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## Executed in U.S. may be awake as they suffocate

- Execution drugs sometimes don't work as planned, medical review finds
- Deaths can be slow, painful, involve suffocation while awake, study says
- Method probably violates ban on cruel and unusual punishment, researchers say
- 37 states have adopted lethal injection; 11 have suspended its use

(AP) -- The drugs used to execute prisoners in the United States sometimes fail to work as planned, causing slow and painful deaths that probably violate constitutional bans on cruel and unusual punishment, a new medical review of dozens of executions concludes.

Even when administered properly, the three-drug lethal injection method appears to have caused some inmates to suffocate while they were conscious and unable to move, instead of having their hearts stopped while they were sedated, scientists said in a report published Monday by the online journal PLoS Medicine.

No scientific groups have ever validated that lethal injection is humane, the authors write. Medical ethics bar doctors and other health professionals from taking part in executions.

The study concluded that the typical "one-size-fits-all" doses of anesthetic do not take into account an inmate's weight and other key factors. Some inmates got too little, and in some cases, the anesthetic wore off before the execution was complete, the authors found.

"You wouldn't be able to use this protocol to kill a pig at the University of Miami" without more proof that it worked as intended, said Teresa Zimmers, a biologist there who led the study.

The journal's editors call for abolishing the death penalty, writing: "There is no humane way of forcibly killing someone."

Lethal injection has been adopted by 37 states as a cheaper and more humane alternative to electrocution, gas chambers and other execution methods.

But 11 states have suspended its use after opponents alleged it is ineffective and cruel. The issue came to a head last year in California, when a federal judge ordered that doctors assist in killing Michael Morales, convicted of raping and murdering a teenage girl. Doctors refused, and legal arguments continue in the case.

### More than 2,000 executions

In 2005 alone, at least 2,148 people have been killed by lethal injection in 22 countries, especially China, where fleets of mobile execution vans are used, the editors write, citing Amnesty International figures. Of the 53 executions in the United States in 2006, all but one were by lethal injection.

The new review was written by many of the same authors who touched off controversy when they published a 2005 report suggesting that many inmates were conscious and possibly suffering when the last of the drugs was given.

That report was criticized for its methodology, which relied on blood samples taken from prisoners hours after executions.

The new paper looked at the executions of 40 prisoners in North Carolina since 1984 and about a dozen in California, plus incomplete information from Florida and Virginia. The authors analyzed details such as the dose the inmates received, their weight and the time they needed to die.

Most states use three drugs -- thiopental, an anesthetic; pancuronium bromide, a nerve blocker and muscle paralyzer; and potassium chloride, a drug to stop the heart. Each is supposed to be capable of killing all by itself, but if not, the anesthetic is supposed to render the inmate unconscious while the other drugs do the job.

In 33 North Carolina executions, the average death time was 10 to 14 minutes, depending on the combination of drugs used, the authors report. Calculating each inmate's actual dose, based on his or her weight, they concluded that some did not receive enough.

"The person would feel either asphyxiation or the burning sensation associated with the potassium," said Dr. Leonidas Koniaris, a surgeon and co-author at the University of Miami. "The potassium would cause extreme discomfort, something like being put on fire."

Even the final drug did not always prove fatal as intended. At least one California inmate required a second dose, and the California warden has said additional doses were used in two other executions, the study reports.

Death penalty proponents complained the report's conclusions were based on scant scientific evidence.

"It's more like political science than medical science," said Mike Rushford, president of Criminal Justice Legal Foundation in Sacramento.

Steve Stewart, prosecuting attorney in Clark County, Indiana, where an execution is scheduled for May 4, said the simple solution seemed to be to give a higher dose of the anesthetic, which probably would not satisfy opponents who see all methods as barbaric.

"It doesn't matter a whole lot to me that someone may have felt some pain before they were administered poison as a method of execution," he said.

Dr. Mark Heath, an anesthesiologist at Columbia University Medical Center who has studied lethal injection cases, took issue with some of the paper's conclusions, but said it generally showed that concerns about lethal injection in its current form "are well-justified."

Editors said they sent the manuscript to three independent medical experts for review -- an anesthesiologist, a forensic pathologist and someone in charge of a critical care unit, plus a lawyer.

"We were satisfied" with the science, said Dr. Virginia Barbour, a British physician who is managing editor of the journal, published by the nonprofit group Public Library of Science. "The difficulty of a paper like this is that there is very poor evidence for all the kinds of protocols used" in lethal injections, but the authors did a good job analyzing what there is, she said.

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