

NEWS IN FOCUS



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JOE RAEDLE/NEWSMAKERS/GETTY



The lethal-injection chamber in Huntsville, Texas.

ANAESTHETICS

Death row incurs drug penalty

Bid to use common anaesthetic for executions threatens to cut off supply to US hospitals.

BY CHRIS WOOLSTON

Allen Nicklasson has had a temporary reprieve. Scheduled to be executed by lethal injection in Missouri on 23 October, the convicted killer was given a stay of execution by the state's governor, Jay Nixon, on 11 October — but not because his guilt was in doubt. Nicklasson will live a while longer because one of the drugs that was supposed to be used in his execution — a widely used anaesthetic called propofol — is at the centre of an international controversy that threatens

millions of US patients, and affects the way that US states execute inmates.

Shortages of anaesthetic drugs usually used in lethal injection, the most common method of execution, are forcing states to find alternative sedatives. Propofol, used up to 50 million times a year in US surgical procedures, has never been used in an execution. If the execution had gone ahead, US hospitals could have lost access to the drug because 90% of the US supply is made and exported by a German company subject to European Union (EU) regulations that restrict the export of medicines and devices

that could be used for capital punishment or torture. Fearing a ban on propofol sales to the United States, in 2012 the drug's manufacturer, Fresenius Kabi in Bad Homburg, ordered its US distributors not to provide the drug to prisons.

This is not the first time that the EU's anti-death-penalty stance has affected the US supply of anaesthetics. Since 2011, a popular sedative called sodium thiopental has been unavailable in the United States. The manufacturer, US company Hospira, abandoned plans to produce the drug at its plant in Italy after regulators in the country required that the thiopental never be used in executions. The drug, which is difficult and costly to make, was already in short supply because of manufacturing problems.

"There has been a collision of the politics of capital punishment in the United States and Europe, forcing us to hopscotch around looking for suitable methods for anaesthesia," says Jerry Cohen, a former president of the American Society of Anesthesiologists.

"The European Union is serious," says David Lubarsky, head of the anaesthesiology department at the University of Miami Miller School of Medicine in Florida. "They've already shown that with thiopental. If we go down this road with propofol, a lot of good people who need anaesthesia are going to be harmed."

The loss of thiopental from the anaesthesia arsenal was a relatively minor inconvenience, says Cohen, because propofol provided an alternative. But if propofol is used for executions in Missouri or any other state, it could disappear too, leaving hospitals in a serious bind. "Propofol has a lot of uses for which there are no substitutes," says Cohen. It is the preferred way to sedate people who have breathing tubes because it acts quickly and does not cause vomiting. Federal regulations make propofol difficult to manufacture in the United States.

The 35 US states with prisoners on death row were already scrambling to find effective drugs for lethal injection, which was used for 43 executions last year. The procedure previously relied on a course of three injections: thiopental to sedate the prisoner, muscle relaxant pancuronium bromide to induce paralysis, and potassium chloride to stop the heart. As supplies of thiopental ran low in 2009 and 2010, many states started stockpiling pentobarbital, another sedative. But in 2011, Lundbeck, a drug company in Copenhagen and sole US supplier of pentobarbital, banned it from use in executions because of Danish and EU human-rights ►

► laws. Texas's supply of pentobarbital expired in September, but the state obtained more from unregulated compounding pharmacies, which tailor-make drugs. Pentobarbital is not "especially" useful as a surgical anaesthetic, says Lubarsky, so its shortage has little impact on patient care.

On 15 October, after running out of pentobarbital, Florida executed William Happ using midazolam as the sedative. But midazolam, which is similar to diazepam (Valium), had never been used in an execution, and, according to media reports, Happ was still blinking and moving his head minutes after the injection.

Nobody knows whether midazolam is appropriate for lethal injections, says Lubarsky. "We've turned this into a circus of experimenting on prisoners," he says. "The state is playing doctor without any regard for efficacy. It changes protocols willy-nilly." The drug is not a good anaesthetic, he says, and it may not shield prisoners from the pain of the final injection.

Although midazolam has now entered the realm of capital punishment, it is unlikely that surgical supplies will be affected. Hospira is one of many companies that makes midazolam and has no plans to stop, says Dan Rosenberg, a company spokesman. Rosenberg would not

say where Hospira makes midazolam, but he says that European regulations "aren't an issue".

