Motion to Alter or Amend Judgment: Exhibit A

IN THE UNITED STATES DISTRICT COURT
FOR THE MIDDLE DISTRICT OF ALABAMA

KENNETH EUGENE SMITH, Plaintiff, v. JOHN Q. HAMM, Commissioner, Alabama Department of Corrections, Defendant.	)	Case No. 2:22-cv-00497-RAH CAPITAL CASE **EXECUTION SCHEDULED FOR NOVEMBER 17, 2022**

AMENDED COMPLAINT

Plaintiff Kenneth Eugene Smith alleges as follows:

INTRODUCTION

1. Plaintiff Kenneth Eugene Smith is in the custody of the Alabama Department of Corrections ("ADOC") at William C. Holman Correctional Facility ("Holman") under a death sentence imposed by the State of Alabama ("State") despite the jury's recommendation by a vote of 11 to 1 that he be sentenced to life imprisonment without the possibility of parole.

2. As the Eleventh Circuit Court of Appeals has recognized, "if Smith's trial had occurred today, he would not be eligible for execution because, in 2017, Alabama amended its capital-sentencing scheme," which had allowed elected state court judges to override a jury's sentencing determinations. *See Smith v. Comm'r*, 850 F. App'x 726, 726 n.1 (11th Cir. 2021). But because Alabama's amendment applied only prospectively, Mr. Smith has been denied relief from his death sentence, even though that same sentence could not be imposed today if—as happened in Mr. Smith's case—a jury of his peers recommended life in prison.

3. Plaintiff brings this action under 42 U.S.C. § 1983 to enjoin an imminent deprivation of his rights and privileges secured by the Constitution and laws of the United States.

4. If ADOC is allowed to execute Plaintiff by lethal injection on November 17, 2022, as it currently plans to do, there is a substantial likelihood that he will be subjected to an intolerable risk of torture, cruelty, or substantial pain.

5. That is what occurred when ADOC executed Joe Nathan James on July 28, 2022 and when it attempted to execute Alan Eugene Miller on September 22, 2022. ADOC's execution of Mr. James—one of the longest executions in history—and its failed attempt to execute Mr. Miller both made clear that once ADOC is allowed to begin an execution, it will not stop until the warrant expires, and during that time, will do anything to obtain intravenous ("IV") access, including disregarding its own lethal injection protocol ("the Protocol").

6. The Protocol provides that an IV team will establish IV access before curtains to the witness rooms are opened—*i.e.*, out of public view. It authorizes only two methods for establishing IV access in a condemned inmate: the "standard" method, and if that cannot be provided, then a central line may be used. It also sets out the steps that follow the IV team's secret procedures, including the reading of the warrant and the condemned offender's last words. *See* Protocol, Attached as Exhibit 4 to Declaration of Joel B. Zivot, MD, FRCP(C), MA, dated October 17, 2022 ("Zivot Decl."). A copy of the Zivot Declaration is attached as Exhibit A.

7. ADOC's public position is that it follows its protocol carefully in carrying out executions. For example, following the execution of Mr. James, ADOC's commissioner John Hamm claimed, "we have protocols and we're very deliberate in our process, and making sure

everything goes according to the plan."[1] An ADOC spokesperson later emailed the media that "ADOC's execution team strictly followed the established protocol" in executing Mr. James.[2]

8. But Mr. James's maimed body, which was examined by a physician after his execution, tells a much different story: one in which he was subjected to more than three hours of pain and torture at the hands of incompetent, unknown individuals who blatantly disregarded Alabama's execution protocol. His body alone is evidence of two significant protocol violations: (1) an unauthorized "cutdown" procedure in which an incision is made with a scalpel directly into the skin in an attempt to find a vein (2) an unauthorized intramuscular injection. Eyewitness accounts of the execution also provide evidence of a third protocol violation: upon information and belief, Mr. James was rendered unconscious before the warrant was read and his last remarks were requested, two steps in the Protocol that cannot meaningfully occur if the condemned is unconscious.

9. Mr. Miller—who survived his botched execution attempt—has, by way of his own Second Amended Complaint, provided a first-hand account of what occurred in the execution chamber when the public was not permitted to watch. *See Miller v. Hamm*, No. 2:22-cv-506-RAH, Doc. No. 79-1. That account is further evidence of ADOC's failure to follow the Protocol. For example, Mr. Miller allegedly was strapped to a gurney in a stress position, which is not authorized by the Protocol, and was "slapp[ed] . . . on his neck," *id.* ¶ 129, which is not necessary or even useful in establishing an IV catheter in the neck, nor is it permitted by the Protocol.

[1] *See* Bruenig, Elizabeth, Dead to Rights: What did the state of Alabama do to Joe Nathan James in the three hours before his execution? https://www.theatlantic.com/ideas/archive/2022/08/joe-nathan-james-execution-alabama/671127/ (last visited Oct. 17, 2022.

[2] *Id.*

10. The James execution and Miller attempted execution made clear for the first time that ADOC's lethal injection "protocol" is entirely advisory—meaning executions are being carried out by individuals who are either unable or unwilling to follow the Protocol. Instead, once ADOC is given permission to begin an execution, it will not stop until the death warrant expires, even when those efforts go beyond the Protocol and cross the threshold into torture, cruelty, or substantial pain. And because this process is largely shielded from public view, ADOC is protected from public accountability for its actions because the only person who could bear witness to the cruelty and pain he experienced will be deceased.

11. ADOC's present attempt to deflect from Plaintiff's allegations by representing that it will not perform a cutdown procedure or give intramuscular injections during Plaintiff's execution is inadequate to ensure that Mr. Smith will not be subjected to the same torture as Mr. James and Mr. Miller.

12. Put simply, it is impossible to reconcile ADOC's insistence that it strictly follows its protocol with the facts that can be gleaned from the James autopsy and Mr. Miller's account of ADOC's attempt to execute him. And with the rare exception of Mr. Miller, unidentified ADOC personnel are the only witnesses to what occurs outside public view, and ADOC has not been forthcoming about those events. Without more factual development about what the IV team is doing while shielded from the public view, it is difficult for Plaintiff to know what other painful and unnecessary procedures need to be enjoined. For example, even if ADOC does not perform a cutdown or give an intramuscular injection, as it has claimed it will not do, will it restrain Plaintiff in a stress position and hit him unnecessarily, as allegedly happened to Mr. Miller? What else might it do? Without discovery to understand the reasons for ADOC's apparent inability to perform what should be quick, relatively painless IV access procedures, Plaintiff and other

condemned individuals are presented with a horrifying game of whack-a-mole—even if they succeed in preventing the protocol violations that previously occurred, more protocol violations are likely to occur during their own executions, but by the time the nature of those violations becomes apparent, Plaintiff will be strapped to a gurney, out of public view, with no attorneys or other representatives present to bear witness to what ADOC officials do to him.

13. Given that ADOC's lethal injection protocol is only advisory, shrouded in secrecy, and, therefore, insufficient to prevent subjecting Plaintiff to an intolerable risk of torture, cruelty, or substantial pain, permitting ADOC to execute Plaintiff by lethal injection would violate his Eighth Amendment rights under the U.S. Constitution.

14. As a matter of law, nitrogen hypoxia is feasible and readily available alternative that would significantly reduce the intolerable risk to Mr. Smith from lethal injection. Plaintiff was unable to make an informed decision regarding legislation enacted in 2018 that provided condemned people, including Plaintiff, a right to elect execution by nitrogen hypoxia rather than lethal injection. By its terms, the statute gave condemned people a 30-day window in June 2018 to make that election or waive their right. Plaintiff lacked notice of his right during the election window. But even putting that aside, Plaintiff lacked information necessary to make a knowing and voluntary waiver of that right. During the 30-day election window, Plaintiff did not know that ADOC had no protocol for execution by nitrogen hypoxia and no prospect for developing one, thereby resulting in indefinite delays of execution for condemned people who chose execution by nitrogen hypoxia. Nor did Plaintiff know that ADOC's lethal injection process would subject him to an intolerable risk of a more than three-hour, non-public, torturous ordeal before the administration of the lethal drug cocktail as ADOC inflicted on Mr. James. Had he known that the State was offering him a choice between an unknown nitrogen hypoxia protocol that may not

be implemented for many years and a lethal injection protocol that subjects him to an intolerable risk of torture, cruelty, or substantial pain, Plaintiff would have chosen to be executed by nitrogen hypoxia.

JURISDICTION AND VENUE

15. This is an action for declaratory and injunctive relief.

16. The Court has subject matter jurisdiction under 42 U.S.C. § 1983 and 28 U.S.C. §§ 1331, 1343(a)(3), and 2201(a).

17. Venue is proper in the Middle District of Alabama under 28 U.S.C. § 1391(b).

PARTIES

18. Plaintiff Kenneth Eugene Smith, a citizen of the United States and resident of the State, is an inmate at Holman under Defendants' supervision and subject to execution under a State court judgment of conviction for capital murder. His execution is currently scheduled for November 17, 2022.

19. Defendant John Q. Hamm, in his official capacity, is the Commissioner of the Alabama Department of Corrections, which is an administrative Department of the State responsible for administering and exercising the direct and effective control over penal and corrections institutions within the State, including for administering the lethal injection process by which the State intends to execute Plaintiff.

CASE OR CONTROVERSY

20. There is a real and justiciable case or controversy between the parties.

EXHAUSTION OF ADMINISTRATIVE REMEDIES

21. Plaintiff has no available administrative remedies because State law exempts "[t]he policies and procedures of the Department of Corrections for executions of persons sentenced to

death . . . from the Alabama Administrative Procedure Act, Chapter 22 of Title 41." Ala. Code § 15-18-82.1(g).[3]

FACTUAL ALLEGATIONS

A. ADOC's Lethal Injection Protocol

22. ADOC's lethal injection protocol (the "Protocol") authorizes only two methods for establishing intravenous access in a condemned inmate.

23. According to the Protocol: "The standard procedure for inserting IV access will be used. If the veins are such that intravenous access cannot be provided, [redacted] will perform a central line procedure to provide an intravenous access." *See* Protocol, Annex C, ¶ c (redaction in original).

24. It should not take three hours, as it did in Mr. James case, or nearly two hours, as it did in Mr. Miller's case to establish intravenous access by the standard procedure or determine that is not possible, and then to establish intravenous access by a central line procedure or determine that is not possible. *See* Zivot Decl. ¶ 5.

25. The execution of Mr. James and the aborted execution of Mr. Miller demonstrate that the Protocol serves only an advisory function. Once an execution begins, ADOC reserves the right to deviate from the protocol to establish intravenous access as long as that is accomplished before the warrant expires at midnight. If the result is the death of the condemned person, there are no witnesses to what occurred other than ADOC personnel. And ADOC is not forthcoming about that process.

[3] In a previous litigation, the State has "[a]dmitted" that '[n]o administrative grievance process is available for . . . death row inmates to challenge the procedures to be employed during their executions." *In re Ala. Lethal Injection Protocol Litig.*, No. 12-cv-316 (M.D. Ala. 2012) Doc. 348 at ¶ 22, Doc. 354 at ¶ 22.

B. ADOC Materially Deviated from the Protocol During the Execution of Mr. James

26. On June 13, 2022, the Alabama Supreme Court scheduled Mr. James' execution for 6 pm CT on July 28, 2022.

27. ADOC's lethal injection process subjected Mr. James to at least a three- and one-half-hour ordeal, including torture, cruelty, or substantial pain. That process was replete with violations of the Protocol which amply demonstrate that the "Protocol" is merely advisory in nature, and ADOC officials, whether through incompetence or maleficence, are free to deviate from its provisions to accomplish its end of executing the condemned before the warrant expires.

28. At the scheduled time, there were no legal obstacles that prevented ADOC from proceeding with Mr. James' execution. But ADOC did not administer its lethal drug cocktail to Mr. James at or around 6 pm CT as scheduled.

29. Instead, without explanation from ADOC and without public observation, Mr. James execution extended for more than three hours. He did not appear to observers until approximately 9 pm CT and was not pronounced dead until 9:27 CT.

30. During the three hours of the process that was not open to the public, ADOC strapped Mr. James to a gurney and poked, prodded, and cut him attempting multiple times to access a vein for intravenous injection of the lethal drug cocktail. Zivot Decl. ¶ 5; *see also* Declaration of David C. Pigott, MD, dated October 12, 2022 ("Pigott Decl.") ¶¶ 4–6. A copy of the Pigott Declaration is attached as Exhibit B.

31. The Protocol provides that if IV access cannot be achieved through the standard procedure, a central line procedure should be performed. *See* Protocol, Annex C, ¶ c. Even though it should have been apparent to the IV team within a short period of time—certainly much less than three hours—that the standard procedure was not possible, there is no evidence that a central

line procedure was ever attempted. Instead, rather than follow the Protocol, the IV team seemly moved to a different, unauthorized procedure, as described below.

32. Based on the results of an autopsy on Mr. James performed by an independent pathologist, among other things, ADOC staff attempted a cutdown procedure to access a vein. Zivot Decl. ¶¶ 9–12; Pigott Decl. ¶¶ 4–5.

33. Venous cutdown is an emergency procedure whereby a physician surgically exposes a patient's vein after applying local anesthesia when rapid access is required for intravenous therapy and other less-invasive procedures have failed. That procedure is not authorized by the Protocol. Furthermore, in medical practice generally, cutdowns have fallen out of favor because of the potential for bleeding and because such procedures require surgical expertise. *See* Declaration of Robert Jason Yong, MD, dated October 18, 2022 ("Yong Delc.") at 8. The Yong Declaration is attached as Exhibit C.

34. A photograph taken during the James autopsy shows the attempted cutdown:

35. The deeper laceration in the pit of the elbow in the photograph above is indicative of the attempted cutdown procedure. *See* Pigott Dec. ¶ 5; Zivot Dec. ¶¶ 10, 12. The photograph shows what appear to be tissue response and blood in and around the laceration, suggesting that it was made while Mr. James was still alive, as post-mortem wounds do not bleed. *Id.*

36. The independent autopsy further revealed evidence of puncture wounds in areas of Mr. James' arm that are not in an area where a vein would expect to be located, which suggest that Mr. James was administered an intramuscular injection during the three-hour attempt to access a vein. *See* Zivot Decl. ¶ 9. Intramuscular injections are not permitted by the Protocol.

37. On information and belief, in the two minutes Mr. James was visible to observers before the administration of the lethal drugs, Mr. James did not open his eyes or move and did not respond when asked if he had any last words. Reportedly, Mr. James had confided in a fellow condemned person that he intended last words, suggesting, consistent with the clinician's observation of an intramuscular injection, that he had been rendered unconscious or otherwise unable to respond before witnesses were permitted to observe by injection with a sedative. *See* Elizabeth Bruenig, *Dead to Rights, What did the State of Alabama do to Joe Nathan James in the three hours before his execution*; The Atlantic (Aug. 14, 2022), available at https://www.theatlantic.com/ideas/archive/2022/08/joe-nathan-james-execution-alabama/671127/; Evan Mealins, *ADOC 'cannot confirm if Joe Nathan James Jr. was fully conscious before his execution*, Montgomery Advertiser (Aug. 2, 2022); available at https://www.montgomeryadvertiser.com/story/news/2022/08/02/joe-nathan-james-jr-execution-adoc-cannot-confirm-if-conscious/10168003002/.

38. The Protocol states that the Warden "will read the warrant to the condemned offender" and that the "condemned offender will be allowed to make any last remarks." Protocol

§ IX.L; IX.M. Neither of those steps can be completed if the condemned is unconscious. Accordingly, upon information and belief, the James execution deviated from those Protocol provisions.

39. ADOC did not disclose what happened during the three hours that Mr. James was not visible to observers. At a press conference after Mr. James' execution, Commissioner Hamm simply offered the vague explanation that ADOC is "very deliberate in our process of making sure everything goes according to plan" without further elaboration. Kim Chandler, *Man executed despite calls from victim's family to spare him*, Associated Press (July 28, 2022), available at https://www.newstimes.com/news/article/Alabama-execution-set-over-opposition-from-17334136.php.

40. Later ADOC issued another vague statement regarding the execution: "ADOC's execution team strictly followed the established protocol. The protocol states that if the veins are such that intravenous access cannot be provided, the team will perform a central line procedure. Fortunately, this was not necessary and with adequate time, intravenous access was established." Elizabeth Bruenig, *Dead to Rights*, *supra*.

41. ADOC did not provide any information about what steps it took to establish an intravenous line, what complications arose that prevented it from doing so for more than three hours, how many attempts it made to establish an intravenous line, whether the process caused bleeding or any other physical or emotional harm to Mr. James, whether the ADOC execution team included people qualified and/or trained to perform the various procedures on Mr. James, whether qualified medical professionals were on hand to perform or supervise those procedures, or anything else about what transpired during those three hours.

42. Nor has ADOC disclosed that information since. To the contrary, it has not disclosed the results of its autopsy of Mr. James. Zivot Decl. ¶ 7. And it has denied a press request for information shedding light on what occurred during Mr. James' execution. Bryan Lyman, *Department of Corrections denies request for Joe Nathan James, Jr. execution records*, Montgomery Advertiser (Aug. 16, 2022), available at https://www.montgomeryadvertiser.com/story/news/2022/08/16/joe-james-jr-execution-adoc-denies-advertiser's-request-records/10333449002/?utm-source=montgomeryadvertiser-DailyBriefing&utm_medium=email&utm_campaign=daily_briefing&utm_term=list_article_headline&utm_content=PMOY-1123MA-E-NLETTER65.

43. And, although Commissioner Hamm stated at the press conference after Mr. James' execution that Mr. James had not been sedated before the lethal drug cocktail was administered, the following day ADOC admitted that it "cannot confirm that" Mr. James was fully conscious when he was executed. Evan Mealins, *ADOC 'cannot confirm if Joe Nathan James Jr. was fully conscious before his execution*, *supra*.

44. That is telling. As one commentator put it: "If the department does not know whether a prisoner is conscious or unconscious at the time of the execution, then they are incompetent to carry an execution out. If the department does know but will not say, then they cannot be trusted." *Id.*

45. Given ADOC's lack of transparency, Mr. James' sister has called for an investigation into Mr. James' execution, pointing out that "[o]nly the ADOC employees know what occurred during those three hours." Evan Mealins, *Sister of Joe Nathan James: Circumstances surrounding execution warrant an investigation*, Montgomery Advertiser (Aug. 3,

2022), available at https://www.montgomeryadvertiser/story/news/2022/08/03/joe-james-sister-calls-investigation-execution/10219862002/.

46. To date, despite the request of Mr. James' sister, neither ADOC nor any State representative has publicly indicated that any review or other investigation, much less an independent one, of ADOC's lethal injection process to reduce the intolerable risk of torture, cruelty, or substantial pain to which it subjects condemned people is underway or contemplated.

C. ADOC Materially Deviated from the Protocol During the Aborted Execution of Mr. Miller

47. Mr. Miller was scheduled to be executed on September 22, 2022.

48. Due to pending court proceedings, Mr. Miller's execution began about 10 pm CT when he was walked to the execution chamber and strapped into the gurney at about 10:15 pm. *See Miller v. Hamm*, No. 2:22-cv-00506, Doc. No. 79-1 ¶¶ 100–04 (Oct. 6, 2022) ("Miller Second Am. Compl.").

49. On information and belief, thereafter, while he was strapped in the gurney in a stress position, two unidentified men in medical scrubs with unknown medical credentials, if any, repeatedly, slapped, poked, prodded, and punctured Mr. Miller for nearly two hours. They started in his left arm, and then moved sequentially to his right hand, left hand, inner left arm, right foot, and left foot in a futile attempt to establish intravenous access. *See id.* ¶¶ 109–26. Having failed to establish intravenous access, the two unidentified men resorted to simultaneously puncturing his left and right arm, respectively, *See id.* ¶ 127.

50. On information and belief, a third unidentified man in medical scrubs entered the execution chamber and began slapping the skin on Mr. Miller's neck. *See id.* ¶ 129.

51. There was no basis to slap the skin on Mr. Miller's neck to perform any procedure that is authorized under the Protocol. Zivot Decl. ¶ 14.

52. On information and belief, all the while, ADOC personnel ignored Mr. Miller's verbal expressions of excruciating pain and his questions about their efforts. *See* Miller Second Am. Compl. ¶¶ 109–26.

53. On information and belief, just before midnight when the warrant for his execution expired, ADOC personnel informed Mr. Miller that his execution had been postponed without further explanation, despite Mr. Miller's requests for one. *See id.* ¶ 135.

54. On information and belief, even then, Mr. Miller's ordeal did not end as he has continued to suffer emotional and physical pain from the trauma of his aborted execution. *See id.* ¶¶ 144–53.

55. ADOC gave only a vague explanation of what occurred during Mr. Miller's aborted execution: "Due to the time constraints resulting from the lateness of the court proceedings the execution was called off once it was determined the condemned's veins could not be accessed in accordance with our protocol before the expiration of the deadline." *See* USA Today, *'Veins Could Not be Accessed': Alabama Halts Man's Execution for Time, Medical Concerns* (Sept. 23, 2022), https:www.usatoday.com/story/news/nation/2022/09/23/alabama-alan-miller-execution-halted-medical-concerns/8088788001/.

56. Subsequently, the State moved on an expedited basis to reschedule Mr. Miller's execution without any assurance that it will be able to establish intravenous access by a procedure authorized in the Protocol.

D. ADOC's Lethal Injection Process is Shrouded in Secrecy

57. The State exercises no greater power than when it executes condemned people. Consequently, the process by which the State does so demands maximum transparency to ensure

that it is consistent with the Constitution and the values of the State's citizens. ADOC's lethal injection process, however, is anything but transparent.

58. ADOC's conceals from public observation critical portions of the lethal injection process, including the establishment of an intravenous line in the condemned person.

59. ADOC conceals who is responsible for establishing an intravenous line in the condemned person and does not provide information to ensure that those responsible are qualified for the task.

60. The only witnesses to that process are unidentified ADOC personnel and the condemned person who (with the rare exception of Mr. Miller) ordinarily does not live to describe it.

61. Mr. James' execution, Mr. Miller's aborted execution, and other history demonstrate that ADOC cannot be trusted to provide accurate information about what happens during its lethal injection process.

62. For example, during the scheduled execution of Doyle Lee Hamm on February 22, 2018, there was a two- and one-half hour delay while ADOC staff attempted to establish an intravenous line. During that time, ADOC "[s]taff punctured Hamm at least 11 times in his limbs and groin, causing him to bleed profusely on the gurney." Evan Mealins, *ADOC 'cannot confirm if Joe Nathan James Jr. was fully conscious before his execution*, Montgomery Advertiser (Aug. 2, 2022). ADOC stopped the execution, on information and belief, only when the warrant was about to expire.

63. Despite having subjected Mr. Hamm to torture, cruelty, or substantial pain, afterwards, then ADOC Commissioner Jefferson Dunn said that Mr. Hamm's execution was called off "out of an abundance of caution" due to "a time issue" and that "I wouldn't necessarily

characterize what we had tonight as a problem." Liliana Segura, *Another Failed Execution: The Torture of Doyle Lee Hamm*, The Intercept (Mar. 3, 2018).

64. While ADOC could not establish intravenous access in Mr. Hamm, that did not put other condemned inmates on notice that the Protocol is advisory only.

65. On information and belief, unlike Mr. James, Mr. Hamm was a cancer patient and had a prior history of intravenous drug use, which compromised the ability to access his veins. And the State agreed not to attempt to execute Mr. Hamm again, suggesting that it would take steps to ensure that it did not subject other condemned persons to the same cruel and painful treatment. In contrast, the State has filed an expedited motion to reschedule Mr. Miller's execution.

66. During the execution of Ronald Bert Smith on December 8, 2016, Mr. Smith coughed and heaved for nearly fifteen minutes after the administration of midazolam—the first drug in ADOC's lethal drug cocktail—which is supposed to anesthetize condemned people even though it is a sedative, not an analgesic. *Ronald Smith Put to Death in Controversial Execution*, Alabama Public Radio (Dec. 9, 2016), available at https://www.apr.org/news/2016-12-09/ronald-smith-put-to-death-in-controversial-execution.

67. If midazolam does not function as an anesthetic, a condemned person will suffer an "objectively intolerable risk of harm" in violation of the Eighth Amendment. *Baze v. Rees*, 553 U.S. 35, 53 (2008) (plurality op.) (if the first drug in the three-drug lethal injection cocktail does not function properly, "there is a substantial, constitutionally unacceptable risk of suffocation from the administration of pancuronium bromide and pain from the injection of potassium chloride").

68. Despite the apparent failure of midazolam to render Mr. Smith unconscious and the "constitutionally unacceptable risk" of his experiencing suffocation and pain from administration

of the second and third drugs in ADOC's lethal injection process, ADOC proceeded with Mr. Smith's execution.

69. Afterwards, then ADOC Commissioner Dunn said "[w]e followed our protocol" and that ADOC did not discuss cancelling the execution despite Mr. Smith's signs of apparent consciousness. *Id.* Commissioner Dunn offered no assurance from anyone with medical credentials qualified to make a judgment about whether Mr. Smith was conscious and, thus, experiencing suffocation and pain or even that any such qualified person was available for ADOC to consult before proceeding with the execution.

70. The same thing happened during the execution of Torrey Twane McNabb on October 18, 2017 when ADOC proceeded with his execution despite his showing visible signs of consciousness after the administration of midazolam when he raised his arms and grimaced, reportedly causing one observer to say, "He's going to wake up." *Alabama executes man convicted of killing police officer in 1997*, Associated Press (Oct. 19, 2017), available at https://www.cbsnews.com/news/torrey-twane-mcnabb-executed-convicted-of-killing-police-officer-in-1997/.

71. Once again, after the execution, then-Commissioner Dunn offered the assurance that "I'm confident he was more than unconscious at that point," *Alabama executes Montgomery cop killer Torrey Twane McNabb*, Al.com (Oct. 19, 2017), without the advice of any qualified medical professional.

72. Given ADOC's history of evasion and lack of transparency, there was no way for a condemned person to know that the Protocol is only advisory until that was demonstrated by the facts surrounding Mr. James' execution and Mr. Miller's aborted execution.

73. And, if Mr. Smith is executed on November 17, 2022, there will be no witnesses to the procedures used other than ADOC personnel, and ADOC has demonstrated that it cannot be trusted to disclose information about those procedures.

E. Nitrogen Hypoxia is a Feasible and Readily Available Alternative that Would Significantly Reduce the Intolerable Risk to Mr. Smith from Lethal Injection

74. As a matter of law, nitrogen hypoxia is an available and feasible alternative method of execution. *Price v. Dunn*, 920 F.3d 1317, 1328–29 (11th Cir. 2019).

75. Execution by inhalation of nitrogen gas would eliminate the need to establish intravenous access, Zivot Decl. ¶ 27, and, therefore, would eliminate the intolerable risk that ADOC will deviate from the Protocol in attempting to do so as it did in Mr. James' execution and Mr. Miller's aborted execution. In addition, execution by inhalation of nitrogen gas would reduce the risk that a condemned person would suffer pulmonary edema, which autopsies show has occurred in condemned people executed by lethal injection, and which would cause the condemned inmate to experience the sensation of choking or drowning if conscious.

F. Plaintiff Did Not Make a Knowing and Voluntary Waiver of His Right to Elect Execution by Nitrogen Hypoxia

76. On March 22, 2018, Governor Ivey signed Senate Bill 272, amending Alabama Code § 15-18-82.1 to authorize the use of nitrogen hypoxia as a method of execution.

77. According to sponsors of the 2018 legislation, nitrogen hypoxia is a "more humane" method of execution than lethal injection, similar "to how aircraft passengers lose consciousness if the plane depressurizes." Kim Chandler, *Alabama Senate votes to allow execution by nitrogen case*, Associated Press (Feb. 22, 2018), available at https://apnews.com/article/64a91b4e5be147dd8417df80488dc4fc.

78. Under the amended statute, "[a] death sentence shall be executed by lethal injection, unless the person sentenced to death affirmatively elects to be executed by . . . nitrogen hypoxia." Ala. Code § 15-18-82.1(a).

79. The amended statute provided condemned people with "one opportunity to elect that his or her death sentence be executed by . . . nitrogen hypoxia." Ala. Code § 15-18-82.1(b).

80. For condemned people like Mr. Smith whose conviction and death sentence already had been affirmed in the Alabama state courts, "[t]he election for death by nitrogen hypoxia is waived unless it is personally delivered to the warden of the correctional facility within 30 days" of the effective date of the amended statute.

81. Senate Bill 272 became effective on June 1, 2018.

82. Senate Bill 272 was enacted during the pendency of litigation brought by the Federal Defenders for the Middle District of Alabama ("Federal Defenders") on behalf of several condemned people who challenged lethal injection as an unconstitutional method of execution and proposed nitrogen hypoxia as an alternative.

83. On or about June 26, 2018, attorneys with the Federal Defenders traveled to Holman to consult with their clients about the amended statute, notify them of their right to elect nitrogen hypoxia as their method of execution, answer any questions about that method, and provide them with an election form ("Election Form") should they wish to elect execution by nitrogen hypoxia.

84. As the Election Form was intended for use by the Federal Defenders in consultation with its clients, the Election Form did not notify condemned people of the June 30, 2018 deadline for making an election and it did not model or replicate the language of the amended statute.

85. Plaintiff was not a client of the Federal Defenders. He did not consult with the Federal Defenders about his right to elect execution by nitrogen hypoxia or receive the Election Form from the Federal Defenders.

86. No earlier than June 26, 2018—four days before the expiration of the opt-in period for execution by nitrogen hypoxia—the then Warden of Holman reportedly asked a corrections officer to distribute the Election Form drafted by the Federal Defenders to all death row inmates.

87. The Warden did not institute any controls on the distribution and collection of the Election Form or put any system in place to verify that a condemned person received the Election Form. Nor did the Warden provide any information to condemned people about their rights.

88. United States Circuit Judge Jill Pryor has described as "feckless" the way in which ADOC, having taken "on the responsibility to inform prisoners about their right to elect death by nitrogen hypoxia within 30 days, did so." *Smith v. Comm'r, Ala. Dep't of Corr.*, No. 21-13581, 2021 WL 4916001, at *5 (11th Cir. Oct. 21, 2021) (Pryor, J., concurring).

89. Plaintiff did not receive an Election Form from the Warden or any other ADOC employee.

90. Nor did the Warden or any other ADOC employee notify Plaintiff of the deadline to elect execution by nitrogen hypoxia, the consequence for failing to do so, or any other information relevant to a decision.

91. During the 30-day window, ADOC knew or should have known that it had no protocol for conducting executions by nitrogen hypoxia and no prospect for establishing one.

92. To date, ADOC has not established a protocol for executing condemned people by nitrogen hypoxia despite repeated representations to courts that one is imminent.

93. Since Senate Bill 272 became effective on June 1, 2018, the State has executed seven condemned people by lethal injection, has scheduled one more for execution, and has moved to set a date to execute Plaintiff by that method.

94. During the same time, ADOC has not executed any condemned person who chose execution by nitrogen hypoxia, no execution of any such person is scheduled, and the State has not moved to schedule any execution of such a person.

95. In effect, ADOC has extended an indefinite delay of execution to condemned people who selected nitrogen hypoxia.

96. Plaintiff had no means to obtain information by himself about Senate Bill 272 or other information relevant to his right to elect execution by nitrogen hypoxia during the 30-day window.

97. In 2018, the designated law library at Holman was not available to death row inmates. Instead, a make-shift law library with one computer was available to them at designated times depending on the condemned person's individual cell tier location.

98. During the 30-day election window, Plaintiff did not know and had no way of knowing that the choice afforded by Senate Bill 272 was between execution by an unknown nitrogen hypoxia process that would not be implemented for years, if ever, and by a lethal injection process that would subject him to an intolerable risk of torture, cruelty, or substantial pain as evidenced by Mr. James' execution.

99. Due to the lack of notice and the lack of information necessary to make a knowing and voluntary waiver, Plaintiff did not elect to be executed by nitrogen hypoxia within the 30-day window.

100. Had Plaintiff known that his choice was between an indefinite delay of execution under a yet-to-be-determined nitrogen hypoxia protocol and a lethal injection process that subjects him to an intolerable risk of torture, cruelty, or substantial pain, he would have chosen to be executed by nitrogen hypoxia.

CLAIMS FOR RELIEF

First Claim for Relief

Alabama's method of execution by lethal injection violates Mr. Smith's right to be free from cruel and unusual punishments under the Eighth Amendment.

101. Mr. Smith incorporates paragraphs 1 through 79.

102. The Eighth Amendment to the U.S. Constitution prohibits "cruel and unusual punishments." U.S. Const. amend VIII.

103. A method of execution violates the Eighth Amendment if "the risk of pain associated with the State's method is substantial when compared to a known and available alternative." *Bucklew v. Precythe*, 139 S. Ct. 1112, 1125 (2019) (citations and internal quotation marks omitted).

104. Defendants intend to execute Plaintiff by lethal injection.

105. Use of Defendant's Protocol will subject Plaintiff to an intolerable risk of torture, cruelty, or substantial pain because the Protocol is advisory only and, as ADOC implements it, authorizes ADOC to use other procedures in its discretion.

106. Nitrogen hypoxia is an available and feasible alternative method of execution.

107. Assuming proper administration, if exposed to pure nitrogen gas, Plaintiff would lose consciousness within seconds, and experience no pain or discomfort while dying within minutes.

108. Plaintiff's feasible and alternative method of execution significantly reduces the intolerable risk of torture, cruelty, or substantial pain associated with Defendants' lethal injection process.

109. Permitting Defendants to execute Plaintiff by lethal injection would violate his rights under the Eighth Amendment.

110. Plaintiff will suffer irreparable harm in the absence of an injunction prohibiting Defendants from executing him by lethal injection.[4]

PRAYER FOR RELIEF

WHEREFORE, Mr. Smith respectfully requests that this Court grant the following relief:

1. With respect to the First Claim for Relief,

    a. A preliminary and permanent injunction prohibiting Defendant from executing Plaintiff by lethal injection; and

    b. A declaration that executing Mr. Smith by ADOC's Protocol would constitute cruel and unusual punishment in violation of Mr. Smith's rights under the Eighth and Fourteenth Amendments to the U.S. Constitution.

2. Such other relief as this Court deems just and proper.

[4] As noted in Plaintiff's Motion to Alter or Amend the Judgment, Plaintiff does not seek leave to replead the Second Claim for Relief in his original complaint related to 14th Amendment violations, although he respectfully disagrees with the Court's judgment dismissing that claim and reserves his right to appeal from it.

Respectfully submitted, this 19th day of October 2022.

/s/ Andrew B. Johnson

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Attorneys for Plaintiff Kenneth Eugene Smith

Amended Complaint: Exhibit A

IN THE UNITED STATES DISTRICT COURT
FOR THE MIDDLE DISTRICT OF ALABAMA

KENNETH EUGENE SMITH Plaintiff, v. JOHN Q. HAMM, Commissioner, Alabama Department of Corrections, Defendant.	)))))))))	Case No. 2:22-cv-00497-RAH CAPITAL CASE **EXECUTION SCHEDULED FOR NOVEMBER 17, 2022**

DECLARATION OF JOEL B. ZIVOT, MD, FRCP(C), MA

I, Joel B. Zivot, declare under penalty of perjury as follows:

1. I am an associate professor and a senior member of the Departments of Anesthesiology and Surgery, Emory University School of Medicine, in Atlanta, Georgia. I am the former fellowship director for training in Critical Care Medicine for the Department of Anesthesiology. I hold board certification in Anesthesiology from the Royal College of Physicians and Surgeons of Canada and The American Board of Anesthesiology. I am board certified in Critical Care Medicine from the American Board of Anesthesiology. My current CV is attached as Exhibit 1.

2. I have practiced anesthesiology and critical care medicine for 27 years and in that capacity, I have personally performed or supervised the care of over 50,000 patients. I have extensive experience in the review of autopsies in a medical setting and in the setting of lethal injection execution, which is the method that the Alabama Department of

Corrections (ADOC) proposes to use to execute Kenneth Eugene Smith (KE Smith) on November 17, 2022.

3. I hold an active medical license from the state of Georgia, and have held unrestricted medical licenses in Ohio, the District of Columbia, Michigan, and the Canadian provinces of Ontario and Manitoba. I hold a license to prescribe narcotics and other controlled substances from the US Drug Enforcement Administration (DEA).

4. In this matter concerning KE Smith, I am asked to offer an opinion about the autopsy findings of Joe Nathan James (JN James), recently executed by the ADOC, and how these autopsy findings will impact the planned lethal injection execution of KE Smith. In reaching my opinions, I reviewed the materials listed on Exhibit 2. My opinions are based on my review of those materials, the autopsy findings of JN James, and my medical training, knowledge, experience, and expertise acquired over 27 years of practice. I hold my opinions to a reasonable degree of medical certainty.

5. JN James was executed by ADOC on July 28, 2022. Press reports indicate that the execution was highly troubled. The ADOC team tried and failed to establish the intravenous (IV) access that is needed as a port of injection to deliver the drugs that cause death. In total, 3 hours elapsed between the start of seeking IV access and the completion of the task. The execution protocol put forth by ADOC stipulates the need to establish 2 separate IVs by the standard procedure or, if that is not possible, by a central line procedure. In my experience, in a medical setting and in the hands of skilled medical

professionals, it would be highly unusual to take three hours to start 2 IVs by one of those procedures or to determine that neither is achievable.

6. After JN James was executed, his body was taken by ADOC to undergo an autopsy. To date, the results of this autopsy remain undisclosed and therefore not subject to public scrutiny. ADOC has given no indication that it ever intends to release the results of the autopsy. Review of those autopsy findings would be helpful in determining what happened to JN James

7. Upon learning of the events during JN James' execution, I sought information as a concerned citizen and physician. I was informed by Medical Director, Dr. Steve Dunton of the Alabama Department of Forensic Sciences that no timeline existed for the release of the autopsy results of JN James.

8. After obtaining permission from the family of JN James, I arranged and participated in a second autopsy of JN James on August 2, 2022, which was independent of ADOC. This second autopsy took place at Abanks Mortuary in Birmingham, Alabama and occurred 5 days after the execution of JN James. Along with me at the autopsy was local pathologist Dr. Boris Datnow and his assistant Jay Glass and Elizabeth Bruenig, a journalist from *The Atlantic*. Upon examination of the body, I found signs that strongly suggested JN James had been subjected to a torturous process during his execution. By "tortuous," I mean that the process caused unnecessary pain in advance of JN James' death. Copies of the photographs taken during the autopsy are attached as Exhibit 3.

9. My conclusion that JN James was tortured arises from my examination of the body of JN James where we found evidence of the initial autopsy manifested as the standard Y incision of the abdomen and thorax and a dissection of the visceral organs contained within. I observed multiple puncture sites in both arms in the antecubital fossae (elbow pits) and the dorsum (back of the hand opposite the palms) of both hands. I also found puncture sites in the arms in areas where anatomically, veins suitable for IV access are not present. Significantly, I found two incisions on the dorsal surface of the left arm just distal to the antecubital fossa. These incisions were perpendicular to the long axis of the arm, separated by about ¾ of an inch and approximately 1.5 inches in length. An autopsy photograph showing those incisions appears below.

10. These incisions are consistent with a procedure known as a cut-down. The purpose of this action is to slice directly into the skin in an area where a vein may be expected to be found. Opening the skin with a knife and separating the tissue affords a visual and palpable opportunity to locate a vein. Upon review of the photograph, it appears that one of the two cut-downs might have been successful in finding a vein. A small bruise can be seen next to the incision, which might be the result of an IV, although I cannot say with certainty.

11. In the current practice of establishing IV access in the OR at Emory hospitals and across the U.S., a cut-down is extremely uncommon and has been replaced by the non-invasive use of ultrasound to locate a vein not otherwise palpable or visualized. A cut-down is also not in the normal skill set of a phlebotomist (a person trained to take blood samples from a patient). It is not clear who was involved in JN James' execution or what medical training, if any, those people might have.

12. The cut-down exhibited on JN James' inner left arm was not a postmortem occurrence. Blood is seen at the edges of the cut-downs on JN James' arms. This could not possibly occur in the postmortem period because, simply put, the dead don't bleed, ever, not after death. Moreover, I obtained a copy of the autopsy report and photographs after the ADOC executed Mathew Reeves on January 28, 2022. While the examiner noted that Mr. Reeves' lungs showed signs of pulmonary edema (also noted in the second autopsy of JN James), the examiner made no mention of any incision to examine for correct IV

placement. Some variation in autopsy procedures will naturally occur. Information that could help to clarify this might be present in the original autopsy of JN James.

13. In the ADOC Execution Procedures Manual dated March 2021, Annex C, IV Team-Detailed Instructions, section c states, "The standard procedure for inserting IV access will be used. If the veins are such that intravenous access cannot be provided, (redacted) will perform a central line procedure to provide an intravenous access." The performance of a central line is not in the skill set of a phlebotomist. When I examined the body of JN James, I found no evidence that anyone had attempted a central line. The Execution Procedures Manual does not permit the use of a cut-down procedure. A copy of the Execution Procedures Manual is attached as Exhibit 4.

14. Paragraph 129 of a complaint recently filed on behalf of Allan Eugene Miller (AE Miller) after ADOC unsuccessfully attempted to execute him on September 22, 2022 alleges that "Navy scrubs then moved up to Mr. Miller's head and started feeling and slapping the skin on his neck." The suitability of establishing an intravenous catheter in the neck would never involve feeling the skin and slapping the neck. The veins that are used to establish a central line are far below the skin and cannot be brought to the surface by agitating the skin over them or otherwise. Such actions under the circumstance suggest that those present lacked the skills and knowledge of how to place a neck central line.

15. KE Smith is set to be executed by lethal injection on November 17. Based on the two preceding execution failures, I am asked to comment on the general risks and specific

risks should a lethal injection execution be attempted on KE Smith. I have serious concerns that KE Smith will be subjected to a torturous process if ADOC is permitted to execute him by its lethal injection process.

16. Establishing IV access in an execution setting with a condemned person strapped to a gurney is subject to inherent risks above and beyond any that might exist in establishing IV access with a willing patient in a medical setting. In a clinical setting, a patient understands the doctor is acting with beneficence and the pain of an intravenous insertion is logically more bearable as a consequence.

17. A condemned inmate on the precipice of death would be nervous or anxious and knows that the doctor or phlebotomist is only acting with maleficence. There is no contract of collaboration. When a person is nervous or frightened, the sympathetic nervous system is activated, and this leads to the release of certain hormones and chemical mediators. This stress response causes the blood vessels to constrict, and it becomes much harder to locate suitable veins for intravenous canulation.

18. Further, unlike medical professionals who are highly trained and skilled and establish IV access in patients on a daily basis, in a variety of clinical situations, the unidentified people who perform these procedures during ADOC executions are not likely to have the same training and experience, if they have any at all. They also may not have the same equipment available to them to find accessible veins when standard processes are not achievable as would be available in a hospital or other medical facility.

19. There also are risks unique to individual inmates. For example, according to information on ADOC's website, KE Smith is 5'10" tall and weighs 207 pounds. This height and weight combination corresponds to a BMI that is borderline obese. It is much more difficult to locate suitable veins in obese individuals. I have been informed that KE Smith was also recently started on medication for depression and insomnia, no doubt in anticipation of his upcoming execution. It is highly likely that his mental state will be one of great anguish and anxiety, which will make it more difficult to establish IV access for the reasons described above. His risks of a failed intravenous attempt are very likely quite similar in circumstance to the recent failed attempt at IV access of AE Miller.

20. These risks are real and not theoretical. Reports after the attempted execution of AE Miller on September 22, 2022, including allegations in a complaint filed on AE Miller's behalf, indicate that ADOC personnel had the same trouble establishing IV access that they had in JN James' execution, concluding their efforts after about two hours only as midnight approached when the death warrant expired.

21. I have been asked to comment on an alternative execution method known as "Nitrogen Hypoxia." Nitrogen Hypoxia is not a condition in medical practice and the joining of these two words is to simply state that this method of execution will cause death by the inhalation of nitrogen gas. To date, ADOC has released no protocol for accomplishing that. How it will be done remains unknown.

22. Although this is not a medical procedure, and I am duty bound as a physician not to guide or advise ADOC or any other prison system on how nitrogen may be used for execution, I am qualified to explain how inhaling nitrogen gas would cause death. Nitrogen is an inert gas meaning that when it is inhaled, it undergoes no chemical change and is exhaled in the same chemical state. Normal air is approximately 80% Nitrogen and 20% oxygen. We therefore breathe nitrogen constantly and are not harmed by it in any way. The body requires a constant supply of oxygen as fuel, but the body is not designed to breathe pure oxygen as it is toxic to the lungs. We normally breathe a nitrogen-oxygen mixture, which avoids the problems that would be caused by breathing pure oxygen while still permitting us to breathe enough oxygen to live.

23. Special chemical receptors in the brain constantly evaluate the quantity of oxygen and carbon dioxide in the blood stream. Carbon Dioxide is the natural waste product of respiration, and we exhale carbon dioxide in exchange for the oxygen we inhale. The body experiences carbon dioxide as an acid and therefore, the precise quantity of carbon dioxide is detected and regulated. The only way carbon dioxide is eliminated is by exhalation. When we hold our breath, the level of carbon dioxide rapidly rises, and this is experienced as a state of extreme discomfort and an overwhelming need to exhale.

24. The body has no specific receptor for the detection of nitrogen and our oxygen detector is not particularly sensitive in warning us when low levels of oxygen are in the blood. It is further possible to have a significantly reduced amount of oxygen in the blood and be unbothered, provided carbon dioxide blood levels remain in a normal range. An elevated

blood carbon dioxide level is a powerful trigger for the experience of respiratory distress. As nitrogen is an odorless, colorless, non-noxious gas, it is possible to hypothesize that we may breathe in increasing concentrations of nitrogen and be unaware of it as long as our breathing remains unobstructed and we are permitted to exhale carbon dioxide gas at a normal rate.

25. Death by inhalation of nitrogen gas has occurred in different settings. Two examples of death by nitrogen gas are in the setting of an industrial accident and the use of nitrogen gas in suicide. In both cases, the experience of death in this way cannot truly be known but it is possible to conjecture that if respiration was not impaired and carbon dioxide levels remained in a normal range, nitrogen gas inhalation would at least not produce extreme feelings of shortness of breath.

26. In addition, execution by inhalation of nitrogen gas would seem to avoid the need to establish IV access, which would eliminate the problems of establishing IV access that arose during the execution of JN James and the attempted execution of AE Miller.

27. Autopsies performed on individuals presumed to have been killed by nitrogen gas have little in the way of postmortem signature findings. In a few reported cases, pulmonary edema was not seen.[i] In contrast, pulmonary edema occurs commonly in inmates executed by lethal injection.[ii] In the last two lethal injection executions in Alabama, both Mathew Reeves and JN James had pulmonary edema found at autopsy.

28. Death by nitrogen gas inhalation may not produce pulmonary edema as has been seen with lethal injection. This is pertinent, since lethal injection, beyond doubt, causes the agony equivalent to death by drowning.

29. Finally, Defendant's Reply to Plaintiff's Response to Defendants' Motion to Dismiss describes me as "a doctor well-known in 'the anti-capital-punishment advocacy domain.'" Doc. No. 14 at 5 n.2. I wish to clarify my views.

30. I am agnostic with respect to capital punishment. I leave it to the courts to decide what degree of mercy is required by just laws and as to the form of punishment that will be used in the circumstance of a criminal conviction. However, I have stated my objection to what I consider to be the misappropriation of medicine as a tool to inflict torture, meaning unnecessary pain preceding death, including that caused by executions by lethal injection. In addition, I agree with national physician associations and medical boards, which object to physician participation in executions. To the extent physicians are involved in ADOC's lethal injection process and are performing tasks performed by physicians, I consider that the practice of medicine notwithstanding the disclaimer in the ADOC Execution Procedures Manual that "lethal injection shall not constitute the practice of medicine." Ex. 4 at § I.F. My opinions expressed in this matter are based on my medical judgment independent of any personal views.

31. The above comments do not represent my complete opinion about the risk to KE Smith if lethal injection is used in an attempt to execute him. I reserve the right to supplement my

opinions based on new evidence as it becomes available, including information arising from the recent attempted execution of AE Miller.

I declare that the foregoing is true and correct under penalty of perjury, pursuant to 28 U.S.C. § 1746.

Signed on this 17th day of October 2022 in Atlanta, Georgia.

Joel B. Zivot, MD, FRCP(C), MA

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[i] Lo Faro, AF, Pirani, F, Paratore, A, Tagliabracci, A, Busardo, FP, "Fatal inhalation of nitrogen inside a closed environment: Toxicological issues about the cause of death" *Forensic Sci Int* . 2019 Sep;302:109871. doi:10.1016/j.forsciint.2019.06.029. Epub 2019 Jul 2.

[ii] Zivot J, Edgar M. Lubarsky D, "Execution by lethal injection: Autopsy findings of pulmonary edema" *MedRxiv,* doi: https://doi.org/10.1101/2022.08.24.22279183

Zivot Declaration: Exhibit 1

EMORY UNIVERSITY SCHOOL OF MEDICINE
CURRICULUM VITAE

Revised: September 2022

1. **Name**: Joel B. Zivot, MD, FRCP(C), MA (Bioethics)

2. **Office Address**: 1364 Clifton Road
Atlanta, GA 30322

Telephone: (404) 686-4411

3. **E-mail Address**:

JZivot@emory.edu

4. **Current Titles and Affiliations**:

a. Academic Appointments:

i. Primary Appointments:

Associate Professor, Department of Anesthesiology, Emory University School of Medicine (From September 1, 2015)

ii. Joint and Secondary Appointments:

Associate Professor, Department of Surgery, Emory University School of Medicine. (From September 1, 2015)

Adjunct Professor, Emory School of Law, Emory Institute of Liberal Arts and Interdisciplinary Studies

b. Other Administrative Appointments:

i. Director of Medical Humanities, Department of Anesthesiology, Emory University School of Medicine (From July 1, 2020)

ii. Medical Advisor, Southern Center for Human Rights, Atlanta, Georgia (From July 1, 2016)

iii. Project Hope to Abolish the Death Penalty: Advisory board member (From August 1, 2021)

5. **Previous Academic and Professional Appointments**:

i. Assistant Professor, Department of Anesthesiology and Critical Care Medicine, University of Michigan Medical Center, 1995-1998

ii. Assistant Professor of Anesthesia, Surgery, and Intensive Care, University Hospitals of Cleveland, Case Western Reserve University School of Medicine, Cleveland, Ohio, USA, 1998-2005

iii. Assistant Professor, Department of Anesthesiology and Critical Care Medicine, George Washington University Hospital, District of Columbia, USA, 2005-2007

iv. Associate Professor, Department of Anesthesiology, University of Manitoba, Winnipeg, Manitoba, Canada, 2007-2010

v. Member, Accreditation Review Committee-Anesthesiologist Assistants, Commission on Accreditation of Allied Health Education Programs (ARC-AA), 2008

vi. Member of selection committee, Physician Assistant Program, The University of Manitoba, Winnipeg, Manitoba, Canada, 2008

vii. Member, Academic Promotions Committee, University of Manitoba, Faculty of Medicine, Winnipeg, Manitoba, Canada, 2009

viii. Senior Faculty Fellow, Emory Center For Ethics (From July 1, 2021)

6. **Previous Administrative and/or Clinical Appointments**:

i. Director, Post Anesthesia Care Unit, Department of Anesthesiology, University of Michigan Medical Center, Ann Arbor, MI, 1995-1998

ii. Director Critical Care Medicine Fellowship, Department of Anesthesiology, University of Michigan Medical Center, Ann Arbor, Michigan, USA, 1996-1998

iii. Co-Medical Director, Surgical Intensive Care Unit, University Hospitals of Cleveland, Case Western Reserve University, Cleveland, Ohio, USA, 2002-2005

iv. Program Medical Director, Master of Science in Anesthesiology, Case Western Reserve University School of Graduate Studies, Cleveland, Ohio, USA, 2000-2005

v. Medical Director, CTICU, George Washington University Hospital, Washington, DC, 2005-2007

vi. Medical Director, Cardio-thoracic ICU, Intensive Care Cardiac Sciences Program, Winnipeg Regional Health Authority, Winnipeg, Manitoba, Canada, 2007-2010

vii. Medical Director, Critical Care Medicine, Department of Anesthesiology, Emory University School of Medicine 11S, EUHM, June 2010 - February 2013

viii. Medical Director, Critical Care Medicine, Department of Anesthesiology, Emory University School of Medicine 4A/5A, EUH, February 2013 - June 2015

ix. Fellowship Director, Critical Care Medicine, Department of Anesthesiology, Emory University School of Medicine, Jan 2013 - January 2016

7. **Licensures / Boards**:

License, Controlled Substance, Drug Enforcement Agency: Issued 1995
Licentiate, Medical Council of Canada: Issued 1989
License, Georgia Composite Medical Board: Issued
2010

8. **Specialty Boards**:

i. Fellow, Royal College of Physicians of Canada, (Anesthesiology) 1993-Present

ii. Diplomat, Anesthesiology, American Board of Anesthesiology, 1995-Present

iii. Diplomat, Critical Care Medicine, American Board of Anesthesiology, 1995-Present

iv. Fellow, American College of Chest Physicians, 2000-2010

v. Testamur, National Board of Echocardiography, Basic Perioperative Trans-Esophageal Echocardiography, 2010-2021

9. **Education**:

University of Manitoba, Winnipeg, Manitoba, Canada (no degree)	1980 1983
University of Toronto, Toronto, Ontario, Canada (no degree)	1984
Doctor of Medicine, University of Manitoba, Winnipeg, Manitoba, Canada	1984 1988

10. **Postgraduate Training**:

i. Rotating Internship, Mount Sinai Hospital, University of Toronto, Department of Post Graduate Medical Education, Toronto, Canada, 1988-1989 Supervisor: Ms Miriam Rottman

ii. Residency, Anesthesiology, University of Toronto, Department of Anesthesiology, Toronto, Canada, 1989-1993, Supervisor: Dr. David McKnight,

iii. Residency, Anesthesiology, Cleveland Clinic Foundation, Department of Anesthesiology, Cleveland, Ohio, United States, 1993-1994, Supervisor: Dr. Armin Schubert,

iv. Fellowship, Critical Care Medicine, Cleveland Clinic Foundation, Department of Anesthesiology, Cleveland, Ohio, United States, 1994-1995, Supervisor: Dr. Marc Popovich

v. Master of Arts in Bioethics, Emory Center for Ethics, 2017-2017, Supervisor: Dr. Toby Schonfeld

vi. Emory Public Scholars Institute, 2018

vii. Emory School of Law, Jurist Master's Program candidate, expected graduation: 2022

11. **Committee Memberships**:

a. National and International:

i. American Society of Anesthesiology, Committee on Ethics, 2011-2018

ii. American Society of Anesthesiology, Care Team Committee, 2007-2009

iii. Society of Critical Care Medicine, Committee on Ethics, 2011-2020

iv. Society of Critical Care Medicine, Patient and Family Satisfaction Committee, 2013-2020

v. Society of Cardiovascular Anesthesiology, Committee on Ethics, 2012-2013

vi. Society of Critical Care Anesthesiologists, Graduate Education Committee 2013-2016

b. Regional and State:

i. President, Cleveland Society of Anesthesiology, 2001-2002

ii. President Elect, DC Society of Anesthesiology, 2006-2007

c. Institutional:

i. EUHM Committee on Ethics, 2011-2018

ii. EUHM Pharmacy and Therapeutics Committee 2011-2021

iii. EUHM Executive Critical Care Committee 2010-2015

iv. EUHM CAUTI and CLABSI prevention committee 2010-2015

v. EUH Executive Pharmacy Committee 2012-2020

vi. EUH Antibiotic Utilization Subcommittee 2012-2020

vii. EUH Resuscitation Committee 2013-2016

viii. EUH Difficult Airway ad-hoc group 2013-2014

ix. EUH Executive Critical Care Committee 2013-2015

x. Department of Anesthesiology Residency Review Committee, 2013-2020

xi. EUH/EUHM CTS Quality Committee, 2012-2015

xii. EHC COVID triage committee, 2020-present

12. **Peer Review Activities**:

a. Manuscripts:

i. Canadian Journal of Anesthesiology, Manuscript Reviewer, 2013

ii. Critical Care Medicine, (manuscript reviewer), currently with bioethics focus

iii. Mayo Clinic Proceedings, (manuscript reviewer), 2015

b. Conference Abstracts:

i. **Zivot J**, Hoffman W, Lockrem J, Esfandiari S, Bedocs N, Vignali C, Popovich M. “Changes in gastric intramucosal pH are not predicted by therapeutic changes in conventional hemodynamic variables for septic surgical patients”. Critical Care Medicine. 23(1) Supplement A:107, Jan 1995

ii. Webster J, Thomson V, **Zivot J.** “Excessive endotracheal tube cuff pressures are common but are not clinically significant”. Anesthesiology 87(3 Suppl) A984, 1997

iii. Bloch, MG, **Zivot JB**. “Successful transplantation of liver and kidney allografts from a donor maintained on veno-arterial extracorporeal membrane oxygenation”. Anesthesia and Analgesia, 94(25 Supplement) S104, Feb 2002

iv. **Zivot J**, Polemenakas A, Aggarwall S, Rowbottom J. “Differential lung capnography after single lung transplant”. Critical Care Medicine 30(12) Supplement: A90 December 2002

v. Voltz D, **Zivot J**, “Changes in the Bispectral Index during Deep Hypothermic Circulatory Arrest.” Society of Critical Care Medicine Annual Meeting, San Francisco, California, January 2003

vi. Ravas R, **Zivot J**, “Blood conservation; Designing a better blood bag”, Department of Anesthesiology, University Hospitals of Cleveland, Case Western Reserve University, Cleveland, Ohio, Midwestern Anesthesia Resident Conference (MARC), Chicago, Illinois, March 2003

vii. Hacker L, **Zivot J** “Local anesthetic spread for skin infiltration”, Department of Anesthesiology, University Hospitals of Cleveland, Case Western Reserve

University, Cleveland, Ohio, Midwestern Anesthesia Residents Conference, Chicago, Illinois, March 2003

viii. Falk S, **Zivot J**, "Post-operative Sidenafil for pulmonary hypertension following mitral valve repair" 17th Asia Pacific Conference on Diseases of the Chest, Istanbul, Turkey, August 2003

ix. Aggarwal S, **Zivot J**, "New onset anterior spinal artery syndrome after lumbar drain removal" Department of Anesthesiology, University Hospitals of Cleveland, Case Western Reserve University, Cleveland, Ohio, Midwestern Anesthesia Residents Conference, Rochester, Minnesota, March 2004

x. Stetz J, **Zivot J**, "Dextromethorphan masquerading as phencyclidine" xi. Department of Anesthesiology, University Hospitals of Cleveland, Case

xi. Petelenz K, **Zivot J**, "Bilateral BIS monitoring in unilateral brain injury", Department of Anesthesiology, University Hospitals of Cleveland, Case Western Reserve University, Cleveland, Ohio, Midwestern Anesthesia Residents Conference, Chicago, Illinois, March 2005

xii. Arora RC, Zarychynski R, Bell D, **Zivot J**, Lee J, Kumar K, Zhang L, Menkis A "The Manitoba Model of Post-Operative Cardiac Surgery Intensive Care" The Cardiac Sciences Program, St. Boniface Hospital and the University of Manitoba, Winnipeg, Canada. Toronto Critical Care Meeting, October 2007

xiii. K Kumar, R Zarychanski, DD Bell, **J Zivot**, J Lee, R Manji, A Menkis, RC Aurora, "The Impact of the Manitoba Model of 24-hour in-house intensivist on a dedicated cardiac surgery ICU" Canadian Cardiovascular Society Annual Meeting, Toronto, Ontario, Canada, October 2008

xiv. M Rivet, S Chartrand, G Henry, ICCS Nurses, RC Aurora, DD Bell, A Menkis, **J Zivot**, RA Manji, on the GRACE, GRACE2 Investigators, "Bunk Beds in the ICU - Can Two Cardiac Surgery Patients Occupy One ICU Bed?" Canadian Cardiovascular Society Annual Meeting, Toronto, Ontario, Canada, October 2008

xv. RA Manji, E Jacobsohn, D Bell, RK Singal, **J Zivot**, A Menkis "Delirium and bed management in the cardiac surgery ICU" Canadian Cardiovascular Society Annual Meeting, Edmonton, Alberta, Canada, October 2009

xvi. RA Manji, D Bell, C Shaw, C Moltzan, P Nickerson, AH Menkis, **J Zivot**, E Jacobsohn, Management Suggestions for Cardiac Surgery Patients with a Positive Heparin Induced Thrombocytopenia (HIT) ELISA, Canadian Cardiovascular Society Annual Meeting, Edmonton, Alberta, Canada, October 2009

xvii. RA Manji, E Jacobsohn, J **Zivot**, H Grocott, Alan Menkis, Prolonged in-hospital wait times does not affect outcomes for urgent coronary artery bypass surgery, Canadian Cardiovascular Society Annual Meeting, Edmonton, Alberta, Canada, October 2009

xviii. J **Zivot**, RA Manji, E Jacobsohn, H Grocott, A Menkis, Reductions in wait times for cardiac surgery may be harmful, Canadian Cardiovascular Society Annual Meeting, Edmonton, Alberta, Canada, October 2009

xix. RA Manji MD PhD FRCSC MBA, E Jacobsohn MBChB FRCPC, H Grocott MD FRCPC, J **Zivot** MD FRCPC, AH Menkis DDS MD FRCSC, "Longer in-hospital wait times does not affect outcomes for urgent coronary artery bypass grafting surgery", American Heart Association Annual Meeting, Orlando, Florida, November 2009

xx. **Zivot,** JB, "When the patient and the doctor disagree: end of life in the ICU" (poster presentation) American Society of Anesthesiology Annual Meeting, San Diego, California, October 2010

xxi. Joel **Zivot**, MD, "A cure in search of a disease, comments on: From an Ethics of Rationing to an Ethics of Waste Avoidance", N Engl J Med. 2012; 366:1949-1951, May 24, 2012

xxii. Mazzeffi, Halkos, **Zivot** "Timing and characterization of post-cardiac surgery in-hospital mortality" Society of Critical Care Annual Meeting Society of Critical Care Annual Meeting, Jan 2013.

xxiii. Neamu, Halkos, **Zivot** "Right Ventricular Laceration During Closed Chest Compression in a Cardiac Surgical Patient" Society of Critical Care Annual Meeting: Jan 2013

xxiv. Caridi-Scheible, Zivot, Paciullo, Connor "Successful treatment of pulmonary-renal syndrome secondary to p-ANCA vasculitis using ECMO with Argatroban", Society of Critical Care Medicine Annual Meeting, San Francisco, CA, Jan 2014

xxv. Lin, Stacey, **Zivot J**, "The Interaction between Opioids and SSRI leading to Serotonin Syndrome" American Society of Anesthesiology Annual Meeting, Boston MA, October 2017

xxvi. Wiepking, Mathew, **Zivot J,** "Eastern Equine Encephalitis: A Dangerous Dark Horse in Organ Transplantation" IARS annual meeting, Chicago, IL, April 2018

13. **Consultantships/Advisory Boards**:

i. Merck Pharmaceuticals, physician advisory board, 2005-2007

ii. Consultant for Wireless EKG Monitor, 2004-2005

iii. Masimo Corporation, product design and physician advisory board, 2013-2107

iv. Doximity, physician advisory committee, 2014-2017

14. **Editorships and Editorial Boards**:

i. Guest Editor, "The Emory-Tibet Science Initiative, a Novel Journey in Cross-Cultural Science Education", *Frontiers in Communications and Networks*, 2020-2022

ii. MedPage Today, regular contributor

15. **Honors and Awards**:

i. Robert B. Sweet Clinical Instructor of the Year, University of Michigan, Department of Anesthesiology, 1997

ii. Outstanding Clinical Instructor of the Year, Case Western Reserve University, Master of Science in Anesthesiology Program, 1999

iii. Clinical Instructor of the Year, University Hospitals of Cleveland, Department of Anesthesiology, 2000

iv. Outstanding Clinical Instructor of the Year, Case Western Reserve University, Master of Science in Anesthesiology Program, 2001

v. Meritorious Service Award, American Academy of Anesthesiologist Assistants, 2003: Given for academic work as the Medical Director of the Master of Science of Anesthesiology at Case Western Reserve University, advocacy for scope of practice, and committee work to improve the relationship between the American Society of Anesthesiology and American Academy of Anesthesiologist Assistants.

vi. Quality and Patient Safety Award, University Health Systems Consortium, 2002: Given by University Health System Consortium for various quality benchmark projects when I was the co-medical director of the Cardio-thoracic Intensive Care Unit at University Hospitals of Cleveland.

vii. Distinguished service by a Physician Award, American Academy of Anesthesiologist Assistants, 2005: Given for work with the American Academy of Anesthesiology Assistants annual meetings where I served as a speaker on multiple locations and also developed and hosted an annual Jeopardy game competition between all of the Master of Science in Anesthesiology schools around the country.

viii. District of Columbia Annual Patient Safety Award, District of Columbia Department of Health, 2006: Given by the District of Columbia Department of Health for quality improvement work done when I was the medical

director of the cardio-thoracic intensive care unit at George Washington University Hospital. I developed several collaborative quality projects between cardio-thoracic surgery and critical care medicine.

ix. Presidential Citation, Society of Critical Care Medicine, 2013: Given for work done within the Society of Critical Care Medicine that included writing a book chapter, service on 2 society committees, and moderating an on-line debate about the topic of end-of-life decisions in patients with implanted mechanical cardiac support devices.

x. Excellence in Patient and Family Centered Care, Emory Center for Critical Care, 2018.

xi. Distinguished Alumni Award Master's Program, Laney Graduate School, Emory University, April 2022

16. **Society Memberships**:

i. American Academy of Anesthesiologist Assistant, 2005-2017

ii. American College of Chest Physicians, 2000-2007

iii. American Medical Association, 1995-2022

iv. Society of Critical Care Anesthesiologists, 1995-2019

v. American Society of Anesthesiologists, 1993-present

vi. Canadian Anesthesiologist Society, 2007-2011

vii. District of Columbia Society of Anesthesiologists, 2006-2007

viii. International Anesthesia Research Society, 1996-2000

ix. International Extra-Corporeal Life Support Organization, 1997-2005

x. Ohio Society of Anesthesiologists, 1993-2005

xi. Society of Critical Care Medicine, 1995-present

xii. Manitoba Medical Society, 2007-2010

xiii. Canadian Medical Association, 2008-2012

xiv. Georgia Society of Anesthesiologists, 2010-present

xv. Society of Cardiovascular Anesthesiologists, 2010-2014

xvi. Society of Academic Anesthesiology Associations, 2013-2015

xvii. Medical Association of Georgia, 2016-present

17. **Organization of Conferences**:

i. National and International:

i. "On the Ethics of Drug Shortages" June 2012, jointly with the American Society of Anesthesiology and the Emory Center for Ethics

ii. Administrative Positions:

i. American Society of Anesthesiology and the Emory Center for Ethics, Director, Meeting Planning Committee, 2012

iii. Sessions as chair:

i. American Society of Anesthesiology and the Emory Center for Ethics, Conference Chair, 2012

18. **Clinical Service Contributions**:

i. Medical Director of 21 ICU/11S ICU, (I was the first person to hold this position) Emory University Hospital Midtown.

I created the practice standards for all ICU physicians.

I hired all the physician and APP positions for the unit.

Established best practice jointly with members of the cardiac surgical service

Participated in the design and the new build of 11 ICU to relocate from 21 ICU.

ii. 4A/5A ICU Emory University Hospital:

Created and chaired a joint protocol development group with Critical Care Medicine, Surgery, Nursing, and Respiratory Therapy with the purpose of improving quality metrics in critical care medicine including:

A blood conservation strategy for post-operative cardiac surgery patients.

Intra-aortic balloon pump removal.

DVT and GI prophylaxis and the beginning of an atrial fibrillation management protocol.

Wrote and helped implement a rapid extubation protocol for EUH and EUHM cardiac surgery patients.

iii. Fellowship Director, Critical Care Medicine, Emory University Hospital, Department of Anesthesiology:

- Developed the first joint Anesthesiology-Emergency Medicine critical care medicine fellowship at Emory.
- Expanding the number of fellows from 1 fellow to 6.
- Established the use of Critical Care Medicine Fellows to be involved in overnight emergency airway coverage as a project within the EUH emergency airway committee on which I am a member.

iv. Conflict resolution project

Working jointly with Emory Healthcare Office of Quality I participated in the design and implementation of the Pledge Partnership. I received funding from Emory Healthcare to develop a novel examination of conflict triggers in the operating using classic anthropological ethnography jointly with the primate researcher, Dr. Frans De Waal.

19. **Community Outreach**:

i. General:

i. International: St. Petersburg, Russia, 2002, 2004 - Home visits to community members who were unable to travel to see a physician.

ii. The Global Surgical and Medical Support Group, (GSMSG) 2018

iii. Regional: Hurricane Katrina Medical Response Team, 2005

iv. Emory 500 Atlanta Motor Speedway Health Tent Volunteer, 2010

Selected Media Appearances:

i. Anesthesiology News, 2002 Anesthesiologist Assistants

ii. The Medical Post, 2009 Waiting for Cardiac Surgery

iii. The Health Report, CJOB 68 AM, Winnipeg, Canada, 2010

Cardiac Critical Care

iv. End of Life in the ICU VIP syndrome

v. Inside the Black Box, WREK 91.1 FM, Atlanta, Georgia, 2011

vi. Biting the Bullet: The Technology of Anesthesia, National Public Radio WABE 90.1 FM Atlanta, Georgia, 2011

vii. Physicians and the Death Penalty Drug shortages

Georgia Public Broadcasting, Atlanta GA, 2012 Drug shortages reaching critical levels,

viii. MedPage Today, 2013, No Advantage for Fresh Blood in ICU Transfusions

ix. Meningitis Outbreak: Suspicion needed for nausea complaints Drug Shortages spark use of compounders, Medscape Medical News, 2013

x. GPOs to Blame for Drug Shortages, Says Physicians Group, MedPage Today, 2014

xi. Cruel and Unusual Punishment, Lethal Injection: A Cruel, Painful, Terrifying Execution, Miami Herald, 2014

xii. “Doctor speaks out on use of untested drugs in capital punishment”, The New York Times, 2014

xiii. Timeline describes frantic scene at Oklahoma execution, The Washington Post, 2014

xiv. Florida’s Gruesome Execution Theater “Another execution gone awry. Now what?” Washington Post, 2014

xv. CNN with Sanjay Gupta, 2014, Dr. Zivot: Lethal injection not humane

xvi. Amicus on Slate with Dahlia Lithwick, 2015 Botched protocols, Huffington Post, 2015

xvii. Oklahoma wants to reinstate the gas chamber and experts say it’s a bad idea, Time, 2015

xviii. The harsh reality of execution by firing squad, BBC World News, 2017

xix. Lethal injection in Arkansas, BBC Radio Science Unit 2017

xx. Pain in execution by lethal injection, CNBC, 2017

xxi. Silicon Valley is trumpeting A.I. as the cure for the medical industry, but doctors are skeptical AXIOS, 2017

xxii. The Human Diagnosis Project: A Skeptical Look at new AI Initiatives, Washington Post, 2017

xxiii. States to try new ways to execute prisoners BBC Three, 2018

xxiv. Life and Death Row: How the Lethal Injection Kills Mother Jones, 2018

xxv. Veterinarians won’t use This Gas to Kill Animals, but 3 states want to use it on prisoners, Eye for Pharma, 2018

xxvi. Artificial Intelligence: The Counterargument, National Public Radio, 2018

xxvii. All Things Considered, Lethal Injection, National Public Radio, 2018

xxviii. Nebraska's first lethal injection execution will use new cocktail of drug, including fentanyl, Newsweek, 2018

xxix. Good Law/Bad Law Podcast, October 2018 Is Lethal Injection Fatally Flawed on Moral and Constitutional Grounds?

xxx. Anamnesis: Medical Storytellers from MedPage Today, Podcast July 24, 2019

Higher Power: All I could do

xxxi. "Why This Inmate Chose the Electric Chair over Lethal Injection" National Public Radio, September 21, 2020

xxxii. "Inmate Autopsies Reveal the Troubling Effects of Lethal Injection" USA TODAY, December 6, 2020

xxxiii. "What will 2021 bring? Promising vaccines and 'the darkest days of our war on COVID-19" National Public Radio, December 10, 2020

xxxiv. "ICU doctor on why health workers shouldn't be prioritized in Coronavirus Vaccination" STAT, December 13, 2020

xxxv. "It's peace of mind": COVID-19 vaccines can't arrive soon enough for many frontline health workers" STAT news, December 2020

xxxvi. Death Penalty Information Center, December 9, 2020

"Podcast: Anesthesiologist Dr. Joel Zivot on What Prisoner Autopsies Tell Us About Lethal Injection"

xxxvii. "HD Live! The State of COVID-19 in the US and its Toll on Healthcare Workers" December 2020

xxxviii. ProPublica, "Inside Trump and Barr's Last-Minute Killing Spree" December 23, 2020

xxxix. New York Times, April 15, 2021, "Trump's killing spree continues"

xl. "Oklahoma to Continue Lethal Injections After Man Vomits During Execution", New York Times, October 29, 2021

xli. "The torturous death of John Grant in Oklahoma" The Atlantic, November 2, 2021

xlii. "Expert: Drugs for quadruple killer's execution could fill his lungs with fluid" Las Vegas Review Journal, November 17, 2021

xliii. "Lethal injection: can pharma kill the death penalty"? Pharmaceutical Technology, December 1, 2021

xliv. “Florida has a unique position for executing prisoners. It wants to keep the details secret” The Miami Herald, January 19, 2022

xlv. “Jury is deadlocked in murder trial of Ohio doctor accused of overprescribing fentanyl to the dying” CNN, April 18, 2022

xlvi. 'Euthanasia Pivots on Intent:' Physician Witnesses in Husel Trial Speak Out, MedPage Today, April 21, 2022

xlvii. “Jury ‘right’ in Husel verdict, says witness” NBC4, April 21, 2022

xlviii. “How can doctors be sure a medically assisted death is a peaceful death?” The National Post, July 1, 2022

xlix. “Dead to rights: What did the state of Alabama do to Joe Nathan James in the three hours before his execution?” The Atlantic, August 14, 2022

20. **Formal Teaching**:

i. Medical Student Teaching:

i. Discovery Project: “Propofol wastage in the ICU” Medical student Mina Tran, 2012-2013

ii. Teacher and mentor for medical students in anesthesiology and critical care medicine. 2010

iii. Instructor for Fundamental Critical Care Support (FCCS) training course for medical students, 2012-present

iv. Forge Medical Student Innovation Group, Mentor, 2012

ii. Graduate Programs:

i. Training Programs:

Instructor in the Master of Science in Anesthesiology program. I developed the first critical care medicine rotation for all the students and a series of didactic lectures on the topic of critical care medicine the included “Critical Care Medicine”, “Heart Failure”, and “Acid-Base Disorders”

Emory School of Law: Co-chief instructor of **LAW 819-002, “Law, Medicine and Human Rights”,** a 2-credit hour seminar taught in the fall 2016 semester, Emory School of Law

iii. Emory Institute of Liberal Arts, School of Interdisciplinary Studies:

Chief Instructor, **IDS 385-5, "When medicine and the state collide: bioethics and the due process of cruelty"** Emory University, Institute of Liberal Arts, 3.0 credit hours, Fall, 2017

Chief Instructor, **IDS-385-4 "The Science, Medicine, and Ethics of Killing"** Emory University, Institute of Liberal Arts, 3.0 Credit hours, Spring 2018

Chief Instructor, **IDS-385-4 "Medicine, the Law and the Ethics of Punishment and Killing"** Emory University, Institute of Liberal Arts, 3.0 Credit hours, fall 2018

Chief Instructor, **IDS-385 "Medicine, the Law and Bioethics"** Emory University, Institute of Liberal Arts, 3.0 Credit hours, spring 2019

Co-Instructor, **IDS-290 "Medicine, Literature, Law, Crime, Punishment, Death"** Emory University, Institute of Liberal Arts, 1.0 Credit Hour, spring 2019

Chief Instructor, **IDS-385 "Medicine, the Law and Bioethics**" Emory University, Institute of Liberal Arts, 3.0 Credit Hours, fall 2019

Chief Instructor, I**DS-385 "Medicine, the Law and Bioethics"** Emory University, Institute of Liberal Arts, 3.0 Credit Hours, spring 2021

iv. Emory Center of Bioethics

Chief Instructor, **Bioethics 506-1(5935) "Independent Study in Bioethics: Public Scholarship"**, 3.0 Credit Hours, fall 2019

Guest instructor, **Bioethics 504, Public Scholarship**, Fall, 2021

v. Emory Scholars Program

Emory Scholars Retreat, Hilton Head, South Carolina, January 2019 **"Lethal Injection and Capital Punishment"**

Emory University **Ethically Engaged Leaders Program** (EEGL) Mentor for undergraduate student, Shreeja Patel, 2019

vi. Emory Neuroscience and Behavioral Biology Program

Supervising Faculty: **NBB Honors 495A, Samuel John, "Needle Exchange Programs and their Role in Alleviating the Opioid Crisis and Addiction"** 4.0 credit hours, 2019-2020

iii. Residency Programs:

Instructor for residents in anesthesiology, emergency medicine, and surgery in the area of critical care medicine. Lecture topics "Septic shock", "Thyroid disease in critical care", "Mechanical heart support", "Pulmonary

artery catheters" "Heuristics and biases in clinical reasoning", "delirium and agitation in critical illness", "biological variability".

iv. Other Categories:

i. Instructor for regularly scheduled lecture series on a variety of critical care topics for respiratory therapy including "capnography" and "paralytics".

ii. Instructor for students in the Emory critical care NP/PA program and regular critical care lectures to the NP/PA practitioners in critical care. Also teaching on how to read chest X-rays.

iii. Invited instructor in the Emory School of Law on the topic "Physician Assisted Suicide".

iv. Emory Tibet Science Initiative: Taught biology to Buddhist monks at Drepung Loseling Monastery in Southern India in June 2015, June 2017, June 2018 and June 2019. This initiative is a result of an invitation from His Holiness, The Dalai Lama, to bring science education to the curriculum of the monks and represents the first time in 700 years that the curriculum has changed. I spent 2 weeks at the monastery on each occasion teaching for 6 hours per day including microscopy lab teaching. I worked with a series of translators.

v. Emory-Addis Ababa Education Innovation Community of Practice Program, Instructor: Distance Learning, September 2019

21. **Supervisory Teaching**:

a. Residency Program:

i. Fellowship Director, Critical Care Medicine, Emory University Hospital, Department of Anesthesiology, 2013-2016. I was chiefly responsible for the education and training of the critical care fellows in the Department of Anesthesiology. In addition to a multitude of critical care topics, I assisted the fellows in abstract writing for a national critical care meeting, grand rounds for the Department of Anesthesiology and a quality improvement project for Graduate Medical Education Day that occurred annually in June.

b. Thesis Committees:

i. Laney School of Graduate Studies, Center for Bioethics Thesis Committee for Dr. Michelle Sumler, 2019-2021

c. Other:

i. Summer internship at the Southern Center for Human Rights and teach law students on the topic of lethal injection.

22. **Lectureships, Seminar Invitations, and Visiting Professorships**:

a. National and International

i. "The Case of Samuel Golubchuk: Lessons about end-of-life decision-making?" A debate between Doctors Joel Zivot and Adrian Fine, March 2009, 12h30-13h30. The Center for Professional and Applied Ethics, University of Manitoba, Winnipeg, Manitoba.

ii. "Cardiac output after the Pulmonary Artery Catheter" American Academy of Anesthesiologist Assistants Annual Meeting. Clearwater, Florida, April 2009

iii. "End of Life in the ICU", Canadian Hospice Palliative Care Conference Annual Meeting, Winnipeg, Manitoba, Canada. October 2009

iv. "Reductions in wait times for cardiac surgery may be harmful", poster presentation, Canadian Cardiovascular Society Annual Meeting, Edmonton, Alberta, Canada, October 2009

v. "Biological Variability" American Society of Anesthesiology, 2009 - Formed a panel to discuss biological variability. My panel consisted of an anesthesiologist, a mathematician, and a physicist.

vi. "End of life in the ICU: When the patient and doctor disagree…" Province wide health care ethics grand rounds, St. Boniface Research Centre, Winnipeg, Manitoba, Canada. January 2010

vii. "Mostly dead is slightly alive, the problem with the dying process" Center for Ethics, Emory University, 2011

viii. "Anesthesiology Jeopardy!" American Academy of Anesthesiologist Assistants Annual Meeting, 2006, 2007, 2008, 2009, 2010, 2011

ix. "Queuing Theory: Applications for Anesthesiology" American Academy of Anesthesiologist Assistants Annual Meeting, Destin, Florida, 2011

x. "Cardiac Anesthesia: Mostly we have it wrong" American Academy of Anesthesiologist Assistants Annual Meeting, Destin, Florida, 2011

xi. "End of life in the ICU: When the patient and doctor disagree" American Academy of Anesthesiologist Assistants Annual Meeting, Destin, Florida, 2011

xii. "Sedating the difficult patient" 5th Annual Southeastern Critical Care Summit. Emory University, Atlanta, GA, March 2012

xiii. "End of Life Care" IMPACT 2012 American Academy of Physician Assistants Annual Meeting, Toronto, Canada, June 2012

xiv. "Biosimilars, where do we stand?" Georgia Bio and the Georgia Association of Healthcare Executives. September 2012, Atlanta, Georgia

xv. "Drug Shortages" Visiting Professor, Rutgers Business School, Newark, New Jersey, November 2012

xvi. "Deactivating a permanent cardiac device is not physician assisted death", Pro-con debate Webinar, Society of Critical Care Medicine, November 2012

xvii. "Drug shortages: The invisible hand of the Market" New Horizons in Anesthesiology, Vail, Colorado, February 2013

xviii. "Hey Anesthesia, is a compliment, not an insult: the case for protocols" New Horizons in Anesthesiology, Vail, Colorado, February 2013

xix. "Pro/Con: Death Panels in End-of-Life Care" New Horizons in Anesthesiology, Vail, Colorado, February 2013

xx. "Hockey Violence and Killer Apes: Conflict Management in the Operating Room" New Horizons in Anesthesiology, Vail, Colorado, February 2013

xxi. "Drug Shortages, a failed market" American Society of Anesthesiology Legislative Conference Annual Meeting, April 2013, Washington, DC

xxii. "Lethal injection in the death penalty", Georgia Law Society and the Southern Center for Human Rights, Atlanta, Georgia, July 2014

xxiii. "Identifying and managing futile care in the ICU", 10th Annual South Easter Critical care Summit, May 2016, Atlanta, Georgia

xxiv. "Capital Punishment and Lethal Injection", Georgia State School of Law, Atlanta, Georgia, September 2016

xxv. "The Ethics of Drug Pricing", GEM annual meeting, Georgia Society of Ophthalmology, January 2017

xxvi. "Medical Assistance in Dying: Not as Easy as it Looks" Institute of Liberal Arts and Interdisciplinary Studies, Emory University, October 2017

xxvii. "Medical Assistance in Dying: Not as easy as it looks" TEDx Emory, February 2018

xxviii. "Emotive Arts Series Panel Discussion: The Opioid Epidemic" Carlos Museum, Emory University, February 2018

xxix. "Fast Track Cardiac ICU in Canada" 37th annual APACVS meeting, Miami, Florida, April 2018

xxx. "On the Ethics of Drug Pricing" Grand Rounds, Department of Anesthesiology, Case Western Reserve University, May 2018

xxxi. "Building Transdisciplinary Capacity for Tibetan Medical Research: Methods, Translation and Efficacy Evaluation" Translation needs for Tibetan Medical Research, Emory University, School of Medicine and School of Anthropology, October 2018.

xxxii. "Medicine, AI, and the Human Touch" Contemporary Challenges of AI in Healthcare: Verification, Big Data, and Investment. Emory Center for Ethics, Emory University, December 2018.

xxxiii. 25th Annual Conference of the Healthcare Ethics Consortium: Panelist, Emory Conference Center, "remote technologies, telemedicine, artificial intelligence & keeping care for the patient", Atlanta, Georgia, March 2019

xxxiv. American Society of Anesthesiology Annual Meeting, "The Patient, Family and Physician: Balancing Autonomy in Perioperative Decision-Making. The Right not to Know", October 4, 2020.

xxxv. AMICUS presents: Moderator Professor Jon Yorke, Birmingham City School of Law, On Death Row – Doctors, July 26, 2022

xxxvi. Visiting Professor, Depart of Anesthesiology, University of New Mexico. "Hey anesthesia is a compliment not an insult", "Intubation in the ICU." August 18-19, 2022

23. **Invitations to National or International Conferences**:

i. National and International:

i. University of Richmond Law Review, Allen Chair Symposium, "The Death Penalty in the United States", 2014.
ii. Yale Law School, March 2015, "Lethal Injection".

3. The Fordham Law Review, Fordham Law School, "Criminal Behavior and the Brain: When Law and Neuroscience Collide", February 2016.
4. American College of Correctional Physicians, Fall Educational Conference, Las Vegas, Nevada, "Physician participation in executions: A discussion of the Ethical Challenges and the Pros and Cons, a pro-con debate between Dr. Carlo Muso and Dr. Joel Zivot, October 2016.
5. Panelist, "What is life and what are its origin"? The First International Emory Tibet Symposium: Bridging Buddhism & Science for Mutual Enrichment, Drepung Loseling Monastery, Mungod, Karnataka, India, December 18-20, 2016.
6. Witness, Senate of Canada: Bill C-7, "Medical Assistance in Dying: peaceful or painful"? February 8, 2021

ii. Regional:

i. "Prescribing Price: The Ethics, Science, and Business of Drug Development and Pricing." Emory Center for Ethics, October 7, 2016

ii. Panelist, Emory Conference Center, Emory Center for Ethics, Atlanta, Georgia, November 2016

24. **Research Focus**:

Medicine, moral theory, end of life, physicians and vulnerable populations, depression in Tibetan Monastics. Physician participation in lethal injection. Ethogram to study conflict in the operating room. Human factors in critical care decision-making and biological variability. Developed an economic model explaining the national generic drug shortages. Studied Propofol wastage in the operating room.

a. Ongoing Research Projects:

i. **"Do Tibetan Monks get depressed?"**

This project was an IRB approved study involving the administration of the PHQ-9, a validated depression screening tool, translated into the Tibetan language and administered to a cohort of 400 monks and nuns to screen for depression symptoms. This project was conducted jointly with Professor Jennifer Mascaro in the Emory School of Public Health and Professor Arri Eisen in the Emory Department of Biology.

ii. **"Autopsy Findings in Prisoners executed by Lethal Injection"**

This project is a review of autopsies performed on 43 prisoners after death by Lethal Injection in order to determine the histologic effects on organ systems because of exposure to extremely high doses of barbiturates, benzodiazepines and Potassium Chloride. This is a joint project with Dr. Mark Edgar, Emory University School of Medicine Department of Pathology.

25. **Grant Support**:

a. Previous Support:

i. Other: Team Based Science (TBS) grant from the Department of Anesthesiology for Evaluation of conflict in the operating room, $20,000.00

ii. The Emory Georgia Tech Healthcare Innovation Program (HIP), (HIP-ACTSI-GSU) Seed grant, $25,000.00, for "Managing Conflict and Error in the Operating Room". Awarded July 2014.

iii. $20,000.00 from the American Society of Anesthesiology to plan the meeting "On the Ethics of Drug Shortages". June 2012

26. **Bibliography**:

a. Published and Accepted Research Articles (clinical, basic science, other) in Refereed Journals

i. Perera ER, Vidic DM, **Zivot J**. "Carinal resection with two high frequency jet ventilation delivery systems". Canadian Journal of Anesthesia. Jan 1993: 40(1):59-63. PMID: 8425245 Zivot JB, Hoffman WD. "Pathological effects of endotoxin". New Horizons. May 1995; 3(2):267-75. PMID:7583168

ii. Popovich MJ, Lockrem JD, **Zivot JB**. “Nasal bridle revisited: an improvement in the technique to prevent unintentional removal of small-bore naso-enteric feeding tubes”. Critical Care Medicine. March 1996; 24(3):429-31. PMID: 8625630

iii. Kumar K, Zarychanski R, Bell DD, Manji R, **Zivot J**, Menkis AH, Arora RC; Cardiovascular Health Research in Manitoba Investigator Group. “Impact of 24-hour in-house intensivist on a dedicated cardiac surgery intensive care unit”. Ann Thorac Surg. 2009 Oct; 88(4):115361.doi: 10.1016/j.athoracsur. 2009.04.070

iv. **Zivot JB**. “The Case of Samuel Golubchuk”, AJOB Volume 10, Issue 3 March 2010, pages 56 – 57 doi: 10.1080/15265160903681890.

v. Abdul-Razaq A. H. Sokoro, PhD., **Joel B. Zivot**, , MD, FRCPC, Robert E. Ariano, PharmD, FCCM "Neuroleptic malignant syndrome versus Serotonin syndrome: the search for a diagnostic tool?" Ann Pharmacother. 2011 Sep; 45(9):e50.doi: 10.1345/aph. 1P787. Epub 2011 Aug 30.

vi. When the patient and doctor disagree. **Zivot JB**, CMAJ 2012, Jan 10;184 (1):76-6. doi: 10.1503/cmaj. 112-2008

vii. **Zivot JB**, “Anesthesia does not reduce suffering at the end of life”, Crit Care Med. 2012 Jul; 40(7):2268-9. doi: 10.1097/CCM.0b013e31824fc12b.

viii. **Zivot JB,** “The absence of cruelty is not the presence of humanness: physicians and the death penalty in the United States”. Philos Ethics Humanit Med. 2012 Dec 3;7(1):13. doi: 10.1186/1747-5341-7-13.

ix. Mazzeffi, M, **Zivot J**, Buchman T, Halkos M, “In hospital mortality after cardiac surgery: patient characteristics, timing, and association with postoperative length of intensive care unit and hospital stay”. Ann Thorac Surg. 2014 Apr;97(4):1220-5. doi:10.1010/j.athoracsur.2013. 10.040. Epub 2013 Dec 21.

x. **Zivot JB**, “The withdrawal of treatment is still treatment”. Can J Anesth 2014; Oct;61(10): 895-8

xi. **Zivot J**, “Lethal injection: the states medicalize execution” 49 U. Rich. L. Rev. 711 (2015)

xii. **Zivot J,** “Elder care in the ICU: Spin bravely?” Crit Care Med 2015 July;43(7):1526-7

xiii. Jones LK, Jennings BM, Goetz RM, Haythorn KW, **Zivot JB**, de Waal FB “An Ethogram to Quantify Operating Room Behavior” Ann Behav Med. 2016 Jan 26. [Epub ahead of print]

xiv. **Zivot J**, Arenson K, “Lessons learned from physician participation in lethal injection: Is Carter v. Canada a death knell for medical self-regulation?” Can J Anaesth 2016 March;63(3):246-251

xv. **Zivot JB**, “Elderly patients in the ICU: Worth it, or not?” Crit Care Med 2016 April;44(4):8423

xvi. Moll V, Ward CT, **Zivot JB**, “Antipsychotic-Induced Neuroleptic Malignant Syndrome after Cardiac Surgery” AA Case Rep. 2016 July 1; 7 (1); 5-8

xvii. **Zivot J**, “Too Sick to be Executed: Shocking Punishment and the Brain” November 2016 Vol 85, pp 697-703, Fordham Law Review

xviii. **Zivot J**, “Useful ethics committees: no mandate required” Crit Care Med. 2020 Jun; 48(6):928-929. doi: 10.1097/CCM.0000000000004357.

xix. **Zivot J**, “Coronavirus Disease 2019 Triage Teams: Death by Numbers” Crit Care Med 2020 May 15. doi: 10.1097/CCM.0000000000004435. Online ahead of print.

xx. **Zivot J** “The author replies” Crit Care Med Jan 2021 Volume 49-Issue 1-p e104 doi: 10.1097

xxi. Nusslock R, Balgopal M, Hue G, **Zivot J**, Negi LT, Eisen A “The Emory-Tibet Science Initiative: A Historic Collaboration between Modern Science and Tibetan Buddhism – Insights from a Spiritual Leader” Front. Commun., October 14, 2021, Volume 6, Article 765368 doi: 10.3389/fcomm.2021.765368

xxii. **Zivot JB**, Jabaley CS, “American perspectives on vaccine hesitancy and refusal: Time for a new approach?” Journal of Critical Care October 16, 2021 https:lldoi.org/10.1016/j.jcrc.2021.09.016

xxiii. Mascaro JS, Shellman, D, Keaton WA, Wilson M, Brauer E, Samphel T, Chang H, Raison CL, **Zivot J**, Eisen A, “Mixed-method evaluation of the public health questionnaire for estimating depression among Tibetan Buddhist monastics” Front. Commun., 24 November 2021, Volume 6, Article 752820, doi.org/10.3389/fcomm.2021.752820

xxiv. Eisen A, **Zivot J**, Nusslock R, Balgopal M, Hue Gillian, Tenzin Negi L, “The Emory-Tibet Science Initiative, a Novel Journey in Cross-Cultura; Science Education” Font. Commun., 26 April 2022, https://doi.org/10.3389/fcomm.2022.899215

xxv. **Joel B. Zivot,** Mark A. Edgar, David A. Lubarsky “Execution by lethal injection: Autopsy findings of pulmonary edema” August 24, 2022, **doi:** https://doi.org/10.1101/2022.08.24.22279183

b. Book Chapters:

i. Bojan Paunovic MD, FRCPC1, Rizwan Manji MD, PhD, FRCSC2, Rakesh Arora MD, PhD, FRCSC2, Johan Strumpher MD, FRCPC3, Rohit Singhal MD, FRCSC2, **Joel Zivot MD, FRCPC[4]**, and Eric Jacobsohn MBChB, MHPE, FRCPC5 "Diagnosis and Management of Sepsis and Septic Shock in the Cardiac Surgical Patient". Society of Cardiovascular Anesthesiology Monograph, March 2010

ii. **Zivot, JB**, "What Are Advance Directives?" Critical Care Ethics: A Practice Guide, Third Ed. Copyright 2014 Society of Critical Care Medicine.

c. Examination Activities:

i. Committee Member, 2005, National Anesthesiologist Assistant Certification, Examination Development Committee

ii. Question writer, 2005, Critical Care Medicine, National Board of Medical Examiners

iii. Question reviewer, 2015, American Board of Anesthesiology-Maintenance of Certification in Anesthesiology (MOCA), Critical Care Medicine

d. Other Publications:

Op-Ed:

i. "Baby's status as human is on trial" Op-Ed, Feb. 19, 2010, **Winnipeg Free Press**

ii. "Why I am for a moratorium on lethal injections" Op-Ed, Dec 15, 2013, **USA Today**

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v. "Executions put physicians in unfair dilemma" January 2017, **CNN**

vi. "Gorsuch grapples with death: a physician's viewpoint" February 2017, **CNN**

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viii. "Don't thank me, it's my job" May 2018, **MedPage Today**

ix. "Inmates as test subjects: can clinical trials in prisons ever be ethical?" **MedPage Today,** September 2018"

x. “Lethal injection: Burning as they die” **MedPage Today**, December 2018

xi. “Lethal injections are medicine, not poison” **Houston Chronicle**, December 2018

xii. “In Defense of Telling Patients They’re Dying via Robot” **Slate**, March 2019

xiii. “What Kim Kardashian Can Teach Us About Drug Pricing” **MedPage Today**, March 2019

xiv. “Patients love a miracle, but doctors can't be afraid to deliver bad news (even via robot)” **USA Today**, March 2019

xv. “Buddhist Wisdom and Human Poop” **MedPage Today**, March 2019

xvi. “What if Airlines Worked Like Healthcare?” **MedPage Today**, April 2019

xvii. “Abortion: No Middle Ground on Fetal Heartbeat” **MedPage Today**, May 2019

xviii. “Kobe Bryant’s Death: What Were the Chances?” **MedPage Today**. Jan 30, 2020

xix. “Could U.S. ICUs Handle 45,000-Bed Corona Virus Load?” **MedPage Today**, February 12, 2020

xx. “Doctors Volunteer for Covid-19 Duty: Who has Their Backs?” **MedPage Today**, March 3, 2020

xxi. “Rationing Ventilators by Age Is Wrong” **MedPage Today**, April 8, 2020

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xxvi. "Canada's Medical Assistance in Dying = Tortuous Death" **MedPage Today**, February 16, 2021

xxvii. “The Legal Stakes of a Lab Leak” **MedPage Today**, June 13, 2021

xxviii. "Last rights: assisted suicide is neither painless nor dignified" **The Spectator**, September 18, 2021

xxix. "Allowing assisted dying would pander to the privileged" **The Times of Scotland**, September 22, 2021

xxx. "What the death rattle and capital punishment have in common" **STAT**, October 21, 2021 (With Ira Bedzow)

xxxi. "What the Film Industry Can Learn From Patient-Safety Protocols" **The Globe Post,** October 29, 2021 (With Ira Bedzow)

xxxii. "Opinion: Medicine's lessons can make movie sets safer" **Atlanta Journal Constitution**, November 17, 2021 (With Ira Bedzow)

xxxiii. "Why is Dr. Oz eyeing Washington? The story of physician burnout may be at play"
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xxxv. "Does Russia's Invasion of Ukraine Constitute Biological Warfare"
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xxxviii. "Death by lethal injection: It is time for more transparency" **Al Jazeera**, August 22, 2022.

27. **Contributions not otherwise noted:**

National and International:

a. American Society of Anesthesiology, Abstract Review Committee and Poster Session Moderator, 2012

Regional:

b. Midwestern Anesthesia Resident Conference, Abstract Reviewer, 2001-2003

c. American Society of Anesthesiology Committee on Ethics Syllabus: CME Questions; “Ethics of Drug Shortages” 2005

Zivot Declaration: Exhibit 2

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Alabama Department of Corrections Execution Procedures, March 2001
Lo Faro, AF, Pirani, F, Paratore, A, Tagliabracci, A, Busardo, FP, "Fatal inhalation of nitrogen inside a closed environment: Toxicological issues about the cause of death" *Forensic Sci Int* . 2019 Sep;302:109871. doi:10.1016/j.forsciint.2019.06.029. Epub 2019 Jul 2.
Miller v. Hamm, No. 2:22-cv-00506, Doc. No. 79-1 (Oct. 6, 2022)
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Smith v. Hamm, No. 2:22-cv-00497, Defendant's Motion to Dismiss Pursuant to Rule 12(b)(6) of the Federal Rules of Civil Procedure and 42 U.S.C. § 1997e(c) (Doc. No. 10) (Aug, 26, 2022)
Zivot J, Edgar M. Lubarsky D, "Execution by lethal injection: Autopsy findings of pulmonary edema" *MedRxiv*, doi: https://doi.org/10.1101/2022.08.24.22279183

Zivot Declaration: Exhibit 3

Zivot Declaration: Exhibit 4

EXECUTION PROCEDURES
CONFIDENTIAL
March 2021

I. General

A. This procedure establishes the responsibilities and procedures for the reception of a condemned inmate, for confinement, and for execution and day of execution preparation.

B. This procedure identifies the responsibilities associated with an execution.

C. This procedure outlines the forms used to ensure a professional and chronological order for executions.

D. This document is confidential in nature and will be disseminated only to personnel having a need and right to know the contents herein.

E. A permanent log will be kept by the [redacted], beginning on Monday of the week of the execution. This log will reflect any practice, maintenance, and other preparations for the execution.

F. Alabama Code Section 15-18-82.1(f) clearly states that, not withstanding any law to the contrary, the "prescription, preparation, compounding, dispensing, and administration of a lethal injection shall not constitute the practice of medicine, nursing, or pharmacy."

II. Reception of Condemned Inmate

Once an inmate has received a sentence by the court to be executed, the condemned inmate will be transferred directly from the committing county to the W. C. Holman Correctional Facility, W. E. Donaldson Correctional Facility, or the Julia Tutwiler Prison for Women. Upon arrival, he/she will be processed through regular admission procedures, to include [redacted]

III. Confinement

Upon the receipt of a condemned person at W. C. Holman Correctional Facility, the inmate shall be confined in a cell designated by the Warden until the time of his/her execution arrives. Appropriate safeguards and security measures will be maintained as directed by the Warden. Pending the invoking of the [redacted]-hour Death Watch, the condemned inmate will be maintained in accordance with Departmental Rules and Regulations.

IV. Warrant Notification

Whenever a person is sentenced to death, the clerk of the court in which the sentence is pronounced shall issue a warrant under the seal of the court for the execution of the sentence of death (source: Alabama Code Section 15-18-20). The warrant identifies: the facts of the conviction, the offense, the judgment of the court, and the time fixed for the execution. The court provides the warrant to the Marshal who delivers it to the Warden of W. C. Holman Correctional Facility (source: Alabama Code Section 15-18-80).

A. Once the death warrant has been issued, the Warden will advise the offender as soon as possible. This will normally be done in an attempt to notify the inmate prior to an announcement by the news media.

B. If the inmate is at the W. E. Donaldson Correctional Facility or the Julia Tutwiler Prison for Women, the Warden of the W. C. Holman Correctional Facility will notify the Warden of the other facility and request the inmate be notified.

1. If the inmate is at the W. E. Donaldson Correctional Facility, arrangements will be made [redacted] to have the inmate transferred to the W. C. Holman Correctional Facility. Upon arrival at the W.C. Holman Correctional Facility, the inmate will see a physician [redacted] for an assessment of his vein structure.

2. In the instance of a female inmate receiving a death warrant, the inmate will be moved to the W. C. Holman Correctional Facility [redacted] prior to the execution. The Warden of the Julia Tutwiler Prison for Women will have a physician assess her vein structure as soon as possible after notification of the death warrant.

C. On the day the condemned inmate is advised of the death warrant, the Warden will inform him/her that:

1. The inmate may select a spiritual advisor to accompany him/her in the execution chamber;

2. The inmate may select one (1) alternate spiritual advisor to serve in the event that the originally named spiritual advisor will not/cannot serve at the time of the execution;

3. The inmate must inform the Warden of his/her choice of spiritual advisor and alternate no later than five (5) days after being advised of the death warrant;

4. The inmate's spiritual advisor and alternate must submit a written plan to the Warden for approval, for how the spiritual advisor intends to assist the inmate in his/her religious exercise in the execution chamber, no later than fourteen (14) days after the inmate receives notice of the death warrant.

V. Preparations (Prior to Execution week)

A. On a day designated by the Warden, prior to execution week, the Warden and [redacted] will meet with the execution team.

1. Team members will be given the opportunity to resign from the team.

2. Details of the scheduled execution will be discussed to bring everyone up to date.

B. If lethal injection is to be the means of execution, the Warden will notify the members of the IV team that they will be needed and schedule a time for them to view the offender's veins prior to the scheduled execution.

If it is determined that starting an IV through normal channels will not be possible due to poor vein structure, refer to Annex C for protocol.

C. If electrocution is to be the means of execution, the Warden will instruct [redacted] to contact a [redacted] to inspect the equipment to be used for the execution.

D. The [redacted] will make sure that he has the supplies necessary to carry out the execution.

E. The Warden will notify the Warden of the G. K. Fountain Correctional Center of the upcoming execution. The Warden will request that he/she have the Media Center checked for cleanliness, make sure the grounds are groomed, and insure that the telephone lines are operational.

F. The Warden will meet with the condemned offender and advise him of the schedule for execution week. The Warden will attempt to answer any questions the condemned may have in reference to the execution.

G. After confirming that the spiritual advisor and alternate submitted a written plan within fourteen (14) days after the condemned offender received notice of the death warrant, the Warden or his designee shall meet with the spiritual advisor and alternate to review such plan, and conduct orientation and training of the spiritual advisor and alternate in advance of the execution.

VI. Preparations (Execution Week)

A. Members of the execution team will meet [redacted] to walk through the steps of the execution to include the removal of the offender from [redacted] to the [redacted] and the [redacted]

[redacted] The Warden and [redacted] will rehearse their roles in the execution process at this time.

B. On [redacted] of execution week, the [redacted] will make assignments of [redacted] for the [redacted]-hour Death Watch.

C. [redacted], the Warden and [redacted] will meet with the outside security team.

1. The Warden will brief the team on the number of offender and victim witnesses to expect and who they are, if known at that time, as well as the number of additional visitors to expect, the names of whom will be provided to the [redacted] The Warden will also advise the team about media attention, if any is expected.

2. The [redacted] of the outside security team will make post assignments for [redacted] The [redacted] will also assign an escort for the offender's witnesses and security for the Training Center.

D. The Warden will check the telephone in the Commissioner's viewing room to ensure that the line is working properly.

E. [redacted], the Warden's designee will contact [redacted] to witness the execution and pronounce the time of death.

F. [redacted] the Warden or his designee will notify local law enforcement officials of the pending execution, including the State Troopers, Sheriff, and local authorities.

G. Equipment

1. If lethal injection is to be the means of execution, [redacted] shall be inspected and tested [redacted] until the day of the execution.

2. If electrocution is to be the means of execution, the electric chair, [redacted] shall be inspected [redacted], in accordance with established procedures, [redacted] the equipment will be inspected and tested three (3) times. (See Annex A for procedures and steps for testing the electric chair and equipment)(See Annex B for instructions on sponge preparation)

VII. Placement of Offender in the Holding Cell

A minimum of [redacted] officers shall be assigned to observe the condemned at all times during the [redacted]-hour Death Watch. If the condemned is a female, female security personnel will maintain security. No other correctional staff or civilian personnel, except medical personnel, shall be allowed in the Death Watch area without approval of the Warden or the Warden's designee. No inmates are allowed in the Death Watch area.

A. The accused offender will be moved to the holding cell [redacted], unless the Warden determines he/she should be moved there sooner.

B. [redacted] the execution team will begin a [redacted] will post outside the offender's cell. The cell to be used will be that cell [redacted]

1. The cell will be thoroughly inspected for any contraband prior to initial placement of the condemned offender.

2. The [redacted] will ensure that all functions of the cell are working.

3. The officers assigned to this watch will ensure, during their time on duty, that the condemned offender is under constant observation, regardless of the offender's location.

4. If an emergency should occur, the officer will initially contact the [redacted] As soon as possible, thereafter, the captain of the execution team and the Warden will be contacted.

5. All activity will be recorded on the permanent log. Information to be placed in the log will include, but will not be limited to, the following: [redacted]

C. The offender will have a bed, necessary linens, and one uniform of clothing. All other items of the offender will be kept outside the cell. The offender will be allowed access to personal hygiene items which will be passed to him/her and returned to the officers when he/she has completed use of the items.

1. The offender will be allowed a television in the area that will sit outside the cell.

2. The offender will be allowed access to the telephone. The offender will advise the officer of the number he/she wishes to call and the officer will place the call. [redacted]

3. The offender will be allowed access to his/her mail. The mail will be passed back to the officers when the offender has finished reading it. All legal mail will be opened in the presence of the offender.

4. The offender will be allowed access to a Bible, or its equivalent, and any other reading material approved by the Warden.

5. [redacted] will bring the offender's medication to him/her. Sick call will be in accordance with institutional Rules and Regulations. Sick call will be held in the [redacted].

6. The offender's meals will be delivered to him/her by [redacted]

VIII. Visitation

A. The condemned offender may submit to the Warden an extended visiting list for approval prior to execution week. The Warden will make the approval and provide this list to the officers assigned to visitation.

B. The condemned offender shall be allowed contact visits during execution week with family, friends, private clergy, and his legal representatives, as approved by the Warden.

Visitation will be at the following times:

[redacted]

C. There will be no more than fifteen (15) visitors allowed in the visitation area at any given time.

D. The condemned offender may receive an institutional meal in the visitation area. The visitors may purchase items from the vending machines for the offender's consumption. No food will be allowed to be brought in from outside.

E. Visitors will be allowed to leave the facility and return. They will be processed every time they enter the facility.

F. The [redacted] will be available for the offender and his family. The [redacted] should visit with the condemned offender [redacted]

IX. Day of the Execution

A. The [redacted] will deliver the condemned offender's breakfast meal to the door of the Death Chamber. The [redacted] on that post will receive the meal and serve it to the condemned offender in the holding cell.

1. The [redacted] will prepare the condemned's meal. No inmate will handle the condemned's meal.

2. The [redacted] will ask the condemned offender if he wishes to have a last meal prepared and explain what items are available for him.

3. The condemned offender's last meal can be prepared from anything that is available in the institutional kitchen.

B. At approximately [redacted], the officers assigned to the Death Watch will inventory the condemned offender's property. The condemned will have an opportunity to designate who he wishes his property to go to.

1. This information will be written out as a last will and testament and the condemned offender will sign the document in front of a notary public.

2. [redacted]

C. Visitation may begin at [redacted] and proceed until approximately [redacted]

D. The Warden or his/her designee will attain the funeral arrangements of the condemned. Specific information needed will be a next of kin, [redacted] This information will be made available to the coroner's office and to the Department of Forensic Science.

E. [redacted] will prepare the necessary lethal injection solution when lethal injection is the method of execution.

F. The Warden will meet with the victims of the condemned offender's crime [redacted]

G. [redacted], the condemned offender will be escorted from the visitation yard [redacted]

1. An examination of the accused will be completed and the results recorded on a Medical Treatment Record.

2. If the condemned offender has a spiritual advisor, that person may be escorted to [redacted] and remain with the condemned until the condemned is escorted to the execution chamber, at which time the spiritual advisor will then be escorted [redacted] while the condemned is prepared for the execution. Once the condemned is prepared, the spiritual advisor will be escorted to the execution chamber [redacted]

H. The Commissioner's telephone line to the Governor's and/or Attorney General's staff will be opened.

I. The condemned will be escorted to the execution chamber by the execution team and strapped to the gurney.

1. If lethal injection is the means of execution, the IV Team will be escorted into the execution chamber to start the IV. The heart monitor leads will be applied to the condemned. If the veins are such that intravenous access cannot be provided, [redacted] will perform a central line procedure to provide an intravenous access. (See Annex C)

2. When electrocution will be the method of execution, the inmate will be escorted to the execution chamber and placed in the chair at approximately [redacted] The offender will be strapped in with the electrode attached to the offender's left leg and head.

J. The witnesses will be escorted to the appropriate execution witness room. The following persons may be present at the execution and none other:

1. The Warden and such persons as may be necessary to assist him in conducting the execution

2. The Commissioner of Corrections and/or his/her representative(s)

3. Two (2) physicians

4. The condemned's spiritual advisor

5. The Chaplain of the W. C. Holman Correctional Facility

6. Such news media as may be admitted by the Warden, not to exceed five (5) in number

7. Any relatives or friends of the condemned offender that he/she may request, not to exceed six (6) in number (No inmate shall be permitted to witness the execution)

8. Witnesses for the victim will be limited to immediate family members over the age of 19, not to exceed eight (8) in number. "Immediate family member" is defined to include parent(s), sibling(s), and/or children of the victim.

If the condemned is being executed for a capital murder in which he/she killed two (2) or more people, each of the victims will be entitled to have no more than eight (8) immediate family members over the age of 19 witness the execution. If the total number of witnesses exceeds 12, however, the seats are to be apportioned equally among the victims.

If fewer than six (6) immediate family members of a victim wish to view the execution, AND the condemned has OTHER murder and/or manslaughter conviction(s) for which he was NOT sentenced to death, then the remaining witness slots can be made available to immediate family members of that other victim(s).

Because of restricted space, however, no more than a TOTAL of 12 immediate family members of the victim(s) will be allowed to actually view an execution.

K. The Warden will be informed when the condemned is prepared for execution.

If the execution is to be carried out by lethal injection, the IV Team will complete its task and [redacted] The Warden will report to the execution area at this time. The IV Team will brief the Warden as to [redacted] The curtains to the witness rooms will be opened.

L. The Warden will enter the execution chamber [redacted] The microphone will be turned on and the Warden will read the warrant to the condemned offender.

M. The condemned offender will be allowed to make any last remarks. Remarks should be kept to about two (2) minutes.

N. The Warden and [redacted] will depart the execution chamber to the [redacted] Two (2) members of the execution team will remain in the execution chamber until notified to leave by the Warden.

O. The Warden will check with the Commissioner or his/her designee to see if there has been a last minute stay. If there has been no last minute stay, the two (2) members from the execution team remaining in the execution chamber will receive the signal to depart.

1. These two (2) team members will make last minute checks of the IV lines in the case of lethal injection. One team member will exit the chamber and will [redacted] to the [redacted] signaling it is okay to proceed. The second officer, designated by the Warden, will remain in the chamber and will position himself/herself at the condemned inmate's left side.

2. In the case of electrocution, the two (2) officers will make last minute adjustments to the restraining straps. The officers will place the headgear on the offender and the covering over the face. When their tasks have been completed, [redacted] will [redacted] to the [redacted] signaling it is okay to proceed.

P. When the signal to proceed has been received, the following will occur:

1. In the case of lethal injection, the Warden will begin administering the lethal injection solution to the condemned offender. The lethal injection solution will consist of:

   a. 100 mL of midazolam hydrochloride – two (2) 50mL syringes
   b. 20 mL of saline
   c. 60 mL of rocuronium bromide
   d. 20 mL of saline
   e. 120 mL of potassium chloride – two (2) 60 mL syringes

2. In the case of lethal injection, after the Warden administers the 100 mL's of midazolam hydrochloride and 20 mL's of saline but before he/she administers the second and third chemicals, the one (1) team member who remained in the execution chamber will assess the consciousness of the condemned inmate by applying graded stimulation, as follows. The team member will begin by saying the condemned inmate's name. If there is no response, the team member will gently stroke the condemned inmate's eyelashes. If there is no response, the team member will then pinch the condemned inmate's arm.

   In the unlikely event that the condemned inmate is still conscious, the Warden will use the secondary IV line to administer the 100 mL's of midazolam hydrochloride in the back up set of syringes. After all 100 mL's of midazolam hydrochloride and 20 mL's of saline are administered, the team member in the execution chamber will repeat the graded stimulation process set out above. When the secondary IV line is used for midazolam hydrochloride it is also used to administer the remaining chemicals.

   After confirming that the condemned inmate is unconscious, such will be documented and the Warden will continue with administering the second and third chemicals.

3. When electrocution is the means of execution, the Warden will push the button which will begin the process of 2200 volts of electricity flowing through the offender's body for a period of 20 seconds. The amount of electricity will decrease to 220 volts for the next 100 seconds.

Q. When the execution has been carried out, [redacted] will be notified [redacted] In the case of lethal injection, members of the [redacted] will be [redacted]

1. [redacted] will enter the execution chamber and close the curtains.

2. The [redacted] will be escorted from the [redacted].

3. The [redacted] will be escorted from the [redacted] to the [redacted]

4. Witnesses of the execution will be escorted from the [redacted]

5. The Warden will escort the [redacted] into the [redacted] The [redacted] will do a thorough check and pronounce a time of death.

6. The [redacted] will be escorted from the [redacted]

R. [redacted] will enter the execution chamber.

1. In the case of lethal injection, the IV lines and straps will be detached. The body will be placed in a body bag and onto a stretcher to be taken by van to the Department of Forensic Science for a postmortem examination.

2. In the case of electrocution, the electrodes will be detached and the transformer will be disconnected and locked. The body will be placed in a body bag and onto a stretcher to be taken by van to the Department of Forensic Science for a postmortem examination

S. [redacted] will attach a tag to the body bag and have the representatives of the Department of Forensic Science sign for receipt of the body.

T. Members of the execution team will do a brief clean-up of the execution chamber and exit through the [redacted] The following day several members of the execution team will conduct a more thorough clean-up of the execution chamber.

X. Actions after the Execution

A. Press Conference - The Public Information Officer (PIO) for the Department of Corrections will advise the news media that the Order of the Court has been carried out.

1. The PIO will provide the time of death, any last words the condemned offender may have had, and if any unusual incidents occurred during the execution.

2. News media who were unable to witness the execution will have an opportunity to ask questions of the news media members that were witnesses.

3. Members of the condemned's family will have an opportunity to meet the press and make a statement. The victim's witnesses will also have an opportunity to appear before the news media. At no time will these two (2) groups be allowed to intermingle with each other.

B. Interment - The body may be released to the condemned's relatives at their expense or, if the body is not claimed by friends or relatives, it will be the Department of Corrections' responsibility to bury the remains.

C. Staff participants will be afforded the opportunity to meet with Critical Incident Debriefing Team members if they so desire.

D. Permanent logs will be typed by [redacted] and sent back for signatures. Once all signatures have been obtained, the log will be forward to the Warden for review and his signature. No copies of the log will be made without permission of the Commissioner.

Annex A

Procedures and Steps for Testing the Electric Chair and Equipment

The electrocution equipment should be tested twice (2) monthly, no sooner than the [redacted] of the month and no later than the [redacted] of the month, with at least [redacted] days between tests. Each test will be logged. If electrocution is to be the means of execution, the electrocution equipment will be tested [redacted] from the time the death warrant is received until [redacted] the equipment will be tested [redacted] until the day of the execution. [redacted] the equipment will be tested [redacted] prior to the time of the execution.

1. [redacted] will be present during any testing.

2. The Warden [redacted] will be present and will select [redacted] on the execution team to be present during any testing.

3. No other personnel should be present during testing without the permission of the Warden [redacted]

4. All testing equipment [redacted] will be checked to ensure they are all in operating order.

5. All power switches will be in the "off" position.

6. All jacks and connections will be checked for cleanliness and to ensure they are free of corrosion. All leads will be checked to ensure they are intact and have no visible signs or cracking or any signs of frail ends.

7. The leads will be connected to the load bank register.

8. The [redacted] will be connected with the [redacted] connected to the [redacted]

   a. [redacted]
   b.
   c.

9. Make sure everyone is ready to test the equipment.

10. [redacted] will turn the power on in the equipment room.

11. [redacted] will then enter the control room and turn on the [redacted]

12. [redacted] will turn on the power for the equipment.

13. After making sure that everyone is clear, the switch will be thrown and the meters will be read and recorded.

14. [redacted] will be located in the [redacted] They will read [redacted] and [redacted] from the [redacted]

15. [redacted] will be located in the execution chamber. They will read the voltage on the Simpson 360 voltage meter.

16. The process will be repeated again after a [redacted] wait on generator power.

17. After testing is completed, [redacted] will turn off all power switches and padlock all disconnect panels in the "off" position. [redacted] will check all padlocks to ensure they are locked.

Each time the chair is tested, all other equipment will undergo a check or test to ensure that all is in working order and could be used if needed. Sponges will be checked for durability to ensure they are not torn, shrunken, or weak in texture and that they are free from any salt from a prior execution. Electrodes will be checked to ensure they are clean and free from any deterioration of

the wires that connect to the power source. Also, all connections will be checked to insure they are tight. Security straps will also be checked to ensure they are free from cracking and that buckles are clean and in good working order.

Annex B

Procedures for Preparation and Maintenance of Sponges

1. Sponges will be soaked in a salt and water solution for a [redacted] prior to the time of execution. The sponges should be taken from the salt water solution approximately [redacted] prior to the execution.

2. Sponges will be temporarily tacked lightly to the electrodes for proper positioning. When positioned, remove the tacking stitches. When ready for use, soak the sponges in fresh water and squeeze dry. Sew sponges with black carpet thread to the screening, placing stitches not [redacted] apart and following around the outer edges, down the center, and around the binding posts. The object is to get a good firm contact. Do not pull the stitches too tight, thereby preventing the sponge from soaking up the solution.

3. The leg electrode will go on the left calf below the knee, placed so the binding post is on the outside making it more easily seen and reached for attaching the electrical wire. The shortened strap should be on this same side so the buckle can also be reached. When placing in position, pass the long strap around the leg and insert loosely through the buckle. Raise into position with the right hand and tighten the strap through the self-tightening buckle with the left hand. Draw the strap fairly tight but not so tight that when muscle contractions take place during electrocution there would be danger of breakage.

4. The headset will be made prior to use to approximately fit the condemned inmate's head. Adjustment will be done by means of sliding straps on each side. Place the head set on the head, being careful not to come down too far on the forehead if possible. Position the short strap with the buckle on it on the side that the operator will be working on. Pass the long strap under the chin and fasten snugly. Connect the wire to the binding post. Use number [redacted] insulation for both the head and leg wires. Solder the ends so they won't separate and so the barred ends will go into the hole in the posts. Use the sponges saturated in the salt solution. Squeeze enough solution out with the flat of the hand so excessive dripped will be avoided. In making electrical current contact, be careful not to burn the sponge and the outer skin of the condemned inmate.

5. After use, cut the black threads, remove the sponges, and rinse carefully in fresh water. Be very careful not to cut the tan thread that the pieces of sponge are sewn together with. Remove any black thread pieces and rinse the screws thoroughly to remove all traces of salt water or corrosion will ensue. Keep the straps soft with Neats Foot Oil.

6. Only saltwater sponges are to be used. Sponges should be stored in a clean dry place.

Annex C

IV Team – Detailed Instructions

The Warden or designee will have two (2) intravenous infusion devices placed in veins of the condemned and a saline solution available for an infusion medium. Those persons engaged in this activity will be referred to as the IV Team. For these purposes, [redacted] (if necessary), [redacted] and other [redacted] - as are necessary - will make up this team. [redacted] will normally be [redacted]

a. An IV administration set shall be inserted into the outlet of the bag of normal saline solution. Two (2) IV bags will be set up in this manner.

b. The IV tubing shall be cleared of air and made ready for use.

c. The standard procedure for inserting IV access will be used. If the veins are such that intravenous access cannot be provided, [redacted] will perform a central line procedure to provide an intravenous access.

d. The IV tubing for both set-ups will be connected to the receiving port of the IV access - one (1) for the primary vein and the other for the secondary vein.

e. At this point, the administration sets shall be running at a slow rate of flow (KVO), and ready for the insertion of syringes containing the lethal agents. The Warden, or his designee, shall maintain observation of both set-ups to ensure that the rate of flow is uninterrupted. NO FURTHER ACTION shall be taken until the Warden has consulted with the Commissioner regarding any last minute stay by the Governor or the courts.

Annex D

Syringe Preparation

The following is the syringe sequence:

Syringe 1	midazolam hydrochloride	50 mL – 250 mg
Syringe 1A	midazolam hydrochloride	50 mL – 250 mg
Syringe 2	saline (sodium chloride)	20mL
Syringe 3	rocuronium bromide	60 mL – 600 mg
Syringe 4	saline (sodium chloride)	20 mL
Syringe 5	potassium chloride	60 mL – 120 mEq
Syringe 5A	potassium chloride	60 mL – 120 mEq

Any team member participating in the syringe preparation process shall wear medically approved gloves to ensure the safety of each team member and the preparation process.

I. Syringes 1 and 1A, midazolam hydrochloride procedure:

1. Remove piercing pin from pouch
2. Remove cover from piercing pin
3. Remove flip top from vial of midazolam hydrochloride
4. Insert piercing pin into the stopper with a downward twisting motion
5. Insert sixty cubic centimeter (60cc) syringe into piercing pin and twist until secure
6. Pull back on the syringe to transfer the midazolam hydrochloride into the syringe
7. For each syringe (1 and 1A), conduct items 1 through 6 five (5) times. Each vial of midazolam hydrochloride contains 50 mg of the drug in 10mL.

II. Syringe 2, sodium chloride (saline) procedure:

1. Remove piercing pin from pouch
2. Remove cover from piercing pin
3. Remove flip top from sodium chloride vial or any protective packaging from sodium chloride bag
4. Insert piercing pin into the stopper with a downward twisting motion
5. Insert syringe into piercing pin and twist until secure
6. Pull back on the syringe to transfer the sodium chloride into the syringe until 20 mL are drawn into the syringe

III. Syringe 3, rocuronium bromide procedure:

1. Remove piercing pin from pouch
2. Remove cover from piercing pin
3. Remove flip top from vial of rocuronium bromide
4. Insert piercing pin into the stopper with a downward twisting motion
5. Insert sixty cubic centimeter (60cc) syringe into piercing pin and twist until secure
6. Pull back on the syringe to transfer the rocuronium bromide into the syringe
7. Conduct items 1 through 6 twelve (12) times. Each vial of rocuronium bromide contains 50 mg of the drug in 5 mL.

IV. Syringe 4, sodium chloride (saline) procedure:

Repeat procedures for syringe 2.

V. Syringe 5 and 5A, potassium chloride procedure:

1. Remove piercing pin from pouch
2. Remove cover from piercing pin
3. Remove flip top from vial of potassium chloride vial
4. Insert piercing pin into the stopper with a downward twisting motion.
5. Insert sixty cubic centimeter (60cc) syringe into piercing pin and twist until secure
6. Pull back on the syringe to transfer the potassium chloride into the syringe
7. For each syringe (5 and 5A), conduct items 1 through 6 three (3) times. Each vial of potassium chloride contains 40 mEq of the drug in 20 mL.

Repeat the above procedures for a backup tray of syringes.

Amended Complaint: Exhibit B

IN THE UNITED STATES DISTRICT COURT
FOR THE MIDDLE DISTRICT OF ALABAMA

KENNETH EUGENE SMITH Plaintiff, v. JOHN Q. HAMM, Commissioner, Alabama Department of Corrections, Defendant.	)	Case No. 2:22-cv-00497-RAH CAPITAL CASE **EXECUTION SCHEDULED FOR NOVEMBER 17, 2022**

DECLARATION OF DAVID C. PIGOTT, MD

I, David C. Pigott, hereby state under penalty of perjury as follows:

1. I am a professor and Vice Chair for Faculty Development in the Department of Emergency Medicine at the University of Alabama School of Medicine in Birmingham, Alabama. I am also the Co-Director of the Office of Emergency Ultrasound and serve as a core faculty member for the Emergency Ultrasound Fellowship and a faculty member for the emergency medicine residency program. I hold certifications from the American Board of Emergency Medicine and the American Registry for Diagnostic Medical Sonography. My current CV is attached as Exhibit A.

2. I have practiced emergency medicine for more than 20 years and hold an active medical license from the state of Alabama. I received my medical degree from Columbia University College of Physicians/Surgeons, completed my internship at the Medical College of Pennsylvania, and completed my residency at St. Luke's-Roosevelt Hospital Center in New York. As an emergency medicine physician, I am familiar with the methods used to gain intravenous access in medical settings.

3. I was provided with photographs, copies of which are attached as Exhibit B, which counsel has represented to me are photographs from an autopsy performed on Joe Nathan James, who was executed by the state of Alabama on July 28, 2022. Based on my review of those photographs and my experience and training as an emergency medicine physician, I was asked to offer an opinion regarding the procedures that could have been performed on Mr. James to obtain intravenous access during his execution.

4. My opinion, to a reasonable degree of medical certainty, is that the photographs provided to me show multiple attempts to establish intravenous (IV) access using a needle, as well as an attempted cut-down procedure.[1] An autopsy photo showing the incision is below:

5. The deeper laceration in the antecubital fossae (pit of the elbow), depicted in the photograph above, is indicative of an attempted cut-down procedure. The laceration does not

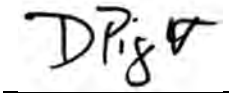
[1] A cut-down is a procedure in which an incision is made with a scalpel directly into the skin in an area where a vein would be found.

appear to have been made with a needle, but rather with some type of knife or scalpel. The laceration is located in an area where a vein would be likely be found, and there appears to be a needle stick just below the laceration. The photograph shows what appear to be tissue response and blood in and around the laceration, suggesting that the laceration was made while the individual was still alive, as post-mortem wounds typically do not bleed. Both the laceration in the pit of the elbow and the more shallow laceration above it appear to have what physicians refer to as "hesitation marks" on the edges, which suggests that the individual making the cuts was not experienced in doing so, although inadvertent movement of the arm during the procedure may have a similar appearance.

6. The bruising depicted in the photograph above, as well as the other photographs, is also indicative of multiple attempts to establish IV access using a needle.

I declare under penalty of perjury that the foregoing is true and correct.

Executed on October 12, 2022



David C. Pigott, MD, RDMS, FACEP

Pigott Declaration: Exhibit A

Curriculum Vitae
David C. Pigott, M.D., RDMS, FACEP

Personal Information

Name:	**David C. Pigott, M.D.**
Citizenship:	United States
Social Security No.:	[redacted]
Home Address:	[redacted]
Cell Phone:	[redacted]
Date of Birth:	[redacted]
Gender:	Male
Rank:	Professor
Rank Begin Date:	10/01/2013
School:	School of Medicine
Institution:	The University of Alabama at Birmingham
Business Address:	619 South 19th Street; OHB 251 Birmingham Alabama 35249-7013
Business Phone:	(205) 975-2444

Education

- Yale University, New Haven, CT, B.A., May 1990, *cum laude*
- Columbia University College of Physicians and Surgeons, New York, NY, M.D., May 1995

Licensures

- Alabama, #22680, May 1999 to present

Board Certification

- American Board of Emergency Medicine (ABEM), #2, June 2001, recert. 2011, 2021

Additional Certifications

- American Registry for Diagnostic Medical Sonography (ARDMS), #150288, August 2011

Postdoctoral Training

- July 1996 - June 1999, Emergency Medicine Residency, St. Luke's/Roosevelt Hospital Center, New York, NY
- July 1995 - June 1996, Preliminary Year - Internal Medicine, Medical College of Pennsylvania, Philadelphia, PA

Awards and Honors

- 2015 – ACEP Spokesperson of the Year Award, awarded by ACEP Board of Directors, ACEP Leadership and Advocacy Conference, Washington, DC.
- 2014 – Trending Topics Lecture Award (most popular lecture), “Inside the Hot Zone: Highly Infectious Pathogens in the ED,” ACEP Scientific Assembly, Chicago, IL
- 2014 – Best Lecturer Award, UAB Emergency Medicine Residency Program

- 2013 – Blazer MD Award (Physician of the Year), UAB Emergency Medicine Residency Program
- 2013 – Best Lecturer Award, UAB Emergency Medicine Residency Program
- 2009 – Best Clinical Instructor, UAB Emergency Medicine Residency Program
- 2006 – Best Lecturer Award, UAB Emergency Medicine Residency Program
- 2005 – Best Lecturer Award, UAB Emergency Medicine Residency Program
- 2004 – Best Clinical Instructor, UAB Emergency Medicine Residency Program
- 2003 – Best Clinical Instructor, UAB Emergency Medicine Residency Program

Invited Lectures and Courses

- 2022 – Invited Faculty, "New Sepsis Guidelines: Latest But Not Greatest," "Sexually Transmitted Infections," "Staying Cool with Pediatric Fever," ACEP Scientific Assembly, San Francisco, CA, October 1-4, 2022
- 2018 – Invited Faculty, "Infections From Abroad: Unwanted Souvenirs," "Z Is for Zoonosis: How Animal Pathogens Are Causing Human Disease," ACEP Scientific Assembly, San Diego, CA, October 1-4, 2018
- 2018 – Invited Expert, ACEP Frontline Podcast, "Flu Season," Jan 10, 2018.
- 2017 – Invited Faculty, "DOA PDQ: Rapidly Fatal Infections," "Pelvic Ultrasound for Pelvic Pain: Make the Diagnosis!" "FAST FACTS: High Yield Infectious Disease," ACEP Scientific Assembly, Washington, DC, October 29-Nov 1, 2017
- 2016 – Invited Faculty, "ID Reloaded: How Old Diseases Are Staging New Comebacks," "DOA PDQ: Rapidly Fatal Infections," "Pelvic Ultrasound for Pelvic Pain: Make the Diagnosis!" "Food Borne Pathogens: Lessons From the Buffet," ACEP Scientific Assembly, Las Vegas, NV, October 16-19, 2016
- 2016 – Invited Faculty, "Emergent management of respiratory infections" – International Conference on Emergency Medicine (ICEM 2016), Cape Town, South Africa, April 21-24, 2016
- 2015 – Invited Faculty, "Guess Who's Coming to Dinner? Foodborne Illness – 2015 Update," "Go With the Flow! Adding Doppler to Your Ultrasound Skill Set," "Inside the Hot Zone: Highly Infectious Pathogens in the ED," and "Pelvic Ultrasound for Pelvic Pain: Make the Diagnosis!" ACEP Scientific Assembly, Boston, MA, October 26-29, 2015
- 2014 – Invited Faculty, "Ebola: Hemorrhagic Fever and the US Experience," and "Inside the Hot Zone: Highly Infectious Pathogens in the ED," ACEP Scientific Assembly, Chicago, IL
- 2014 – Invited Lecturer, Ultrasound for Emergency Medicine Course, Las Vegas, NV.
- 2013 – Course Co-Director, UAB Emergency and Critical Care Ultrasound Course, Hoover, AL, September 7-8, 2013.
- 2013 – Course Director, FAST Exam Ultrasound Course for Trauma faculty and residents, Birmingham, AL
- 2012 – Co-Director, Military Emergency Ultrasound Course, Special Operations Surgical Team-Air Force Special Operations Command, Birmingham, AL, March 12, 2012
- 2011 – Course Director, Emergency Ultrasound Course, Southeastern Chapters (SEC) ACEP Educational Conference, Destin, FL
- 2010 – Chair, Southeastern Regional Society for Academic Emergency Medicine (SAEM) Conference – Birmingham, AL, April 9-10, 2010
- 2009 – UAB Emergency Medicine Residency Program – Best Clinical Instructor
- 2008 – Invited Lecturer and Instructor, Emergency Ultrasound Course, Florida College of Emergency Physicians (FCEP), Tampa, FL
- 2007 – Invited Lecturer and Instructor, Emergency Ultrasound, Alabama ACEP Conference, Destin, FL
- 2007 – Invited Faculty, "Foodborne illness," and "Travel-related Infectious Diseases," ACEP Scientific Assembly, Seattle, WA

- 2006 – Invited Faculty, “Selected Cases in Oncologic Emergencies,” ACEP Scientific Assembly, New Orleans, LA
- 2005 – Invited Lecturer, “Foodborne illness,” New Speakers Forum, ACEP Scientific Assembly, Washington, DC
- 2003 – Invited course developer/instructor for the National Health Professions Preparedness Consortium bioterrorism training course

Academic Appointments
(In Reverse Chronological Order)

- October 1, 2013 – present, Professor of Emergency Medicine, Department of Emergency Medicine, University of Alabama School of Medicine
- July 1, 2007 – present, Vice Chair for Academic Development, Department of Emergency Medicine, University of Alabama at Birmingham
- May 1, 2006 – June 30, 2007 Program Director, Emergency Medicine Residency, Department of Emergency Medicine, University of Alabama at Birmingham
- May 1, 2006 – June 30, 2007, Vice Chair for Educational Services, Department of Emergency Medicine, University of Alabama at Birmingham
- October 1, 2004 – September 30, 2013, Associate Professor of Emergency Medicine, Department of Emergency Medicine, University of Alabama School of Medicine
- January 2004 – May 2006, Associate Director, Emergency Medicine Residency Program, Department of Emergency Medicine, University of Alabama at Birmingham
- 2002 - 2004, Assistant Director, Emergency Medicine Residency Program, Department of Emergency Medicine, University of Alabama at Birmingham
- August 1, 1999 – September 30, 2004, Assistant Professor of Emergency Medicine, Department of Emergency Medicine, University of Alabama School of Medicine
- August 1999 - July 2003, Director, Medical Student Rotation, Department of Emergency Medicine, University of Alabama at Birmingham

Other (Non-academic) Appointments

- 2015 – present, Member, ACEP Spokesperson Network
- 2014 – present, Member, ACEP Epidemic Expert Panel (appointed by ACEP President, Dr. Alexander M. Rosenau), formerly known as ACEP Ebola Expert Panel
- 2012 – present, Core Faculty, Emergency Ultrasound Fellowship Program, Department of Emergency Medicine, University of Alabama at Birmingham
- 2011-present, Co-Director, Division of Emergency Ultrasound, Department of Emergency Medicine, University of Alabama at Birmingham
- 1999 - 2011, Director, Division of Emergency Ultrasound, Department of Emergency Medicine, University of Alabama at Birmingham
- 2005 – present, Consultant, Regional Poison Control Center – Children’s Hospital of Alabama
- 2001 – 2014, Website creator and manager, Emergency Medicine Residency Program, University of Alabama at Birmingham. Designed, created and implemented Emergency Medicine Residency Program website. <www.uab.edu/emresidency>
- 2001 – 2011, Associate Scientist, UAB Center for Emerging Infections and Emergency Preparedness (CEIEP)

Scientific and Professional Societies

- 2012 – Present, ACEP Ultrasound Section Subcommittee on Resident Education (Co-Chair, 2016 – 2018)
- 2011 – Present, Member, American Institute of Ultrasound in Medicine
- 2004 – Present, Member, ACEP Ultrasound Section

- 1994 – 1999, EMRA (Emergency Medicine Residents Association
- 1994 – Present, Member, American College of Emergency Physicians, Fellow, 2002 – Present.
- 1994 – Present, Member, The Society for Academic Emergency Medicine

Memberships

- 1999–2008, Faculty Advisor, Emergency Medicine Interest Group, University of Alabama School of Medicine

Councils and Committees

- 2011 – 2013, Information Technology Advisory Group, University of Alabama Hospital
- 2008 – 2010, Pharmacy and Therapeutics Committee, University of Alabama Hospital
- 2005 – present, Appointments, Promotions and Tenure Committee, Department of Emergency Medicine, University of Alabama Hospital, Chair (2015–)
- 2004 – present, Quality Improvement Committee, Department of Emergency Medicine, University of Alabama Hospital, Committee Chair, 2005-2007
- 2003 – 2016, Leadership Committee, Department of Emergency Medicine, University of Alabama Hospital
- 1999 – present, Medical Education Committee, Department of Emergency Medicine, University of Alabama Hospital
- 1999 – 2007, Health Information Management Committee, University of Alabama Hospital
- 1999 – 2007, Resuscitation Subcommittee of the Critical Care Committee, University of Alabama Hospital
- 1991 – 1992, Dean's Advisory Committee, Columbia College of Physicians and Surgeons

Professional Expertise and Interests

- 2015 – present, Member, ACEP Spokespersons' Network
- 2014 – present, Member, ACEP Epidemic Expert Panel (appointed by ACEP President, Dr. Alexander M. Rosenau), formerly ACEP Ebola Expert Panel
- 2015 – Team Physician, UAB Men's Basketball (2015 Conference-USA Tournament, Birmingham, Alabama)
- 2004 – Medical Director, Main Medical Treatment Area, Mercedes Marathon and Half-marathon, Birmingham, Alabama (approx. 3500 participants).
- 2004 – Medical Director, Main Medical Treatment Area, U.S. Men's Olympic Trials Marathon, Birmingham, Alabama.
- Emergency ultrasound, toxicology, emerging infections including Ebola virus and Zika virus, foodborne illness, trauma, emergency medicine procedure training, emergency medicine education.

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- Co-author, ACEP Epidemic Expert Panel. Influenza Emergency Department Best Practices, April 2019.

- Co-author, ACEP Epidemic Expert Panel. ACEP Fact Sheet: Zika Virus, August 2016.

- Co-author, ACEP Epidemic Expert Panel. ACEP Fact Sheet: MERS (Middle Eastern Respiratory Syndrome), June 2015.

- Co-author, ACEP Epidemic Expert Panel. ACEP Fact Sheet: Measles, January 2015.

- Co-author, CDC/ACEP Ebola Expert Panel/ENA, “Identify, Isolate, Inform: Emergency Department Evaluation and Management for Patients Under Investigation (PUIs) for Ebola Virus Disease (EVD),” 2014-2015. http://www.cdc.gov/vhf/ebola/healthcare-us/emergency-services/emergency-departments.html

- Co-author, ACEP Ebola Expert Panel Consensus Statement on Restrictive Movement including Quarantine of Health Care Workers, November 13, 2014. http://www.acep.org/ebola/

- Co-author, ACEP Ebola Expert Panel Talking Points for White House meeting (Dr. Michael Gerardi, ACEP President, Ronald Klain, Ebola Response Coordinator, Dr. Nicole Lurie, Assistant Secretary for Preparedness and Response, HHS), November 12, 2014.

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- Thompson MA, Gibson CB, Gullett JP, Pigott DC. Acute ST segment elevation myocardial infarction and massive pericardial effusion due to infectious endocarditis: a case report. ACEP Southeast Chapters Educational Conference, Destin, FL, June 6-9, 2016, also presented at the International Conference on Emergency Medicine (ICEM 2016), Cape Town, South Africa, April 21-24, 2016

- McIntosh C, Beason HH, Gullett JP, Pigott DC: Ultrasound-guided hematoma block and reduction of a displaced metacarpal fracture. ACEP Southeast Chapters Educational Conference, Destin, FL, June 3-6, 2013.

- Restrepo CG, Baker MD, Gullett JP, Pigott DC: Ability of pediatric emergency medicine physicians to identify anatomic landmarks with the assistance of ultrasound prior to lumbar puncture in a simulated obese model, Southern Society for Pediatric Research, New Orleans, LA, Feb 2013.

- Thomas JJ, Pigott D, Douglas P: Retinal Detachment Diagnosed by ED Bedside Ultrasound. ACEP Southeast Chapters Educational Conference, Destin, FL, June 14-17, 2010.

- Pigott DC, Bachmann LH, Peters HL, Lumpkins JM, Hook EW III: Does the presence of pregnancy or vaginal bleeding influence Gonorrhea and Chlamydia testing patterns. Ann

Emerg Med 46(3):S47, September 2005.

- Pigott DC, Buckingham RB: A comparison of digital video and still imaging for ultrasonography: an evaluation of diagnostic accuracy, user confidence and image quality. Ann Emerg Med 46(3):S52, September 2005.

- Bachmann LH, Peters H, Lumpkins J, Pigott D, Denninghoff K, Jones M, Terndrup T, Hook III EW: “STD prevalence in females presenting to a university emergency department with abdominal, genitourinary or pregnancy-related complaints." 2000 National STD Prevention Conference, Dec 4-7, 2000, Milwaukee, Wisconsin P#132, pages A133-134, December 4, 2000.

- Bachmann LH, Lumpkins J, Peters H, Pigott D, Jones M, Denninghoff K, Terndrup T, Hook III EW. Sexually Transmitted Disease Prevalence (STD) in Males Presenting to a University Emergency Department (ED) with High-Risk Complaints. International Journal of STD & AIDS 2001; 12 (suppl2):87-93.

Scientific Papers Presented at Regional, National and International Meetings

- McIntosh C, Beason HH, Gullett JP, Pigott DC: Ultrasound-guided hematoma block and reduction of a displaced metacarpal fracture. ACEP Southeast Chapters Educational Conference, Destin, FL, June 3-6, 2013.

- Restrepo CG, Baker MD, Gullett JP, Pigott DC: Ability of pediatric emergency medicine physicians to identify anatomic landmarks with the assistance of ultrasound prior to lumbar puncture in a simulated obese model, Southern Society for Pediatric Research, New Orleans, LA, Feb 2013.

- Thomas JJ, Pigott D, Douglas P: Retinal Detachment Diagnosed by ED Bedside Ultrasound. ACEP Southeast Chapters Educational Conference, Destin, FL, June 14-17, 2010.

- Pigott DC, Buckingham RB: A comparison of digital video and still imaging for ultrasonography: an evaluation of diagnostic accuracy, user confidence and image quality. Scientific Assembly, Research Forum, American College of Emergency Physicians, Washington, DC, October, 2005.

- Pigott DC, Bachmann LH, Peters HL, Lumpkins JM, Hook EW III: Does the presence of pregnancy or vaginal bleeding influence Gonorrhea and Chlamydia testing patterns. Scientific Assembly, Research Forum, American College of Emergency Physicians, Washington, DC, October, 2005.

- Bachmann LH, Peters H, Lumpkins J, Pigott D, Denninghoff K, Jones M, Terndrup T, Hook III EW: “STD prevalence in females presenting to a university emergency department with abdominal, genitourinary or pregnancy-related complaints." 2000 National STD Prevention Conference, Dec 4-7, 2000, Milwaukee, Wisconsin P#132, pages A133-134, December 4, 2000.

- Bachmann LH, Lumpkins J, Peters H, Pigott D, Jones M, Denninghoff K, Terndrup T, Hook III EW. Sexually Transmitted Disease Prevalence (STD) in Males Presenting to a University Emergency Department (ED) with High-Risk Complaints. International Congress of Sexually Transmitted Infections, ISSTDR/IUSTI, Berlin, Germany, June 24-27, 2001.

Miscellaneous

- Greene CJ, Pigott DC. COVID-19 for the Emergency Provider: What You Need to Know. ACEP Now, March 2020. https://www.acepnow.com/article/covid-19-for-the-emergency-provider-what-you-need-to-know/ (recognized by ACEP Now as one of the Top 10 Articles of 2020)
- Member, Radiologic Disasters Working Group, sponsored by Department of Homeland Security, 2012 (Director, Steven M. Becker, PhD)
- Assisted with UAB development of web-based content for CME Module on Bioterrorism and Emergency Infections Education, 2001-2005.
- Faculty Mentor – UAB School of Medicine, 2000-2010

Editorial Review Services

- *Annals of Emergency Medicine*
- *Academic Emergency Medicine*
- *Academic Emergency Medicine Education and Training*
- *The Lancet*
- *Disaster Medicine and Public Health Preparedness*
- *Foodborne Pathogens and Disease*
- *JACEP Open*
- *Oxford Medical Case Reports*
- *Journal of Infection*
- *Emergency Medicine Practice*
- *US Army Research Office*
- *Academic Life in EM (ALiEM) <aliem.com>*

Pigott Declaration: Exhibit B

Amended Complaint: Exhibit C

IN THE UNITED STATES DISTRICT COURT
FOR THE MIDDLE DISTRICT OF ALABAMA

KENNETH EUGENE SMITH Plaintiff, v. JOHN Q. HAMM, Commissioner, Alabama Department of Corrections, *et al.* Defendants.	)	Case No. 2:22-cv-00497-RAH CAPITAL CASE **EXECUTION SCHEDULED FOR NOVEMBER 17, 2022**

DECLARATION OF ROBERT JASON YONG, M.D.

I, Robert Jason Yong, declare under penalty of perjury as follows:

I have been asked by Arnold & Porter to provide an expert review on intravenous access. Specifically, in preparing this report, I have referenced textbooks, journal articles, and guidelines. I also rely on my medical training and clinical experience as an anesthesiologist. My expert opinions on the subject are set forth below. All the opinions stated in this medical report are stated to a reasonable degree of medical certainty.

I. Qualifications

I am the Chief of Pain Medicine and serve as the Medical Director of the Pain Management Center at Brigham and Women's Hospital in Boston, Massachusetts, which is affiliated with Harvard Medical School. I am on the faculty of Harvard Medical School, where I am an Assistant Professor in Anesthesia. In 2014, 2015, 2016, 2018, 2020, and 2021, I was awarded the Pain Attending of the Year Award for the Department of Anesthesiology at Brigham and Women's Hospital. Prior to this, I was an Assistant Professor at Johns Hopkins Hospital in Baltimore, Maryland, where I was awarded Outstanding Teacher of the Year, Department of Anesthesiology in 2013.

I obtained my Medical Degree from Baylor College of Medicine. I completed my residency in anesthesiology, perioperative medicine, and pain medicine at Brigham and Women's Hospital, Harvard Medical School. As a resident at Brigham and Women's Hospital, I received recognition as the Distinguished Resident of the Year and was selected as a Foundation for Anesthesia Education and Research (FAER) Practice Management Scholar. During my last year of residency, I was elected as a Chief Resident of the Anesthesiology Department. Following residency, I completed a fellowship in Pain Medicine at Brigham and Women's Hospital, Harvard Medical School. I am licensed to practice medicine in Massachusetts and double-board certified in Anesthesiology and Pain Management.

I have deep experience with the subject matter of this case. I have substantial knowledge, training, and experience in the insertion and management of intravenous catheters and medication administration. I have over 10 years of experience inserting peripheral intravenous catheters and administering medication. I have a deep understanding of physiology and pharmacology with board certification in Anesthesiology.

Attached as Exhibit A is a list of references considered in preparing my report. My CV is attached hereto as Exhibit B.

I reserve the right to supplement or amend my opinions based upon any new information or medical literature that subsequently becomes available to me. I further reserve the right to comment on any opinions offered by defendants' experts at deposition or trial. In addition, I reserve the right to discuss general concepts within the field of Anesthesiology to provide context for any of the opinions discussed in this report. Finally, I reserve the right to use graphics or demonstratives at trial to illustrate the concepts discussed in my report.

II. Background

A. Anatomy and Physiology

The human circulatory system or cardiovascular system allows the flow of blood throughout the body. The blood transports nutrients and oxygen to the tissues and carries carbon dioxide and waste products away to be metabolized or excreted. The heart serves as the main pump moving blood to the vital organs, including the heart, lungs, kidneys, liver, and brain[1].

Veins are blood vessels that carry blood to the heart while arteries are blood vessels that carry blood away from the heart. The main artery carrying blood away from the heart is the aorta which then branches into other arteries which branch into smaller arterioles and eventually into capillaries. Capillaries then flow to venules which then combine into small veins and eventually into one of two main veins, superior vena cava or inferior vena cava. The superior and inferior vena cava brings blood back to the heart. Peripheral veins are the smaller veins and can often be visualized through the skin. Central veins are the larger veins, including the internal and external jugular vein which connect to either the superior or inferior vena cava.

There are two main circuits in the cardiovascular system, the pulmonary circulation and the systemic circulation. The pulmonary circulation has the heart pump blood to the lungs which then returns back to the heart. The systemic circulation uses the heart to pump blood to the rest of the body including the heart itself, the brain, kidneys, and the peripheral tissue.

The systemic circulatory system is responsible for oxygen and nutrients to the distal parts of the human body. Medication administered to the body uses the same systemic circulatory system to spread to the target tissue where the effect of the medication may take place. Medication

[1] InformedHealth.org [Internet]. Cologne, Germany: Institute for Quality and Efficiency in Health Care (IQWiG); 2006-. How does the blood circulatory system work? 2010 Mar 12 [Updated 2019 Jan 31]. Available from: https://www.ncbi.nlm.nih.gov/books/NBK279250/

taken orally must be absorbed and sometimes metabolized before entering the circulatory system. Medication administered intravenously can be introduced directly into the circulatory system.

B. Intravenous catheters

Intravenous catheters are conduits allowing liquid medication to be introduced directly into a vein[2]. Catheters can be placed peripherally into smaller veins or centrally into larger veins. The conduits allow medication, fluids, blood, and nutrients to be administered directly into the circulatory system.

Peripheral intravenous catheters are the most frequently used devices in hospitals with up to 70% of patients requiring insertion during hospitalization.[3] First, a tourniquet is applied more proximal to the target vein to engorge the distal veins and allowing for higher success. Typically, the skin over a vein in the upper extremity is prepared using a cleaning agent such as alcohol. A hollow metal needle surrounded by the plastic cannula or catheter is then inserted through the skin and through the wall of the vein and into the lumen of the vein. The plastic catheter is then threaded off the metal needle to advance further into the lumen of the vein. The catheter is advanced until the large plastic hub reaches the skin. The hub allows the connection of the tubing and prevents the plastic cannula from going too far into the vein. The metal needle is then removed leaving behind the plastic catheter and hub which is then connected to IV (intravenous) tubing. The catheter is then secured to the skin using tape or other adhesive coverings.

Central venous catheters are larger and longer catheters that insert through the skin and into deeper and larger veins. Central venous catheters were first reported in 1929 and now an

[2] Beecham GB, Tackling G. Peripheral Line Placement. [Updated 2021 Aug 15]. In: StatPearls [Internet]. Treasure Island (FL): StatPearls Publishing; 2022 Jan-. Available from: https://www ncbi nlm nih.gov/books/NBK539795/
[3] Zingg W, Pittet D. Peripheral venous catheters: an under-evaluated problem. Int J Antimicrob Agents. 2009;34 Suppl 4:S38-42. doi: 10.1016/S0924-8579(09)70565-5. PMID: 19931816.

estimated 8 percent of hospitalized patients require central venous access.[4] Central line placement is more involved requiring more equipment, time, and expertise. The three most common sites for central venous access are the jugular vein in the neck, the subclavian vein under the collarbone, and the femoral vein in the groin. The skin over the area is cleaned with antiseptic solution and either using anatomic landmarks or ultrasound guidance, a syringe on a large needle is inserted into the lumen of the larger vein. The syringe is used to provide negative pressure by pulling back on the plunger of the syringe. The negative pressure created is released when the needle is in the vein with venous blood filling the syringe. The syringe is then removed and a solid metal guidewire is inserted through the needle into the lumen of the central vein. If ultrasound guidance is used, ultrasound confirmation of the guidewire coursing the path of the vein is an important step before proceeding with the rest of the procedure. The needle is then removed, leaving behind the guidewire which is in the lumen of the vein and coming out of the skin. A scalpel is then used to incise the skin at the insertion point of the guidewire. This allows the larger dilator to pass through the skin. The dilator is then passed over the guidewire and is advanced until the hole in the vein created by the guidewire is widened. The dilator is then removed leaving the guidewire in place. Next, the central venous catheter is then advanced over the guidewire and into the lumen of the vein until the hub of the catheter reaches the skin. The guidewire is then removed entirely and finally the catheter is secured with sutures and dressed with adhesive coverings. Prior to usage in nonemergency situations, the catheter tip is confirmed with imaging – usually portable chest x-rays.

[4] