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## The Lethal Injection Debate: Law and Science

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**SYMPOSIUM**  
**THE LETHAL INJECTION DEBATE:**  
**LAW AND SCIENCE**  
**INTRODUCTION**

*Deborah W. Denno\**

On April 16, 2008, for the first time in six decades, the United States Supreme Court reviewed evidence concerning whether a state's method of execution violated the Eighth Amendment's Cruel and Unusual Punishments Clause.<sup>1</sup> In *Baze v. Rees*,<sup>2</sup> a 7-2 plurality ruling,<sup>3</sup> the Court upheld the constitutionality of Kentucky's method of executing inmates by lethal injection, determining that Kentucky's administration of a three-drug combination used by most death penalty states did not pose a "substantial" or "objectively intolerable" risk of "serious harm" to inmates.<sup>4</sup> The Court also concluded that petitioners' proposed alternative method of execution, consisting of a large dose of only the first of the three drugs, was unacceptable.<sup>5</sup>

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\* Arthur A. McGivney Professor of Law, Fordham University School of Law. This Introduction is part of the *Fordham Urban Law Journal's* symposium on *The Lethal Injection Debate: Law and Science*. I am most grateful to Marianna Gebhardt and Jennifer Woo for excellent comments and assistance, as well as to the *Fordham Urban Law Journal* staff for outstanding editorial contributions.

1. This six-decade demarcation was proffered by the Court. See *Baze v. Rees*, 128 S. Ct. 1520, 1530-31 (2008) (plurality opinion) (discussing the Eighth Amendment precedent of *Wilkerson v. Utah*, 99 U.S. 130 (1878), *In re Kemmler*, 136 U.S. 436 (1890), and *Louisiana ex rel. v. Resweber*, 329 U.S. 459 (1947)). There is room for disagreement, however, on when the Court last reviewed evidence concerning the constitutionality of an execution method. The Eighth Amendment provides that "[e]xcessive bail shall not be required, nor excessive fines imposed, nor cruel and unusual punishments inflicted." U.S. CONST. amend. VIII.

2. 128 S. Ct. at 1520.

3. Chief Justice Roberts announced the judgment of the Court and delivered an opinion which Justice Kennedy and Justice Alito joined. *Id.* at 1525. Justice Alito filed a concurring opinion. *Id.* at 1538. Justice Stevens filed an opinion concurring in the judgment. *Id.* at 1542. Justice Scalia filed an opinion concurring in the judgment, which Justice Thomas joined. *Id.* at 1552. Justice Thomas filed an opinion concurring in the judgment, which Justice Scalia joined. *Id.* at 1556. Justice Breyer filed an opinion concurring in the judgment. *Id.* at 1563. Justice Ginsburg filed a dissenting opinion, which Justice Souter joined. *Id.* at 1567.

4. *Id.* at 1531 (plurality opinion).

5. *Id.* at 1534-38.

The road leading to *Baze* is well traveled with lethal injection litigation; yet, post-*Baze*, there appear to be many more litigation miles still to go. Ever since Oklahoma first adopted lethal injection in 1977, attorneys have challenged the method's constitutionality on a variety of grounds, ranging from the selection and qualifications of the execution team to the involvement of physicians in the execution process to the formula developed for an injection.<sup>6</sup> The typical formula, which Kentucky uses, consists of a serial sequence of three drugs: sodium thiopental, a common anesthetic for surgery that is intended to cause unconsciousness; pancuronium bromide, a total muscle relaxant that stops breathing by paralyzing the diaphragm and lungs; and potassium chloride, a toxin that induces cardiac arrest and permanently stops the inmate's heartbeat.<sup>7</sup>

A primary concern in *Baze* and lethal injection litigation generally rests with the second drug, pancuronium bromide. Without adequate anesthesia, pancuronium can cause an inmate excruciating pain and suffering because the inmate slowly suffocates from the drug's effects while paralyzed and unable to cry out. Such agony is increased all the more when executioners inject the third drug, potassium chloride, which creates an intense and unbearable burning. There is agreement that if the sodium thiopental is ineffective, it would be unconscionable to inject the second and third drugs into a conscious person. A key issue in litigation is whether prison officials and executioners can determine if an inmate is aware and in torment because the pancuronium is such a powerful mask of emotions.<sup>8</sup>

In *Baze*, the Court found that Kentucky's Department of Corrections took proper precautions to preclude a substantial risk of maladministration of this three-drug combination.<sup>9</sup> Yet there are limits to the Court's analysis that suggest that it is by no means a definitive response to the issue of lethal injection's constitutionality.<sup>10</sup> For example, *Baze* is so splintered that none of its seven opinions comprises more than three votes;<sup>11</sup> the Justices also cite to a wide range of explanations and qualifications about their reason-

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6. See *infra* Symposium, *The Lethal Injection Debate: Law & Science*, 35 FORDHAM URB. L.J. 735-998 (2008).

7. *Id.*

8. *Id.*

9. *Baze*, 128 S. Ct. at 1533-34 (plurality opinion).

10. See Adam Liptak, *Moratorium May Be Over, But Hardly the Challenges*, N.Y. TIMES, Apr. 17, 2008, at A26 (citing commentators' responses to *Baze*).

11. See *supra* note 3.

ing.<sup>12</sup> Likewise, the decision is narrowly confined to just Kentucky and its particular protocol. While the Court asserts that its holding pertains to state protocols that are “substantially similar” to Kentucky’s, the Court provides no guidance for the parameters of such a comparison.<sup>13</sup> Such obscurity is compounded further by Kentucky’s particular execution history. The state has conducted only one lethal injection execution<sup>14</sup> and offers a limited record on which to base a lethal injection challenge.<sup>15</sup> Other states have far better evidence and execution data.<sup>16</sup> These points are critical given that lethal injection has been adopted for use by all but one of the thirty-six death penalty states and the federal government.<sup>17</sup> While it is beyond the scope of this Introduction to analyze *Baze* in further detail, one matter seems clear. Voices on both sides of the death penalty debate have emphasized that *Baze* left doors open for future lethal injection challenges.<sup>18</sup>

There is no better background for attempting to enter, or close, those doors than the *Fordham Urban Law Journal*’s symposium issue, *The Lethal Injection Debate: Law and Science*. This forum, the first of its kind on this topic, reflects the latest balanced perspective on the legal, medical, and ethical concerns over lethal injection from some of the country’s leading experts. While the Court’s September 2007 grant of certiorari in *Baze*<sup>19</sup> led to a de facto national moratorium on executions,<sup>20</sup> as of this writing, states have

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12. See Linda Greenhouse, *Justices Uphold Lethal Injection in Kentucky Case*, N.Y. TIMES, Apr. 17, 2008, at A1 (discussing each of the *Baze* Court’s seven opinions).

13. *Baze*, 128 S. Ct. at 1537 (plurality opinion) (“A State with a lethal injection protocol substantially similar to the protocol we uphold today would not create a risk that meets this standard.”). *But see id.* at 1562 (“At what point does a risk become substantial?”) (Thomas, J., concurring).

14. *Id.* at 1528 (plurality opinion).

15. See *infra* notes 53-57 (discussing Richard Dieter’s article).

16. See Liptak, *supra* note 10, at A26.

17. Deborah W. Denno, *The Lethal Injection Quandary: How Medicine Has Dismantled the Death Penalty*, 76 *FORDHAM L. REV.* 49, 59-60 (2007). Prior to *Baze*, numerous states—and the federal government—ceased executions entirely, many due, in whole or part, to lethal injection-related challenges. *Id.* at 60-61.

18. See *Baze*, 128 S. Ct. at 1542 (“When we granted certiorari in this case, I assumed that our decision would bring the debate about lethal injection as a method of execution to a close. It now seems clear that it will not.”) (Stevens, J., concurring); see *id.* at 1562 (“[F]ar from putting an end to abusive litigation in this area . . . today’s decision is sure to engender more litigation.”) (Thomas, J., concurring); see also Liptak, *supra* note 10, at A26 (discussing commentators’ views that the litigation would continue).

19. 128 S. Ct. 34 (2007).

20. See *infra* notes 55-56 (discussing Richard Dieter’s article); see also Denno, *supra* note 17, at 60-61.

started to set execution dates and to execute.<sup>21</sup> Lethal injection litigation has continued, picking up where the *Baze* Court last left off.

Some of the unsettled disputes in *Baze* pertain to how the Court's Eighth Amendment standards will apply in practice. This symposium's ten articles provide the proper insight and context for making that determination. The first two articles by federal judges Jeremy Fogel and Fernando Gaitan establish a foundation for addressing many of the major deficiencies that prompted the Court to grant *Baze* certiorari. Fogel's article, *In the Eye of the Storm: A Judge's Experience in Lethal-Injection Litigation*, analyzes those California cases decided between 2004-2006 that challenged the constitutionality of the state's lethal injection protocol.<sup>22</sup> The discussion focuses particularly on *Morales v. Tilton*,<sup>23</sup> over which Fogel presided. While Fogel cannot comment on the merits of *Morales* because it is still pending before him, he considers *Morales* "unique" and the most demanding "intellectually, emotionally, and spiritually" of all the "many thousands of disputes" he has handled.<sup>24</sup> The facts and procedural backdrop of *Morales* help to explain why.