Meanwhile, Missouri has suspended another execution, scheduled for 20 November, while it tries to find an alternative to propofol. Lubarsky notes that although a single, large dose of propofol could work as a method of execution, its use in US prisons would be problematic because it could be complex to administer and physicians are generally not willing to participate in the process (see *Nature* **441**, 8–9; 2006). "Putting together a foolproof protocol that could be carried out by prison guards with high-school educations is another matter entirely," he says. ■

PUBLISHING

Brazil fêtes open-access site

South American SciELO project weighs up future after 15 years of free publishing.

BY RICHARD VAN NOORDEN

Researchers and publishers are gathering this week in São Paulo, Brazil, to celebrate a quietly subversive open-access publishing project. The occasion: the 15th anniversary of SciELO (Scientific Electronic Library Online), a subsidized collection of mainly Latin American journals that now puts out more than 40,000 free-to-read articles each year — and which aims to put developing countries firmly on the scientific map.

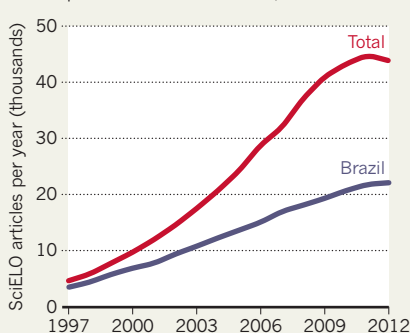
Although little noticed by European and North American scientists, SciELO is "one of the more exciting projects not only from emergent countries, but also in the whole world", argues Jean-Claude Guéron, an open-access supporter who studies comparative literature at the University of Montreal in Canada.

In contrast to fee-charging open-access journals, journals on the SciELO platform charge authors little or nothing to publish because state and government funders provide infrastructure and software. That backing has helped to make Brazilian research the most open in the world — in 2011, 43% of Brazilian science articles were free to read on publication, compared with, for example, 6% of US articles.

But on its 15th birthday, SciELO's future is in flux. Broader recognition of the venture might inspire similar 'public-good' networks in other emerging science regions. Or the project might dwindle in influence as commercial open-access publishers muscle in. "The direction that SciELO goes in will have a big effect on scholarly communications in Latin America," says Juan Pablo Alperin, a doctoral student at Stanford University in California who develops software at the Public Knowledge Project, a research initiative

FREE AND EASY

SciELO has expanded rapidly. For comparison, the global number of immediately available open-access articles published in 2011 was 340,000.



looking at open-access scholarly publishing.

The roots of SciELO go back to 1993, when Rogério Meneghini, now SciELO's scientific director but then at the São Paulo Research Foundation (FAPESP), saw that "a great deal of [Brazil's] scientific conversation was not noticed in global science". In an effort to raise the visibility of Brazilian research, FAPESP started funding SciELO as a one-year pilot project in 1997, with journals that met basic editorial standards being placed in the collection. Ten other countries, including Mexico, Spain and South Africa, subsequently joined. And it has inspired other free Ibero-American publishing platforms, such as the 11-year-old Redalyc.org.

Much of the project is funded by a US\$3-million annual grant from FAPESP and from Brazil's National Council for Scientific and Technological Development, says SciELO director Abel Packer. Separately, some journals offer extra services, such as English translation. And each country supports its own journal

operations (South Africa, for example, has chipped in with \$450,000; Chile, with \$345,000).

SciELO's admirers say that the system builds publishing expertise and helps researchers to publish open science on regional subjects — such as health issues and farming techniques — that might be rejected by international journals. However, citations are low and journal quality variable. Many Brazilian researchers choose instead to publish in international journals, notes Margareth Capurro, a biologist at the University of São Paulo. This is partly because funding agencies prefer higher-impact publications, she adds.

"If 'influence' were measured by other ways, such as usage, we may see a different picture," says Leslie Chan, who studies open access at the University of Toronto in Canada. SciELO Brazil gets 1.5 million downloads per day, and this year, a SciELO citation database will be added to the Thomson Reuters Web of Knowledge, further raising visibility.

Packer and Meneghini hope to persuade other emergent science nations to join: India has been approached. They say that, for the Brazilian journals, the greatest challenges are to raise journal quality and international recognition. This might involve professionalizing editorial boards and paying salaries. But that could mean higher costs, says Meneghini.

As SciELO grows (see 'Free and easy'), its biggest journals are in danger of being bought by profit-seeking publishers, warns Guéron. That would be a shame, Alperin says, adding that a free-to-publish system helps to sidestep problematic aspects of open-access publishing, such as when fee-charging journals accept as many papers as possible without providing adequate peer review. "I'd love to see more of the world copy the Latin American model," he says. ■

SciELO