for the electric chair as the state's method of execution to enable the convicts to act as organ donors. The proposal was not adopted.
- **Hanging** was the primary method of execution in the US until the 1890s. Hanging is still used in Delaware and Washington, although both have lethal injection as

an alternative method of execution. The inmate is weighed the day before the execution, and a rehearsal is done using a sandbag of the same weight as the prisoner. This is to determine the length of 'drop' necessary to ensure a quick death. If the rope is too long, the inmate could be decapitated, and if it is too short, the strangulation could take as long as 45 minutes. The rope, which should be 3/4-inch to 1 1/4-inch in diameter, must be boiled and stretched to eliminate spring or coiling. The knot should be lubricated with wax or soap "to ensure a smooth sliding action." The execution takes place when a trap-door is opened and the prisoner falls through. Hanging typically involves a drop of between four and six feet, depending on the weight of the body. The prisoner's weight should cause a rapid fracture-dislocation of the neck. It causes a fracture between the second and third cervical vertebrae, fracturing the joint, tugging the spinal cord, damaging the brain stem and causing the heart to stop. If the inmate has strong neck muscles, is very light, if the 'drop' is too short, or the noose has been wrongly positioned, the fracture-dislocation is not rapid and death results from slow asphyxiation. If this occurs the face becomes engorged, the tongue protrudes, the eyes pop, the body defecates, and violent movements of the limbs occur. If the rope is too short, the prisoner may not die instantly; too long and he/she may be decapitated. This seems to have been the case in 2007 in the botched hanging of Saddam Hussein's half-brother. Famously used to execute the 10 condemned Nazis in the Nuremberg Trials in 1946 and Saddam Hussein in Iraq in 2006, the last hanging in the US was in Delaware in 1996 with Billy Bailey.

- *Last execution in the US:* Billy Bailey in Delaware in 1996
- *Argument to bring it back:* None.

- The **electric chair** came about through seeking a more humane method of execution than hanging, and New York carried out the first electrocution in 1890. For execution by the electric chair, the person's head and legs are usually shaved and they are strapped to a chair with belts that cross his chest, groin, legs, and arms. A metal skullcap-shaped electrode is attached to the scalp and forehead over a sponge moistened with saline to aid conductivity. Additional electrodes are moistened with conductive jelly and attached to the shaved portion of the prisoner's legs that has been shaved to reduce resistance to electricity. The prisoner is then blindfolded. It provides 30 seconds of up to 2,450 volts applied to the human body at three points, the head and two calves. The jolt varies in power from state to state. It is also determined by the convict's body weight. The first jolt is followed by several more in a lower voltage. In Georgia, executioners apply 2,000 volts for four seconds, 1,000 volts for the next seven seconds, and then 208 volts for two minutes. The person should be dead within 30 seconds if all goes well. But the voltage may not be sufficient to stop the heart and prisoners sometimes require more jolts, despite severe damage to internal organs. This process continues until the prisoner is dead. There are third degree burns with blackening where the electrodes met the skin of the scalp and legs. There have been many botched electrocutions, from broken bones while convulsing to some

even having caught fire. Officials in Nebraska had to keep a fire extinguisher ready and an eye out for smoke coming from the prisoner's head. The last electrocuted inmate was in 2013 in Virginia – Robert Gleason.

- *Last execution in the US:* Robert Gleason in Virginia in 2013
- *Argument to bring it back:*
 - In 2014 in Virginia, state Representative Jackson Miller argued for the state to be able to use the electric chair on condemned inmates if lethal injection drugs are unavailable.
 - Also in 2014, the Tennessee state Senate overwhelmingly voted to reinstate the electric chair to execute capital inmates in the event that the state is unable to procure the necessary chemicals to perform lethal injections. Tennessee Gov. Bill Haslam signed the bill into law in May 2014, making Tennessee the first state to bring back the electric chair without giving the condemned an option of how to die.

- **Gas chamber** (cyanide gas) was introduced in 1924 as Nevada sought a more humane way of executing its inmates. Gee Jon was the first person executed by lethal gas. The state tried to pump cyanide gas into Jon's cell while he slept. This proved impossible because the gas leaked from his cell, so the gas chamber was constructed. Today, five states authorize lethal gas as a method of execution, but all have lethal injection as an alternative method. First, cyanide pellets are placed into a compartment directly below the chair in the chamber. The condemned person is then brought into the chamber and strapped into the chair, and the airtight chamber is sealed. At this point the execution technician will pour a quantity of concentrated sulfuric acid down a tube that leads to a small holding tank directly below the compartment containing the cyanide pellets. Then executioner(s) will throw a switch/lever to cause the cyanide pellets to drop into the sulfuric acid, initiating a chemical reaction that releases cyanide gas into the airtight chamber. Cyanide gas interferes with the human cells' ability to carry oxygen. Scientist Christopher Cooper described the pain as a combination of brain seizure, heart attack and asphyxiation. Prisoners can minimize the pain by breathing deeply, but in practice this is very difficult and many try to hold their breath. The inmate dies from hypoxia, the cutting-off of oxygen to the brain. At postmortem, an exhaust fan sucks the poison air out of the chamber, and the corpse is sprayed with ammonia to neutralize any remaining traces of cyanide. About half an hour later, orderlies enter the chamber, wearing gas masks and rubber gloves. The last gassed inmate was in 1999 when Walter LaGrand was executed in Arizona.
 - *Last execution in the US:* Walter LaGrand in Arizona in 1999
 - *Argument to bring it back:* None.

- **Firing squad** is currently an option in only Idaho and Oklahoma, but both have lethal injection as another option. The shooters are generally composed of several soldiers or police officers. The inmate, dressed in all black—so that the blood won't show—is typically bound to a chair with leather straps across his waist and head, in front of an oval-shaped canvas wall. A black hood is pulled over the inmate's head. A doctor locates the inmate's heart with a stethoscope and pins or velcros a circular white cloth target over it. Standing about 20 feet away, five shooters are armed with .30 caliber rifles loaded with single rounds. One of the shooters is given blank rounds. Each of the shooters aims his rifle and fires at the inmate. Beneath the prisoner is a large pan, specially designed to collect the blood and bodily fluids of the executed. Behind the prisoner are thick sandbags to absorb the bullets and prevent them from bouncing around the execution room. The prisoner dies as a result of blood loss caused by rupture of the heart or a large blood vessel, or tearing of the lungs. The person shot loses consciousness when shock causes a fall in the supply of blood to the brain. If the shooters miss the heart, by accident or intention, the prisoner bleeds to death slowly. Since *Furman*, there have been only three firing squad executions, all in Utah and by request: Gary Gilmore in 1977, John Albert Taylor in 1996, and Ronnie Lee Gardner in 2010. Death by firing squad was banned in Utah in 2004 but four inmates who requested it before then could still get it. In Utah, the firing squad consisted of five volunteer police officers from the county in which the conviction of the offender took place. In China, this was the most common form of execution until the country started adopting lethal injection starting in 1997.
 - *Last execution in the US:* Ronnie Lee Gardner in Utah in 2010.
 - *Argument to bring it back:*
 - In January 2009, New Hampshire State Rep. Delmar Burrridge sponsored a bill calling for the firing squad to be the state's method of execution. "A firing squad is more humane, reliable and quick. And perfectly matches the crime with the punishment," Burrridge said.
 - In 2014, Wyoming state Sen. Bruce Burns argued for the state to pass a bill to allow for the return of firing squads in Wyoming in case lethal injection is ever outlawed. The lawmaker, who introduced a bill calling for such action, also advocated for the firing squad because they are economically sensible. "One of the reasons I chose firing squad as opposed to any other form of execution is because frankly, it's one of the cheapest for the state," said Burns. Burns, whose legislation would make firing squads a secondary form of execution in the state, says his bill was triggered in part by watching the lethal injection problems play out around the U.S.
 - Missouri State Representative Rick Brattin made the same argument for his state in 2014, as well, introducing a bill in the state legislature. "I think it's more inhumane to have someone strapped to a chair, watching a doctor poke them with a needle 10 times and then watch the drug flow down an IV to put them to

sleep like a dog,” says Brattin. “I’m sorry, I find that more inhumane versus a blindfold and your sentence being carried out by a firing squad.”

- Utah Representative Paul Ray proposed a new state law in 2014 that has been endorsed by Utah lawmakers that would call for a firing squad if the state cannot obtain the lethal injection drugs 30 days before the scheduled execution. Ray said it’s the most humane way to execute someone because the inmate dies instantly. The proposal still needs to go through the full legislative process. Under current Utah law, death by firing squad is only an option for criminals sentenced to death before 2004.
- Also in 2014, U.S. 9th Circuit Court Judge Alex Kozinski called for bringing back firing squads while acknowledging that executions cannot be neat and tidy. “Executions are, in fact, brutal, savage events, and nothing the state tries to do can mask that reality,” Kozinski wrote in a dissenting opinion in a case in Arizona. Kozinski’s solution was to stop pretending that a practice so grisly can ever be sanitized:

“If some states and the federal government wish to continue carrying out the death penalty, they must turn away from this misguided path and return to more primitive—and foolproof—methods of execution. The guillotine is probably best but seems inconsistent with our national ethos. And the electric chair, hanging and the gas chamber are each subject to occasional mishaps. The firing squad strikes me as the most promising. Eight or ten large-caliber rifle bullets fired at close range can inflict massive damage, causing instant death every time. There are plenty of people employed by the state who can pull the trigger and have the training to aim true.”

A new alternative?

With pain part of all these, there is discussion on alternatives. Mike Christian, a Republican in the Oklahoma House of Representatives, said in 2014 that he would like to see nitrogen asphyxiation introduced as a method to execute death row inmates.

"It's the most humane way to die. You just sit there and a few minutes later, you're dead." Christian says. "I think it will definitely meet the standards (set) by the United States Supreme Court that it is definitely not cruel and inhumane."

For nitrogen asphyxiation executions, convicts would be placed in an airtight chamber or under a large plastic sack. The introduction of nitrogen, and the absence of oxygen, leads to a rapid loss of consciousness and, ultimately, to death. The method has never been used for capital punishment cases in the US. And there is disagreement as to whether it is

as painless as Christian suggests, with some reports claiming that it is an agonizing way to die.

"Nitrogen is the most humane, cheapest and easiest way to execute people," Dr. Michael Copeland, assistant professor at East Central University in Oklahoma City, says. In contrast with gases used previously for capital punishment, he says that convicts executed with noble gases such as nitrogen would not feel as though they were suffocating.

Unlike with lethal injections, little can go wrong, he says. "You don't need a doctor or other medical personnel to find a vein."

And the method is extremely affordable, Christian adds, saying you only need a bottle of gas and a small plastic tent. "It's even cheaper than the bullets you need for the firing squad," Christian says.

<http://www.spiegel.de/international/world/us-representative-wants-to-replace-lethal-injection-with-nitrogen-a-991651.html> (videos)

Hippocratic Oath Violation?

Doctors play a difficult and controversial role in this process, too. "The bottom line is that physicians are supposed to cure, not kill," says Dr. Priscilla Ray, chair of the Council on Ethical and Judicial Affairs at the American Medical Association (A.M.A.). The A.M.A. can't do much to censure physicians who decide on their own to participate in

executions. And almost all doctors involved in executions take great pains to conceal their identity--from hiding during the execution to requesting payment in cash so there's no check to trace back to the state.

Leading medical organizations discourage members from participating in executions because they say it contradicts the Hippocratic oath.

The rules are often vague about who monitors an execution if physicians are unwilling or unwanted. So the job often falls to corrections officers, few of whom have training comparable to that of physicians.

But other doctors quibble with that interpretation of the Hippocratic oath. In a certain light, a condemned prisoner whose death is imminent and assured could be viewed as a terminal patient. Then the doctors' palliative presence through the dying process takes on a nobler tone. Despite the A.M.A.'s objections, a survey published in 2000 by the Archives of Internal Medicine found that 43% of responding physicians felt it was acceptable for other doctors to inject lethal drugs as part of an execution.

Some experts on executions say the debate over which chemicals to use is the wrong one. States have adopted a process that appears humane because it looks like medical treatment, Professor Denno said. But looks can be deceiving, she added.

Some argue that the wider issue of pain and torture, though, is not the method of execution but the mental trial of being on death row for years.

It takes an average of nine years from the time a death sentence is handed down to when it is actually imposed in the US.

"No method of execution can prevent the knowledge that you are going to die by the state in the future," says Jon Yorke, a law lecturer who has done extensive death penalty research in the US. "That will have a psychological impact, it can never be humane."

The so-called "death row phenomenon" affects an inmate in two ways, says Mr Yorke. One concerns the mind. In 1986 in Florida, Alvin Ford escaped the death penalty because he had become insane on death row.

The other is the physical impact of the structure in which an inmate is being held. In Oklahoma, where cells on death row are deprived of sunlight, a prisoner may endure 25 years without Vitamin D.

Lawyer Clive Stafford-Smith, who has represented death row inmates, agrees and says the mental torture of being on death row is far more horrific than what awaits them at the end.