Based on a variety of reasons—ranging from the findings of a 2005 article in *Lancet*<sup>25</sup> reporting insufficient levels of sodium thiopental in lethally injected inmates to growing evidence of California's own particular protocol problems—Fogel rendered a ruling in *Morales* that was unlike any other before it. For California to conduct the lethal injection execution of Michael Morales, the state had to choose one of two court-mandated options: provide qualified medical personnel who would ensure Morales was unconscious during the procedure, or alter the department of corrections' protocol so that only sodium thiopental would be given, rather than the standard sequence of three different drugs. Strikingly, the state chose to have medical experts present at Morales's execution—a

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21. Shaila Dewan, *Releases From Death Row Raise Doubts Over Quality of Defense*, N.Y. TIMES, May 7, 2008, at A1 (discussing the May 6, 2008 execution of William E. Lynd in Georgia, the first execution since the de facto moratorium due to *Baze*).

22. Jeremy Fogel, *In the Eye of the Storm: A Judge's Experience in Lethal-Injection Litigation*, 35 FORDHAM URB. L.J. 735 (2008).

23. 465 F. Supp. 2d 972 (N.D. Cal. 2006), *prelim. inj. conditionally denied sub nom.*, *Morales v. Hickman*, 415 F. Supp. 2d 1037 (N.D. Cal. 2006), *aff'd per curiam*, 438 F.3d 926 (9th Cir. 2006), *cert. denied*, 546 U.S. 1163 (2006).

24. Fogel, *supra* note 22, at 735.

25. *Id.* at 739 (citing Leonidas G. Koniaris et al., *Inadequate Anesthesia in Lethal Injection for Execution*, 365 LANCET 1412 (2005)).

decision that garnered controversy at the time but even more so later when the two anesthesiologists who were selected resigned mere hours before Morales's scheduled execution time. Because of their ethical responsibilities, the anesthesiologists would not accept the interpretation of the U.S. Court of Appeals for the Ninth Circuit that they would have to intervene personally and provide medication or medical assistance if the inmate appeared conscious or in great pain.<sup>26</sup> This predicament prompted Fogel to organize an unusually long and thorough evidentiary hearing—one that would result in a December 15, 2006 memorandum order stating that “unless California made substantial revisions to its protocol, [he] would declare it unconstitutional.”<sup>27</sup> On May 15, 2007, California filed a detailed response, which is currently the subject of pending litigation before Fogel.<sup>28</sup>

In this context, Fogel's experiences with *Morales* are captivating pronouncements “on the workings of our legal system, a meditation on being a judge, and a reflection upon the potency of the death penalty as an issue in our society.”<sup>29</sup> He highlights five particularly important experiences, all of which accentuate the extent to which new information about lethal injection over the years has either been the inspiration to acquire further knowledge on the subject or served as a source of varied perceptions and miscommunications among different actors in the criminal justice system. First, Fogel describes the evolution of his views on lethal injection, beginning with his skepticism about lethal injection's risks and ending with his decision to enjoin Morales's execution when he became more educated on lethal injection's hazards. Second, Fogel emphasizes the general divide and varying perceptions toward legal issues among judges, lawyers, and corrections personnel. In his view, “the legal system and the corrections bureaucracy are different cultures in which the same words and events often have different implications and consequences.”<sup>30</sup> For Fogel, this revelation prompts a firm take-home message for judges: “While our obligation to be meticulous in our legal analysis and legally coherent in our orders and decisions remains the same, we also have to con-

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26. See *Morales*, 465 F. Supp. 2d at 976; see also *Morales*, 438 F.3d at 931.

27. Fogel, *supra* note 22, at 743 (citing *Morales*, 465 F. Supp. 2d at 974).

28. *Id.* at 743 n.51.

29. *Id.* at 735.

30. *Id.* at 748.

sider the dynamics of the institution in which our orders and decisions will be implemented.”<sup>31</sup>

Fogel’s third experience pertains to how the media’s coverage of lethal injection challenges has changed over time. At least initially, many news articles broadly, and inaccurately, pitched the topic as “whether lethal injection in the abstract is cruel and unusual punishment” or “whether it is constitutional for a condemned inmate to suffer *any* pain at all”; only a few articles addressed the actual (and far more narrow) issue in *Morales*, which was whether California’s protocol operated as was intended when it was implemented.<sup>32</sup> After *Morales*’s execution was postponed, however, the news media became substantially more analytical and correct. Fogel’s fourth experience also reflects this broad versus narrow divergence. For example, during the public debate about California’s lethal injection cases, particularly *Morales*, the focus was on the viability of the death penalty itself rather than the specific concerns pertaining to lethal injection. Because a lethal injection challenge can possibly postpone an inmate’s execution, it prompts deeper reflections about the meaning and purpose of punishment more generally. Judges must balance awareness of the non-lawyer public’s reactions to the handling of lethal injection cases with a need to abide by the legal process.

Fogel’s fifth and last experience reveals the extent to which judges are usually personally separated from the consequences of their decisions. For Fogel, this barrier dissolved in February 2006 when he became deeply enmeshed “in the most intense discussions and hearings imaginable” concerning how Michael Morales would be executed—a circumstance that involved not only Morales’s death but also the future lives of the victim’s family as they waited for over a quarter century for closure.<sup>33</sup> Being presented with such an extraordinary personal and professional challenge, Judge Fogel relies on faith, family, friends, and the legal process itself to provide solace and strength in reaching his decisions, including what the future may hold for Morales.

By the time Fogel issued his December 2006 memorandum decision in *Morales* determining that California’s lethal injection proto-

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31. *Id.* at 749.

32. *Id.* at 750.

33. *Id.* at 759.

col “as implemented” violated the Eighth Amendment,<sup>34</sup> Fernando J. Gaitan, Jr. had already reached such a conclusion about Missouri’s protocol in *Taylor v. Crawford*.<sup>35</sup> Litigation in *Taylor* showed numerous problems with Missouri’s execution procedures. Not only did the state lack a written protocol, for example, but the doctor who had supervised fifty-four executions over the course of a decade had a record of more than twenty malpractice suits and revoked privileges at two hospitals. Testimony also revealed that the doctor’s dyslexia hindered his ability to mix drugs properly and that he adjusted dosages at his discretion, without oversight.<sup>36</sup> The combined impact of the holdings in *Morales* and *Taylor* was a powerful legal force. Indeed, less than a year after those decisions, in *Harbison v. Little*,<sup>37</sup> a Tennessee district court would similarly find its state’s revised protocol unconstitutional.<sup>38</sup>

Gaitan’s symposium article, *Challenges Facing Society in the Implementation of the Death Penalty*, provides an overview of the significance of *Taylor*, *Morales*, and *Harbison*, along with a sampling of comparable challenges in other states, including Florida.<sup>39</sup> Like Fogel, Gaitan begins his article emphasizing the stress that was involved in presiding over lethal injection challenges. In “nearly twenty-seven years as a judicial officer,” there were “few issues . . . that have caused more anxiety.”<sup>40</sup> Yet, the Eighth Amendment’s “‘evolving standards of decency’” have changed perceptions of the meaning of what punishments are considered “cruel and unusual” and, for judges, the “principle of law” must remain paramount.<sup>41</sup>

After examining the historical development of lethal injection, Gaitan analyzes the scope of constitutional standards that courts

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34. *Morales v. Tilton*, 465 F. Supp. 2d 972, 981 (N.D. Cal. 2006), *prelim. inj. conditionally denied sub nom*, *Morales v. Hickman*, 415 F. Supp. 2d 1037 (N.D. Cal. 2006), *aff’d per curiam*, 438 F.3d 926 (9th Cir. 2006), *cert. denied*, 546 U.S. 1163 (2006).

35. *Taylor v. Crawford*, No. 05-4173-CV-C-FJG, 2006 WL 1779035, at \*8 (W.D. Mo. June 26, 2006) (“determin[ing] that Missouri’s current method of administering lethal injections subjects condemned inmates to an unacceptable risk of suffering unconstitutional pain and suffering”), *rev’d*, 487 F.3d 1072, 1085 (8th Cir. 2007) (reversing district court’s holding that the state’s revised protocol violated the Eighth Amendment), *cert. denied*, 76 U.S.L.W. 3568 (Apr. 21, 2008).

36. *Id.* at \*4-6.

37. *Harbison v. Little*, 511 F. Supp. 2d 872 (M.D. Tenn. 2007).

38. *Id.* at 903 (“[T]he court finds that the plaintiff’s pending execution under Tennessee’s new lethal injection protocol violates the Eighth Amendment . . . . The new protocol presents a substantial risk of unnecessary pain . . . .”).

39. Fernando J. Gaitan, Jr., *Challenges Facing Society in the Implementation of the Death Penalty*, 35 FORDHAM URB. L.J. 763 (2008).

40. *Id.*

41. *Id.*



had been using to evaluate lethal injection challenges, ranging from an “‘unnecessary risk of unconstitutional pain or suffering’” (*Morales*), to an “‘unacceptable risk of suffering unconstitutional pain and suffering’” (*Taylor*), to an “‘unnecessary and wanton infliction of pain’” (*Harbison*).<sup>42</sup> These components make clear that the lower courts have disagreed about what test established a constitutional violation. In addition, inmates have challenged the three-drug protocol on a number of issues: the types and dosages of drugs; how the drugs are prepared; the site of veins used for access; the training and qualifications of execution personnel; the location and quality of execution facilities; the ability to ensure the inmate’s unconsciousness, as well as technical matters bearing on all these factors, such as the length of the injection procedure’s tubing and the extent to which the inmate can be viewed while being executed.

Following a detailed examination of the most recent lethal injection challenges, Gaitan concludes by investigating ways the three-drug protocol can be used so that it does not violate the Eighth Amendment. Gaitan’s suggestions include the involvement of medical professionals to oversee such critical aspects of the procedure as monitoring the depth of anesthesia, the mixing of drugs, and the flushing of intravenous lines—irrespective of the ethics concerns cited by several medical societies. “Without physician involvement,” Gaitan writes, “it may be impossible to ensure a lethal injection execution that is not cruel and unusual punishment.”<sup>43</sup> Therefore, the American Medical Association’s ethical prohibition against medical participation in executions “is inconsistent with a desire for a humane lethal injection death under constitutional precepts.”<sup>44</sup> Gaitan makes clear his stance; state agencies should not punish physicians for participating in executions as long as capital punishment is state-sanctioned, lest animal euthanasia continues to be more humane than the execution of humans.

Gaitan also strikes a bold step forward by listing alternative protocol options. Such potential choices include an overdose of a single barbiturate, much like what Fogel suggested, or carbon

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42. *Id.* at 772-73 (quoting *Morales v. Hickman*, 415 F. Supp. 2d 1037, 1039 (N.D. Cal. 2006), *aff’d*, 438 F.3d 926 (9th Cir. 2006), *cert. denied*, 546 U.S. 1163 (2006); *Taylor v. Crawford*, No. 08-4173-CV-C-FJG, 2006 WL 1779035, at \*8 (W.D. Mo. June 26, 2006), *rev’d* 487 F.3d 1072, 1085 (8th Cir. 2007), *cert. denied*, 76 U.S.L.W. 3568 (Apr. 21, 2008); *Harbison v. Little*, 511 F. Supp. 2d 872, 880 (M.D. Tenn. 2007) (quoting *Parrish v. Johnson*, 800 F.2d 600, 604 (6th Cir. 1986)).

43. *Id.* at 782.

44. *Id.*

monoxide poisoning, along the lines of that employed by Dr. Jack Kevorkian. There are also non-injection execution methods, such as the quick death the Chinese government ensured using a single gun shot to the back of an inmate's head. Gaitan also stresses the need for transparency and oversight in whatever protocol is selected, noting for example that protocols should be in writing and, under the best of circumstances, available to the public. As Gaitan explains, he directed the state of Missouri to produce a written protocol. This action, if followed by all death penalty states, would substantially reduce the burden on both courts and litigants in future lethal injection challenges. Much of lethal injection litigation simply concerns attorneys' attempts to get the information they need to prepare a proper challenge.

Gaitan concludes with a statement about the need for hierarchical decision making when it comes to the lethal injection process. In his view, state legislatures are the better branch to examine the current three-drug protocol so that they can provide guidance to the courts; otherwise, judges are inclined to process challenges on a case-by-case basis. The dire consequences of such an unstructured system are evident in the perpetuation of the status quo and the current lethal injection procedure. As Gaitan warns, "[t]hose who want death with a certain degree of torture may have found a safe haven in the three-drug protocol."<sup>45</sup>

In *Methods of Execution and Their Effect on the Use of the Death Penalty in the United States*, Richard C. Dieter takes a somewhat wider perspective on where lethal injection challenges stand relative to other types of anti-death penalty litigation over the decades. According to Dieter, the latest lethal injection challenges "have already held up more executions, and for a longer time than appeals involving such broad issues as race, innocence, and mental competency."<sup>46</sup> Dieter investigates the process behind this hold-up by focusing in particular on the public's perception of capital punishment.

Dieter begins with an analysis of this country's earlier execution methods and how each method corresponded with the country's perception of the death penalty generally. With each change in execution technique came an accompanying alteration in how citizens viewed the state in its capacity as an executioner. For example, when New York state replaced hanging with electrocution in 1890,

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45. *Id.* at 787.

46. Richard C. Dieter, *Methods of Execution and Their Effect on the Use of the Death Penalty in the United States*, 35 *FORDHAM URB. L.J.* 789, 789 (2008).

the death penalty's purpose also changed, "from one where the state was sending a warning to the community to one where the state enacted retribution on the offender" using the latest scientific advancements.<sup>47</sup>

Dieter then focuses on why the current lethal injection debates differ from those of other execution methods in prior decades and how that evolution has altered the way execution methods are carried out. One key reason is that the Eighth Amendment's Cruel and Unusual Punishments Clause was not even applicable to the states until 1962;<sup>48</sup> in turn, the Antiterrorism and Effective Death Penalty Act of 1966 ("AEDPA") put constraints on the filing of habeas petitions as well as confined the issues that could be raised.<sup>49</sup> While lethal injection challenges were relatively ineffectual in this restricted context, that circumstance began to change with the introduction of DNA testing. A seeming explosion of exonerations of innocent death row inmates prompted the perception that the states were making serious errors in the carrying out of the death penalty. As a result there were declines in death sentences, executions, and public support of the death penalty while the level of scrutiny of cases increased. This focus had ripple effects. Within due time, a number of highly publicized electrocution and lethal gas botches prompted states to turn even more to lethal injection, hiding behind the method's medical veneer of humaneness and peace.

In substantial detail, Dieter also traces the process by which attorneys used civil rights actions under section 1983 of the Civil Rights Act<sup>50</sup> to avoid AEDPA's restrictions. Recognizing that inmates were challenging lethal injection and not the death penalty itself, in 2004, the Supreme Court unanimously upheld a section 1983 lethal injection claim,<sup>51</sup> a decision the Court validated further two years later in another context.<sup>52</sup> The accompanying increase in section 1983 challenges resulted in vastly different state-wide reactions, with some states recognizing the challenges as legitimate civil rights suits while other states allowed suits to be filed, but granted no stays or hearings.

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47. *Id.* at 791.

48. *Id.* at 793 (citing *Robinson v. California*, 370 U.S. 660, 675 (1962)).

49. *Id.* at 795 (citing The Antiterrorism and Effective Death Penalty Act of 1996, Pub. L. No. 104-132, 110 Stat. 1214).

50. *Id.* at 800 (citing 42 U.S.C. § 1983 (2006)).

51. *Id.* at 801 (citing *Nelson v. Campbell*, 541 U.S. 637, 645 (2003)).

52. *Id.* at 801-02 (citing *Hill v. McDonough*, 547 U.S. 573, 584 (2006)).

The split among circuits prompted the Court to choose *Baze*, a Kentucky case, for deciding the direction of lethal injection challenges.<sup>53</sup> As Dieter notes, “Kentucky seemed an unlikely state to select for such a review”;<sup>54</sup> the state had conducted only one lethal injection execution and the suit that petitioners brought had not been scrutinized by the federal hearings being carried out in similar kinds of cases. Rather, Kentucky’s hearings were held only in state court and concerned only Kentucky’s procedures and short execution history. Regardless, the selection of *Baze* had immediate effects. Apart from a highly controversial execution carried out in Texas on September 25, 2007, the same day the Supreme Court granted certiorari in *Baze*,<sup>55</sup> there had been no executions until May 6, 2008.<sup>56</sup> While further executions are inevitable, Dieter emphasizes how narrow a case *Baze* is and how “[t]he Supreme Court’s decision will only partially affect this [lethal injection] debate.”<sup>57</sup>

Likewise, Dieter highlights the range of problems and incompetence revealed by cases such as *Morales*, *Taylor*, and *Harbison*. With greater physician involvement in lethal injection challenges and increased coverage of the topic in medical journals, the lethal injection debate has come out of hiding. In addition, a number of different news sources have reported in great detail over the last few years the difficulties and inconsistencies with lethal injection, including widely-publicized botches. As Dieter explains and demonstrates quantitatively, this accumulating kind of evidence can shake the public’s confidence not only about the carrying out of execution methods, but also about the death penalty itself.

In *Anesthetizing the Public Conscience: Lethal Injection and Animal Euthanasia*, Ty Alper also looks at the significance of the public’s attention to the lethal injection debate.<sup>58</sup> He emphasizes that the attention would be stronger still if the public were more aware of how inhumanely inmates were executed as compared to the euthanasia of animals. More pointedly, Alper draws upon the history of animal euthanasia and curariform drugs to argue against the use of pancuronium bromide in the three-drug lethal injection protocol. A facet of this history, which begins Alper’s article, is

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53. *Baze v. Rees*, 128 S. Ct. 34 (2007).

54. Dieter, *supra* note 46, at 803.

55. *Id.* at 804 (discussing the execution of Michael Richard).

56. See Dewan, *supra* note 21, at A1.

57. Dieter, *supra* note 46, at 806.

58. Ty Alper, *Anesthetizing the Public Conscience: Lethal Injection and Animal Euthanasia*, 35 *FORDHAM URB. L.J.* 817 (2008).

evidence that the medical chair of the Texas prison system rejected a Texas veterinarian's proposal to use as the state's method of execution the technique often applied in animal euthanasia. That technique was an overdose of one drug, sodium pentobarbital. Despite the veterinarian's assurances that the single drug was "very safe, very effective, and very cheap" the prison system's doctor was concerned about the outcry that could result if the public thought inmates were being treated the same way as animals.<sup>59</sup> Seemingly for this reason only, Texas decided to adopt Oklahoma's three-drug formula instead.

Alper notes the ironic twist since that 1980s episode in Texas. With the help of expert veterinarians, attorneys today are questioning whether states will continue to hold the standard for executing human beings below that used by veterinarians to euthanize animals. Such testimony primarily concerns the use of pancuronium bromide for two reasons. First, the veterinary and animal welfare communities condemn the use of neuromuscular blocking agents such as pancuronium bromide in animal euthanasia because the drugs are considered inhumane. And second, these communities have adopted a safer and easier procedure (an overdose of pentobarbital) that, for unclear reasons, states have shunned for human executions. To put this debate in context, Alper's article provides a thorough history and evaluation of the paralytic drugs, starting with their tribal origins up to the use of curare in vivisection experiments and through the end of nineteenth century antivivisection laws passed in Great Britain.

In human medicine, curare emerged as a new anesthetic tool in the 1940s, although its horrific risks were known early on. Currently, paralysis without adequate anesthesia, also known as "anesthesia awareness," occurs in about 20,000 to 40,000 cases each year; in 2006, an American Society of Anesthesiologists task force put forth an extended advisory in an effort to limit the number of cases. Indeed, Alper notes that for modern purposes, the paralytic is used in lethal injection executions to protect witnesses from the inmate's contractions, twitches, and grasps that are at times facets of even a painless death. While during the oral argument in *Baze*, the state emphasized that the paralytic provided the inmate with a more "dignified" death devoid of the involuntary twitching, Alper brings such a stance into question by examining in detail the guidelines followed by the American Veterinary Medical Association

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59. *Id.* (quoting Adam Liptak, *States Hesitate to Lead Change on Executions*, N.Y. TIMES, Jan. 3, 2008, at A1).

(“AVMA”). Those guidelines promote an overdose of pentobarbital as the “preferred method” for euthanizing animals.<sup>60</sup> Not only can the single-drug procedure be given with ease even by less trained shelter workers, but “no AVMA-approved method of euthanasia includes a paralytic.”<sup>61</sup> Also, the Humane Society “expressly condemns the use of curariform drugs like the one used in human lethal injections.”<sup>62</sup>

In an effort to investigate how states stand on the issue, Alper provides a uniquely thorough examination and categorization of all the state laws and regulations that control animal euthanasia as well as the legislative histories that led to their enactment. According to Alper, the results are striking. “[V]irtually all lethal injections in this country have taken place in states that either explicitly or implicitly ban the use of paralyzing drugs in animal euthanasia.”<sup>63</sup> Kentucky exemplifies such a state because state regulations mandate the anesthetic-only euthanasia procedure for “certified animal euthanasia specialists” who work in animal shelters and do not have the expertise of veterinarians.

Alper ends his article by contrasting the differing medical and moral approaches used for animals versus humans. While the veterinary and animal welfare communities promote a procedure that really is humane, states’ uses of lethal injection maintain a method that looks humane but carries a high risk of being anything but that.

In *Anomalies: Ritual and Language in Lethal Injection Regulations*,<sup>64</sup> Leigh B. Bienen takes a more textual and symbolic focus on lethal injection issues, including human and animal procedure comparisons, by starting with the following premise: “[t]he state lethal injection protocols do not regulate lethal injections, but instead describe hypothetical rituals meant to reassure the reader—whomever that might be—that a controlled and orderly process, in accordance with the rule of law, will take place.”<sup>65</sup> But, as Bienen contends, such so-called reassurance has no validity. Rather, lethal injection protocols and regulations are “indirect, incomplete, replete with medical and scientific inaccuracies, and padded with ir-

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60. *Id.* at 835 (quoting AM. VETERINARY MED. ASS’N GUIDELINES ON EUTHANASIA 11 (2007), available at [http://www.avma.org/issues/animal\\_welfare/euthanasia.pdf](http://www.avma.org/issues/animal_welfare/euthanasia.pdf)).

61. *Id.* at 838.

62. *Id.* at 837.

63. *Id.* at 821.

64. Leigh B. Bienen, *Anomalies: Ritual and Language in Lethal Injection Regulations*, 35 *FORDHAM URB. L.J.* 857 (2008).

65. *Id.*

relevant statements and descriptions of imagined events.”<sup>66</sup> They are written not for doctors or other medically trained individuals, but instead for the benefit of witnesses and the ill-trained individuals who actually carry out the executions. Also, the protocols are frequently “pseudo-scientific” in their narrative and specific terms. For example, some of the protocols, such as New Mexico’s, are very detailed, including such information as a “pre-execution inventory and equipment check,” which mandates that the executioners assess the dates by which time certain items used in the execution will expire or no longer be sterile.<sup>67</sup> Yet Bienen wonders why there is any need for sterile instruments since there is no possibility of post-operative infection. Even the numbering systems in some of the protocols are illogical, as though a visually hierarchical list will give a semblance of organization that is missing from the protocol’s contents.

The theme that executions are ritualized and take on a “controlled and orderly process” is also incorporated in Bienen’s comparisons of modern day lethal injection techniques to those procedures carried out by Nazi doctors in Auschwitz. Wearing white coats and handling syringes as if they were performing medical checks on a patient, Dr. Josef Mengele and other Nazi doctors delivered phenol injections directly to the victim’s heart. Individuals injected through a vein lingered too long, dying slowly in a setting in which speed and efficiency were paramount; in contrast, heart injections caused almost immediate death.

Other execution rituals throughout European history allowed a degree of discretion and preparation for the condemned that was not made available by Nazi doctors. The rituals also accentuated the real and symbolic choices that the prisoners must make before they die. These choices could include the selection of an execution method, a preference for the final meal, the last words that a prisoner might speak, and even what ceremonial clothes to wear. In modern day lethal injection rituals, there are also choices that, while more medicalized, can be compared to those of long ago: “[t]he state protocols’ concern with cleanliness, unexpired drugs, the insistence upon the color white (white sheets, white walls, and white coats for the technicians), and requirements regarding sterility are analogous to primitive rules governing purity at sites where spirits or evil forces are to be expunged.”<sup>68</sup> Bienen stresses, how-

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66. *Id.* at 860.

67. *Id.* at 863.

68. *Id.* at 873.

ever, that the modern execution process should enable distinctions to be made between the potentially unconstitutional pain and suffering an inmate may experience during the execution, and the horrifying perception of such agony by witnesses. As Bienen asserts, execution witnesses have no constitutional claim when they view a ghastly execution and therefore suffer as a result. Yet complaints about the tragedies of watching executions have been particularly influential avenues for encouraging legislatures to move to another form of execution. In an effort for states to forestall such a move, execution protocols become “window dressing, stage directions, the establishment of ritual, designed to create an illusion of an orderly, humane, dignified procedure for a controlled euthanasia.”<sup>69</sup>

This refined presentation troubles Bienen, however, because it is so far off base. After all, lethal injection is a punishment. If state legislatures wanted it to be humane they would use a large single dose of a fast acting barbiturate. Yet the legislatures, courts, and prison personnel perpetuate the use of the paralytic drug that hides the inmate’s jerks and groans, thereby thwarting the validity of the death penalty and also the rule of law. According to Bienen, if the United States continues to cling to capital punishment, then it is only right that its citizens concede that all of the ritualistic practices and irrelevant details of executions, much less the white sheets and lab coats, are simply for the peace and welfare of the observers and prison actors. Bienen bucks such pretense. “The law owes to itself and its practitioners that honesty, that acknowledgement.”<sup>70</sup>

Jonathan I. Groner focuses on the related theme of the medical profession’s active and long term involvement in capital punishment in *The Hippocratic Paradox: The Role of the Medical Profession in Capital Punishment in the United States*.<sup>71</sup> In a continuing quest to make execution methods more humane, physicians contributed to the creation of many agents of death—the guillotine, the electric chair, the gas chamber, and lethal injection. But only lethal injection was designed to actually mimic a medical practice (the induction of general anesthesia), as well as incorporate instruments and expertise typically used for healing patients. As a result, the current dominance of lethal injection, given the rarity of other kinds of execution methods, has forced the hand of the medical profession to become identified with causing state-sanctioned

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69. *Id.* at 879.

70. *Id.* at 880.

71. Jonathan I. Groner, *The Hippocratic Paradox: The Role of the Medical Profession in Capital Punishment in the United States*, 35 *FORDHAM URB. L.J.* 883 (2008).



death. This chain of events has also prompted an ethical conflict, what Groner calls the “Hippocratic paradox.” The “paradox exists because it is immoral for medical professionals to increase the risk of another human being suffering torture by not participating, but also immoral for medical professionals to perform executions, because such participation risks irreparable harm to the medical profession and to the community as a whole.”<sup>72</sup>

Groner’s article starts with the history of physician involvement, stating that while the precise origins of participation are not known, during the eighteenth century, Dr. Louis Guillotin was “[t]he first, and still the most famous, physician to be associated with a specific killing technique.”<sup>73</sup> While the guillotine was first made available to aristocrats and royalty only, through Guillotin’s efforts it could be used by all condemned irrespective of their social class because such beheadings were considered humane and instantaneous. But the mark of medicine on execution techniques did not stop with the guillotine. Groner discusses the medical mechanics of all the earlier execution methods used in this country: hanging, electrocution, lethal gas, and the firing squad. (Ultimately Groner believes the firing squad can lead to a “nearly instantaneous and painless death.”)<sup>74</sup>

Groner then provides an overview of the development of lethal injection and the medical specifics of how injection operates. He notes that despite the international use of intravenous and intracardiac injections in prior eras, most notably in the death camps in Nazi Germany, lethal injection was not adopted in the United States until 1977, and not actually used until 1982. Statewide depictions of lethal injection as a way of putting prisoners to sleep prompted the method’s popularity and the subsequent increase in executions throughout the 1990s. By the time the execution rate peaked in 1999, the great majority of those executions had been conducted with lethal injection. Also, many executions took place in quick succession. Indeed, in Groner’s eyes, the ability of some U.S. prisons to kill with such efficiency prompted comparisons with the execution agenda of the Nazi euthanasia program. But execution efficiency has its distinct limits, moral ones for sure, but also technological ones that result in botched executions.

Groner next offers a thorough analysis of the medical problems and deficiencies in a range of botched lethal injection executions

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72. *Id.* at 884.

73. *Id.*

74. *Id.* at 887.

across different states and decades, as well as an examination of recent studies of lethal injection drugs, including the *Lancet* study<sup>75</sup> that Fogel also mentioned.<sup>76</sup> In Groner's eyes, it is the combined effect of all this information that fueled the recent lethal injection challenges. Yet, in addition, the legal, administrative, and legislative inadequacies of the lethal injection process have pushed physicians into the realm of the execution world because medical expertise is so sorely needed. For example, cases in Georgia, Missouri, North Carolina, and California have all involved in one way or another the controversial participation of physicians—a situation that jars medical associations. The reasons are straightforward. The Hippocratic Oath, the ethical principle established for the medical profession since antiquity, sets forth a firm standard, stated most succinctly as follows: “[F]irst, do no harm.”<sup>77</sup> This view is shared, nationally and internationally, across a wide span of different medical professions. The World Medical Organization, World Psychiatric Association, International Council of Nurses, American College of Physicians, American Medical Association, and American Society of Anesthesiologists, for example, have all voiced their public concern and opposition regarding the medical profession's participation in executions. Yet the state medical boards hold the true power to discipline physicians for their involvement in executions—a level of authority that can vary depending on the particular state and circumstance.

Groner contends that a medical professional “harms his or her relationships with other patients by participating in an execution”<sup>78</sup> for a range of reasons. In particular, patients lack trust in a physician who can kill another human being. This fear is accentuated by the anonymity of those involved in executions so that patients may never know that their physician participates in lethal injections. Indeed, “the medical nature of the execution process leads to an inversion of values, where killing is seen as therapeutic” and the catharsis of executing a prisoner is at times described as a “‘healing’ effect” for the victim's family or even the entire community.<sup>79</sup> Groner notes that “[a] similar perversion of values—the medical-

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75. *Id.* at 899 (citing Leonidas G. Koniaris et al., *Inadequate Anesthesia in Lethal Injection for Execution*, 365 *LANCET* 1412 (2005)).

76. *See supra* note 25 and accompanying text.

77. Groner, *supra* note 71, at 902.

78. *Id.* at 905.

79. *Id.* at 907.

ization of killing—was also at the heart of the Nazi T-4 ‘euthanasia’ program.”<sup>80</sup>

Court rulings in California, Missouri, and North Carolina, as well as other states, have conflicted with national and international standards of medical ethics because they have either mandated or provided the opportunity to incorporate physicians into the lethal injection process. The result is the “‘Hippocratic paradox’ where it is unethical for physicians not to participate in lethal injection, but also unethical for physicians to participate.”<sup>81</sup> In an effort to quell the dilemma, state lawyers have proposed four primary approaches to lethal injection executions: (1) “medical coercion” (for example, providing physicians who participate in executions payments in cash as well as assurances of anonymity); (2) “technology substitution” (for instance, suggesting a way of substituting a prior faulty procedure with a presumably improved alternative, such as an anesthetic-only injection protocol which nonmedical professionals can more easily use); (3) “medical professional ambiguity” (placing the physician in an intentionally “ambiguous role” in the execution context so that the precise extent of the physician’s actual involvement is not clear); and (4) “medical situational morality” (contending that the physician’s participation during an actual execution is exempt from the medical profession’s ethical obligations).

Despite the extent of the debate concerning physician participation, however, Groner concludes that the dilemma posed by the Hippocratic paradox “cannot be resolved without corrupting the fundamental ethics of medicine.”<sup>82</sup> Recognizing that after *Baze*, physicians will once again become involved in executions, Groner offers a recommendation. “[I]n order to preserve its professional ethics, and its position as a morally protective force in society, the medical profession must work to abolish capital punishment.”<sup>83</sup>

Teresa A. Zimmers and Leonidas G. Koniaris approach physician involvement in lethal injection from yet another perspective: empirical research on the drugs that are used in injections. In *Peer-Reviewed Studies Identifying Problems in the Design and Implementation of Lethal Injection for Execution*,<sup>84</sup> the authors emphasize the complete lack of investigation of an execution method that

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80. *Id.* at 908.

81. *Id.* at 909.

82. *Id.* at 916.

83. *Id.* at 917.

84. Teresa A. Zimmers & Leonidas G. Koniaris, *Peer-Reviewed Studies Identifying Problems in the Design and Implementation of Lethal Injection for Execution*, 35 FORDHAM URB. L.J. 919 (2008).

is now so widely implemented. “Although lethal injection gives the appearance of a medical procedure, no research whatsoever—clinical, veterinary, medical literature search, or other—was ever performed” either before Oklahoma adopted lethal injection or Texas conducted the first lethal injection execution.<sup>85</sup> In addition, evidence provided during lethal injection litigation, as well as eye-witness testimony and scientific data, demonstrate a wide range of problems in lethal injection protocols.

In an effort to further reveal the dearth of objective information on how lethal injection drugs may cause death, the authors examine two peer-reviewed studies on lethal injection. Given the significance of the peer-review process in enhancing the likelihood that scientific journals publish valid and reliable articles, Zimmers and Koniaris first describe what that process entails. In essence, authors submit manuscripts to journals which are then rigorously screened by other experts in the same field according to the quality and sophistication of the research, the statistical analysis, overall scholarship, and any other criteria the journal may have. Based upon any criticisms and exchanges that may result from the journal’s evaluation, the journal’s editors and reviewers then determine whether the manuscript’s data are consistent with the authors’ conclusions and whether other researchers may be able to replicate or rely on the data presented.

In the medical profession, publications that are not subject to peer-review are not taken as seriously as those that are. Zimmers and Koniaris emphasize, however, that in lethal injection challenges, courts have relied substantially on non-peer-reviewed work. Such work includes, for example, the testimony of experts who are compensated for their efforts, and who also bypass the “unbiased expert review and criticism” of the peer-review process.<sup>86</sup> As a result, “otherwise scientifically unsupportable conclusions can be used as a basis for judicial opinions.”<sup>87</sup> In an attempt to rectify this situation and provide peer-reviewed work that could also be used in court, Zimmers and Koniaris investigated “all available data pertaining to lethal injection drug delivery and outcomes” and published their results with co-authors in “two of the world’s leading

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85. *Id.* at 921.

86. *Id.* at 922.

87. *Id.*

[peer-reviewed] journals in general medicine”:<sup>88</sup> the *Lancet* in 2005<sup>89</sup> and the *Public Library of Science (PloS) Medicine* in 2007.<sup>90</sup>

The *Lancet* article received extensive attention both by the judiciary and the medical profession.<sup>91</sup> Based on a review of post-mortem serum thiopental levels derived from the autopsies of executed inmates in several states, the authors drew striking conclusions. “[I]n many instances,” the serum thiopental levels “were much lower than that which would be required for general anesthesia.”<sup>92</sup> In addition, not only did the execution personnel “in many jurisdictions” have “no anesthesia or medical training,” but there was no direct administration of the drugs to the inmate, no monitoring of the inmate’s level of consciousness, no supervision of the procedure’s end result, nor any consistency with standard veterinary practices in the administration of animal euthanasia. The results of the *Lancet* article were not without criticism or controversy, however, and a number of researchers wrote the *Lancet*’s editor with their objections. The article’s authors answered each of these researchers’ objections point-by-point, and their conclusions about their lethal injection study remain resolute. As Zimmers and Koniaris explain, “[t]o date, the *Lancet* paper has withstood three years of scrutiny in the scientific literature without having a single claim disproved or even substantively challenged.”<sup>93</sup>

As a follow-up to the *Lancet* study, Zimmers, Koniaris, and their co-authors published another article in *PloS Medicine*. This second article examined the accuracy of explanations of the pathophysiology of lethal injection, specifically, whether the current lethal injection protocol actually leads to a quick and minimally painful death. The authors relied on the lethal injection practices in North Carolina and California because those states had the most data. By calculating the actual thiopental doses given to North Carolina inmates based upon the body weights recorded on autopsy reports, the authors reached the following conclusion. “[T]he dose of thiopental used in lethal injections overlaps the clinical range—clearly

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88. *Id.* at 923.

89. See Koniaris et al., *supra* note 25, at 1412-14.

90. Teresa A. Zimmers et al., *Lethal Injection for Execution: Chemical Asphyxiation?*, 4 PLoS MED. 0646-53 (2007).

91. Denno, *Lethal Injection Quandary*, *supra* note 17, at 104-06 (discussing cases and medical journals in which the *Lancet* article has been cited).

92. Zimmers & Koniaris, *supra* note 84, at 924.

93. *Id.* at 925.

a dose not designed to be fatal.”<sup>94</sup> Yet the execution logs in California were even more informative. Evidence demonstrated “that inmates continued to breathe for 1 to 9 minutes after 5 grams of thiopental, indicating that thiopental does not reliably induce respiratory arrest.”<sup>95</sup>

In a further effort to clarify the means by which lethal injection works, the authors noted the general consensus: “[T]he mechanism of death is or involves cardiac arrest from potassium chloride.”<sup>96</sup> Yet data from lethal injections conducted in both California and North Carolina suggest otherwise. In California, some inmates required up to eight minutes to undergo cardiac arrest while in North Carolina, “times to death were not statistically different in executions using potassium chloride versus those that did not.”<sup>97</sup> Thus, the authors could not reliably demonstrate that potassium chloride is sufficient to induce death in lethal injection executions. Indeed, in those circumstances where neither sodium thiopental nor potassium chloride is at a sufficient level to induce death, “death is likely effected by paralysis and asphyxiation.”<sup>98</sup>

Altogether, these findings lead to a stunning conclusion put forth by the authors. There is “strong evidence that the lethal injection protocol provides a substantial risk of inadequate anesthesia both due to failures of process, as well as problems in the protocol design itself.”<sup>99</sup> Therefore, the procedure does not appear to operate in the way that is intended. Likewise, all parties in lethal injection should be aware of the acute lack of information available to conduct the kind of research necessary to assess what constitutes a substantial risk.

Mark Dershwitz and Thomas K. Henthorn provide additional empirical approaches for examining the effects of lethal injection drugs, particularly sodium thiopental in *The Pharmacokinetics and Pharmacodynamics of Thiopental As Used in Lethal Injection*.<sup>100</sup> As the authors explain, from about the mid-1940s to the mid-1990s, thiopental “was the most commonly used intravenous anesthetic

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94. *Id.* at 927.

95. *Id.*

96. *Id.* at 928.

97. *Id.*

98. *Id.*

99. *Id.* at 929.

100. Mark Dershwitz & Thomas K. Henthorn, *The Pharmacokinetics and Pharmacodynamics of Thiopental As Used in Lethal Injection*, 35 *FORDHAM URB. L.J.* 931 (2008).

agent.”<sup>101</sup> Therefore, in the 1970s, it was reasonable for the creators of the original lethal injection protocol to select thiopental as the drug needed to render an inmate unconscious before injecting pancuronium bromide and potassium chloride. In order to examine more specifically how thiopental functions when used in an execution, the authors apply two types of strategies, pharmacokinetics and pharmacodynamics. As used in the article, pharmacokinetics “is the study of the concentration of thiopental as a function of time in tissues (particularly brain)”; in turn, pharmacodynamics “is the study of the effects of thiopental (particularly the production of unconsciousness and impairment of the heart’s ability to circulate blood).”<sup>102</sup> By relying on “generally accepted” mathematical modeling strategies and a substantial body of research on the pharmacology of thiopental, the authors set forth their goals in predicting such important information as the onset and duration of thiopental’s effects in the execution context. Determining when an inmate is expected to become unconscious (“onset”) and how long the inmate is expected to stay unconscious (“duration”) are key considerations in assessing the constitutionality of any lethal injection protocol.

Dershwitz and Henthorn’s study of thiopental demonstrates the extent to which the drug’s effects are dependent on the circumstances under which it is being used and the makeup of the person being injected. While pharmacology and anesthesiology texts typically depict thiopental as an “‘ultra-short acting’ sedative/hypnotic agent,” the authors claim that this characterization “is semantically correct, but only when thiopental is compared to other barbiturates.”<sup>103</sup> During surgery, when thiopental was used to induce a general anesthetic in a typical adult patient, for example, the standard dose was approximately 300 mg, the amount needed to keep the patient unconscious for 5 to 10 minutes. Yet after that thiopental injection, a physician would usually administer anesthetic gases to maintain a patient’s unconscious state until surgery was over. In essence, then, thiopental is a drug that typically initiates a patient’s unconscious state at the start of surgery while other agents keep the patient unconscious throughout surgery.

Lethal injection protocols generally list doses of thiopental ranging from 2000 to 5000 mg, amounts that are about seven-to-sixteen times greater than the doses administered in a typical anesthetic.

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101. *Id.*

102. *Id.* at 932.

103. *Id.*

Yet “the relationship between the dose of thiopental and its duration of action is *not* linear.”<sup>104</sup> Thus, a sevenfold increase in a dose of thiopental that peaks at 2000 mg will not result in a sevenfold increase in the duration of an individual’s state of unconsciousness. The increase in duration will actually be “much more.”<sup>105</sup>

The interrelationship between an individual’s level of consciousness and potential for perceiving pain is complex but also critical in assessing lethal injection’s acceptability. As the authors note, a person made unconscious by way of thiopental will not have a conscious perception of pain. At the same time, that unconscious person’s body may demonstrate reflex reactions to pain in a number of ways—by showing movement, a fast heart rate, sweating, or tearing. In addition, those unconscious reactions to pain may revert that individual back to a state of consciousness, “making it difficult to distinguish between [unconscious] reflex responses to pain and conscious response.”<sup>106</sup> Recognizing the potential problems posed by such confusion, some commentators have recommended that “deep unconsciousness, as defined by burst suppression on the electroencephalogram (“EEG”), be the level of unconsciousness produced in lethal injection.”<sup>107</sup>

After this overview, the authors introduce their calculations of the onset times for thiopental administered at various injection rates. Relying on principles of anesthesiology and pharmacology, in addition to published data, the authors present a series of models simulating the onset of thiopental’s effects “from any given dose or injection speed.”<sup>108</sup> The analysis specifically examines levels of unconsciousness and burst suppression for three different doses of thiopental: 2000 mg, 3000 mg, and 5000 mg.<sup>109</sup> Of course, onset can also be influenced by a number of factors, ranging from an individual’s levels of blood circulation and diffusion to the mechanics of the lethal injection procedure itself; particular examples include the length of the intravenous tubing that commonly extends from the injection room to the death chamber before reaching the condemned’s veins, as well as the location where the catheter is inserted.

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104. *Id.*

105. *Id.* at 933.

106. *Id.*

107. *Id.*

108. *Id.* at 945.

109. *Id.*



The authors also examine the duration of the thiopental effect, considering a range of extenuating requirements, for example, that duration should exceed the amount of time needed to administer the remaining two drugs (including the physical acts of changing and applying different syringes). Because the potassium chloride should take two minutes or less to cease cardiac electrical activity, the authors calculate that fifteen minutes should be sufficient to complete a standard lethal injection execution from the time thiopental is administered until electrical activity ceases. Following the administration of a 5000 mg dose of thiopental, for instance, these fifteen minutes would allow the average person to have a 100% probability of becoming unconscious and achieving burst suppression on the EEG. Following a 3000 mg dose, the same person will have a 100% probability of becoming unconscious and a 95% probability of having burst suppression on the EEG. While a 2000 mg dose of thiopental requires less time to inject than a 5000 mg dose, it will also have a lesser effect in decreasing cardiac output. The authors conclude that for most people, doses of 2000 mg or more of thiopental will be lethal.

Applying these concepts and calculations to determine the acceptability of lethal injection execution procedures, the authors support what has become the following consensus of opinion: "The greatest risk to the inmate, in terms of the humaneness of an execution, is the administration of pancuronium and/or potassium chloride to an inmate who is conscious."<sup>110</sup> The authors note, of course, that this risk could be substantially diminished if executioners could demonstrate that the inmate is unconscious before the other drugs are administered. On the other hand, determining the *depth* of an inmate's level of conscious awareness is far more complex; that responsibility would mandate the contributions of more trained and qualified personnel.

The authors also emphasize that although some states regularly perform autopsies on executed inmates (a policy that can provide blood for determining the concentration of thiopental), the procedures are often improperly conducted and the blood samples wrongly interpreted. For example, thiopental demonstrates post-mortem redistribution (meaning that, even after an inmate's death and loss of circulation, the inmate's blood concentration continues to decline); yet "very little information on the postmortem kinetics

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110. *Id.* at 949.

of thiopental [exists] because historically thiopental has been of little importance to forensic toxicologists.”<sup>111</sup>

In an effort to provide some insight on this information gap, the authors analyze data gathered by medical examiners in three jurisdictions in which paired blood samples were collected following executions. The first blood sample was obtained “soon” (within an hour) after the execution and the second blood sample was acquired 7-to-18 hours later, at the time of the autopsy. The data table the authors present constitutes “the only example of *paired* data in which blood samples were drawn from the *same* inmate at *different* times following death.”<sup>112</sup> Statistically, the authors interpret the data to conclude “that there is a 99.9987% probability of a significant *decrease* in the blood thiopental concentration as a function of time following death by lethal injection where death closely follows a single rapid infusion of the drug.”<sup>113</sup> According to the authors, the data suggest that postmortem redistribution of thiopental does indeed take place. In addition, their analyses indicate “that a rise in blood thiopental concentrations would be seen if similar paired postmortem samples were obtained when death occurred much longer after a dose of thiopental.”<sup>114</sup> The authors also emphasize a critical finding—“that there may be substantial and clinically meaningful differences” in thiopental concentration in arteries as opposed to veins, a variance that must be considered when examining postmortem redistribution data.<sup>115</sup>

Such results invite recommendations and conclusions and the authors rise to the challenge. Their first point is unsurprising. If executioners make no egregious mistakes and follow to the word the three-drug lethal injection protocols that the authors examined, inmates will die rapidly and “without undue pain or suffering.”<sup>116</sup> Likewise, Dershwitz and Henthorn believe the foremost advantage of the three-drug protocol is that it has a “definite and rapid endpoint,” specifically, “the onset of a flat-line [electrocardiogram] that can be assessed remotely by viewing an [electrocardiogram] monitor.”<sup>117</sup> The primary disadvantage of the three-drug protocol is predictable. There is a risk that a conscious inmate would experience pain and suffering if given insufficient levels of thiopental

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111. *Id.* at 951.

112. *Id.* at 952.

113. *Id.*

114. *Id.*

115. *Id.*

116. *Id.* at 953.

117. *Id.* at 955.

and then injected with the pancuronium bromide and potassium chloride. Another downside is that because the potassium chloride “causes widespread stimulation of nerve and muscle tissue throughout the body,” its effects often induce involuntary muscle contractions that lay witnesses in prior executions may have thought were signs that the inmate was suffering from pain or a seizure.<sup>118</sup> Given that a large dose of thiopental is an “excellent anticonvulsant medication,” however, the authors find it “most unlikely” that an inmate who had been sufficiently anesthetized would have experienced a seizure. The pancuronium bromide, of course, can eliminate these involuntary contractions.<sup>119</sup>

The key advantage of a protocol with a single large dose of thiopental “is that there is no risk whatsoever of the inmate experiencing pain or suffering due to the effects of pancuronium or potassium chloride.”<sup>120</sup> This conclusion bears emphasis in light of a Netherlands study (which the authors partly question) suggesting that a single administration of thiopental cannot guarantee death; that same study also revealed that the largest dose of thiopental ever used in the Netherlands for euthanasia purposes was only 2000 mg.<sup>121</sup> “[I]t is therefore not surprising that such a dose was found to be less than 100% lethal.”<sup>122</sup> On the other hand, the main disadvantage of the single drug protocol is that an inmate’s death will not immediately be reflected on the electrocardiogram monitor; even though the inmate will probably die within a few minutes, the physiological signposts for death may not show for another half hour. This circumstance may mandate the need for a physical exam revealing the absence of a heartbeat or another indicator of death.

The authors do not say which of the two protocol options they prefer (the standard three-drug protocol or the single large-dose administration of thiopental). They do stress, however, the need for greater transparency and data availability. “[W]e believe that those policy makers responsible for making such decisions [about protocol options] are entitled to accurate scientific information in order to make an informed policy decision.”<sup>123</sup>

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118. *Id.*

119. *Id.*

120. *Id.* at 956.

121. *Id.* at 955 (citing *Administration and Compounding of Euthanasic Agents*, The Hague (Royal Dutch Society for the Advancement of Pharmacy 1994), available at <http://wweek.com/html/euthanasics.html>).

122. *Id.*

123. *Id.* at 956.

In a twist in direction from Dershwitz and Henthorn, Susi Vassallo focuses primarily, and far more critically, on the recommendation of a single large-dose administration of thiopental. In *Thiopental in Lethal Injection*, Vassallo examines existing studies measuring thiopental and awareness and suggests that a thiopental-only single-drug lethal injection protocol ought to be approached with great caution.<sup>124</sup> She bolsters her argument in a range of ways that reflect the differences between how thiopental is used in a clinical medical setting as opposed to an execution.

One of Vassallo's main arguments is that irrespective of all the research on thiopental, it "is unstudied as a single killing agent for humans."<sup>125</sup> Thiopental was not necessarily intended to be the drug that causes death in a lethal injection procedure. Nor is thiopental the dominant drug for animal euthanasia; rather sodium pentobarbital is the most frequently selected agent. According to the American Society of Anesthesiologists' *amicus* brief in *Baze*, "there is no dispute that a massive or supraclinical dose of thiopental (as those being considered by the courts), if effectively delivered into the circulation, will reliably produce prolonged and deep unconsciousness."<sup>126</sup> Yet Vassallo stresses that at no point does the brief mention thiopental's lethality.

Turning to the published scientific literature on thiopental, Vassallo begins by noting that thiopental studies generally do not employ the same dose or application as lethal injection protocols; most research uses relatively smaller amounts. Even if the amounts of thiopental in some studies are comparable to the amounts used in lethal injection procedures, the method of administration differs and the distinction is critical. For example, the pharmacodynamic effect of thiopental varies depending on which of the two ways the drug is administered: (1) a single intravenous bolus (which constitutes "a single push on the plunger of the syringe" enabling the drug to be delivered in a matter of seconds) or (2) a continuous intravenous infusion.<sup>127</sup> Jay Chapman, the chief medical examiner of Oklahoma and creator of lethal injection's drug combination, had suggested a continuous infusion of thiopental for Oklahoma's first lethal injection execution. Yet nearly all

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124. Susi Vassallo, *Thiopental in Lethal Injection*, 35 *FORDHAM URB. L.J.* 957 (2008).

125. *Id.* at 958.

126. *Id.* at 959 (quoting Brief for American Society of Anesthesiologists as Amicus Curiae Supporting Neither Party, *Baze v. Rees*, No. 07-5439, 2008 WL 63222 (U.S. argued Jan. 7, 2008)).

127. *Id.* at 960 n.15.

death penalty states today use the single intravenous bolus for conducting lethal injections. According to Vassallo, “[i]f the published studies on thiopental rely on a different means of administration than lethal injection protocols, then it is difficult and/or inappropriate to draw predictions from these studies to the lethal injection context.”<sup>128</sup>

Another matter distinguishing thiopental studies from lethal injection protocols is the source of tissue used to derive samples of thiopental concentrations. Thiopental concentrations for purposes of research are typically measured not in the brain but rather in “easily obtainable” tissue sources such as blood, plasma, or fat. In contrast, mathematical models of thiopental’s effects are used to estimate brain thiopental concentration. The drawback, then, of using studies as a comparative standard “is that the concentration of thiopental in one tissue source does not necessarily reflect the other, and may not reflect the clinical condition of the individual.”<sup>129</sup>

Lastly, some thiopental studies employ “pharmacokinetic-pharmacodynamic parameters and combine infusion quantal dose-response data.”<sup>130</sup> Yet “[t]he ability to accurately predict thiopental dose-response relationships (the loss of consciousness at a certain dose of thiopental) through computer modeling demands many values for thiopental doses derived from average populations of young healthy men.”<sup>131</sup> These young healthy male populations, however, would not necessarily predict accurately the physiological make up or conditions of an individual prison inmate. Likewise, Vassallo details a range of other complexities that hinder the capacity of modeling studies to mirror the role of thiopental in lethal injection executions. Future modeling techniques may bring insights that do not yet exist.

Vassallo also criticizes continuous infusion studies of thiopental, noting that “[s]hort continuous infusion of thiopental results in a model that does not mimic the single bolus injection of thiopental in lethal injection protocols.”<sup>132</sup> Nor do long infusion models do a better job of reflecting lethal injection procedures. A single bolus injection into an inmate during an execution cannot compare, for

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128. *Id.* at 960.

129. *Id.* at 961.

130. *Id.* at 962. See *supra* text accompanying note 102 for a definition of pharmacokinetic-pharmacodynamic.

131. Vassallo, *supra* note 124, at 962.

132. *Id.* at 963.

example, to the long continuous infusions designed to hold a steady state of coma for a brain injured patient for hours or days. Vassallo comprehensively describes a range of other kinds of studies further demonstrating the comparative limits between research and the implementation of an actual lethal injection.

According to Vassallo, there is a key point to take home from her analysis of thiopental studies. “A future ‘improved’ method of lethal injection—using thiopental alone, no longer requiring the participation of medically trained professionals, and monitoring the depth of anesthesia using [computerized methods]—is an illusion.”<sup>133</sup> In Vassallo’s view, it was this country’s rush to adopt untested execution method strategies that propelled the current problems that lethal injection litigation is now revealing. This disturbing history “should serve to caution against the acceptance of a new lethal injection protocol relying on thiopental alone.”<sup>134</sup>

Robert Blecker’s article closes the symposium issue and puts both legal and medical arguments in context with pointed philosophical reflections about the punitive purpose of lethal injection. In *Killing Them Softly: Meditations on a Painful Punishment of Death*, Blecker, a self-identified retributivist, argues that while the Constitution rightly prohibits punishment by torture, social and legal efforts to abolish all pain in punishment will simply result in the abandonment of punishment itself.<sup>135</sup> As Blecker explains, “[w]e must no longer haphazardly employ execution methods that seem indifferent to the experience of dying, attempting to obliterate from memory the agonizing death of the victim which gives us the right, if not the obligation, to execute the aggravated murderer.”<sup>136</sup> He urges the infusion of capital punishment “with concern and emotional denunciation,” for punishment “must and should be painful.”<sup>137</sup>

Blecker distinguishes between the utilitarians (who believe “pain is evil” and inflict pain only “to prevent greater pain, by deterring others, incapacitating or reforming the dangerous offender”) and retributivists (who believe in inflicting pain and suffering on criminals “because they deserve it, but only to the extent they deserve it”).<sup>138</sup> He frequently cites Cesare Beccaria’s abolitionist

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133. *Id.* at 967 (footnotes omitted).

134. *Id.* at 968.

135. Robert Blecker, *Killing Them Softly: Meditations on a Painful Punishment of Death*, 35 *FORDHAM URB. L.J.* 969 (2008).

136. *Id.* at 971.

137. *Id.* at 971-72.

138. *Id.* at 972-73.

text, *An Essay on Crimes and Punishments*,<sup>139</sup> which endorsed “physically painful punishment calibrated to produce the best effects.”<sup>140</sup> Retribution, however, is not the same as revenge; rather retribution “must be limited and in its more mature measurement proportional—no more (or less) than deserved.”<sup>141</sup> As Blecker explains, “[t]he Biblical ‘eye for an eye,’ originally understood as no more than an eye for an eye, exemplifies retribution as a restriction on pain as much as justification of punishment.”<sup>142</sup>

For purposes of clarification, Blecker refers to the *amicus* brief submitted to the Supreme Court in *Baze* by the American Association of Jewish Lawyers and Jurists.<sup>143</sup> According to the brief, the Talmud urges “the quickest, least painful, and least disfiguring methods of execution that the technology of the day would allow within the framework of Biblical texts.”<sup>144</sup> Blecker refutes this argument, stating that while “the Talmud *limits* bodily pain, it hardly eliminates all technologically avoidable physical pain and suffering.”<sup>145</sup>

Indeed, it was only during recent centuries that punishment transformed “into something which denies its own nature” by focusing more on depriving personal liberty than inflicting pain.<sup>146</sup> Following the Enlightenment and the founding of the early American republic, “[s]cientific determinism challenged free will along with the retributive basis for punishment” and “[t]reatment replaced punishment as the enlightened response to crime.”<sup>147</sup> The introduction of anesthesia in the nineteenth century advertised that pain could be controlled, thereby casting notions of pain and punishment itself to mere abstractions. Likewise, upon observing the growing elimination of public executions, Michel Foucault concluded that punishment “become[s] the most hidden part of the penal process.”<sup>148</sup>

139. CESARE BECCARIA, AN ESSAY ON CRIMES AND PUNISHMENTS (Adolph Casanovi ed. Int'l Pocket Lib., 2d ed. 1992) (1775).

140. Blecker, *supra* note 135, at 973.

141. *Id.*

142. *Id.*

143. *Id.* at 974.

144. *Id.* (quoting Brief for the American Association of Jewish Lawyers and Jurists (“AAJLJ”) as Amicus Curiae Supporting Petitioners, *Baze v. Rees*, 128 S. Ct. 833 (2008) (No. 07-5439)).

145. *Id.* at 975.

146. *Id.*

147. *Id.* at 976.

148. *Id.* at 977 (quoting MICHEL FOUCAULT, DISCIPLINE AND PUNISH 11, 9 (Alan Sheridan trans., 1979)).

These themes are, of course, transferable to modern day pronouncements on pain and punishment. During the oral argument in *Baze*,<sup>149</sup> for example, Blecker contends that “everybody assumed without discussion that less painful punishment becomes . . . more humane” and that “no state would intentionally inflict a painful death.”<sup>150</sup> In Blecker’s eyes, during the *Baze* oral argument and again in the *Baze* plurality opinion, Chief Justice Roberts viewed “‘painless’” as equivalent to “‘humane.’”<sup>151</sup> Chief Justice Roberts was countered only by Justice Scalia, who prompted the following question: “‘Where does this come from, that in the . . . execution of a person who has been convicted of killing people we must choose the least painful method possible?’”<sup>152</sup> Yet Blecker believes Justice Scalia’s query missed a key point. Blecker would have asked the question as follows: “[W]here does it come from that in the execution of a person who has been convicted of killing people *painfully*, we must choose the least painful method possible?”<sup>153</sup> As Blecker explains, “[a]dding ‘painfully’ would have forced the retributive question by implication”;<sup>154</sup> by contrast, “Scalia’s question obscures the deepest retributive issue, instead making it appear solely as a question of a state’s right to reject untried or inefficient-although-less-painful options.”<sup>155</sup>

In *Baze*, Blecker notes that, like the oral argument, “the Justices never seemed to contemplate, much less discuss, whether justice itself might sometimes actually require imposing a painful death.”<sup>156</sup> Indeed, Justice Stevens, who chose *Baze* to set forth his abolitionist views, contended “that too little pain might undermine capital punishment’s retributive function, thus eliminating its primary rationale and only possible constitutional justification.”<sup>157</sup> Only Justice Thomas “acknowledged . . . the possibility that a state might *intentionally inflict* a painful death”; yet he did not consider whether the intentionally inflicted painful death could ever be deserved, quite the contrary.<sup>158</sup> Justice Thomas also equated the

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149. 128 S. Ct. 1520 (2008).

150. Blecker, *supra* note 135, at 978.

151. *Id.*

152. *Id.* at 978-79 (quoting Transcript of Oral Argument at 21, *Baze v. Rees*, No. 07-5439, 2008 WL 1733259 (Apr. 16, 2008)).

153. *Id.* at 979 (emphasis added).

154. *Id.*

155. *Id.*

156. *Id.* at 981.

157. *Id.*

158. *Id.* at 982 (emphasis added).



elimination of pain with constitutional acceptance of the punishment.

According to Blecker, the current debate on lethal injection concerns not only the condemned's experiences of pain, but also the observer's since lethal injection's paralytic masks what could be a horrifying execution sight.<sup>159</sup> Yet this goal is directly counter to Blecker's philosophy. "Nothing could be more perverse and unjust to a true utilitarian than pancuronium causing the condemned to suffer an agonizing death, all the while appearing peaceful."<sup>160</sup> Indeed, classic utilitarians would take the opposite approach. They believe "that rationally structured punishment should most effectively deter others while least injuring the criminal by appearing much more painful than it feels" to criminals.<sup>161</sup> Beccaria, for example, denounced the death penalty in favor of life in prison at hard labor or slavery because the life punishments were "'more terrible to the spectator than to the sufferer himself.'"<sup>162</sup>

Blecker contends that the state's "good motives" to avoid gruesome appearances for the witnesses cannot justify the risk that the condemned may feel pain. In *Baze*, however, Chief Justice Roberts justified in part upholding Kentucky's use of pancuronium bromide because the state has "'an interest in preserving the dignity of the procedure, especially where convulsions or seizures could be misperceived as signs of consciousness or distress.'"<sup>163</sup> According to Blecker, "today's utilitarians, following Beccaria and Bentham, should relentlessly attack the current regime" due to the "appearance-reality gap" between actual and perceived suffering.<sup>164</sup> Such false appearances are also totally unacceptable to retributivists. "If a killer deserves a quick but painful death, we deserve the satisfaction of knowing he experiences it."<sup>165</sup> Alternatively, "[i]f most condemned killers deserve to die, but without pain, we commit a great injustice by creating false appearances that obscure their wrongly inflicted, unjustly suffered pain."<sup>166</sup>

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159. *Id.* at 985.

160. *Id.*

161. *Id.*

162. *Id.* at 986 (quoting CESARE BECCARIA, AN ESSAY ON CRIMES AND PUNISHMENTS 109 (1788)).

163. *Id.* (quoting *Baze v. Rees*, No. 07-5439, 2008 WL 1733259, at \*13 (U.S. Apr. 16, 2008)).

164. *Id.* at 987.

165. *Id.*

166. *Id.* at 987-88.

According to Blecker, this “medical illusion” condemns lethal injection “if nothing else does.”<sup>167</sup> But the illusion has also drawn both the sympathy and ire of the medical profession which remains directly affected by courts’ holdings on lethal injection, most particularly, of course, the holdings of the Supreme Court. And the medical profession’s views also vary. Blecker notes, for example, Dr. Mark Heath’s opinion that lethal injection is “both a medical and a non-medical procedure.”<sup>168</sup> Inserting the IV line and injecting an anesthetic have both medical and therapeutic purposes; but the application of both pancuronium bromide and potassium chloride, for the purposes in which they are used, do not.<sup>169</sup> Yet seeking guidance from the medical establishment generally about whether to implement lethal injection is not the solution. “[W]e don’t look to medical therapists to tell us whom to execute,” Blecker asserts. “[M]edicine should no more tell us how.”<sup>170</sup>

In essence, “[p]unishment and medicine should never resemble each other.”<sup>171</sup> In terms of rationale, pancuronium serves as the “perfect metaphor”; it is a medical agent that “paralyzes all, severing emotions, severing the crime, disconnecting us from what we do, and why.”<sup>172</sup> Blecker states that he and other retributivists oppose lethal injection “not because it possibly causes pain, but because it certainly causes confusion, arbitrarily merging punishment and treatment, arbitrarily severing crime from punishment, pain from justice.”<sup>173</sup>

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This Introduction’s survey of articles on lethal injection represents a range of experts who participated in the *Fordham Urban Law Journal*’s landmark symposium, *The Lethal Injection Debate: Law and Science*. The symposium provides a comprehensive and balanced forum on the legal, medical, and ethical issues that constitute the focus of lethal injection litigation after *Baze*. May this forum be among the first of many on this critical topic.

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167. *Id.* at 988.

168. *Id.* at 990 (quoting Mark Heath, *Revisiting Physician Involvement in Capital Punishment: Medical and Nonmedical Aspects of Lethal Injection*, 83 *MAYO CLINIC PROC.* 115, 115 (2008)).

169. *Id.*

170. *Id.* at 992.

171. *Id.*

172. *Id.* at 998.

173. *Id.*

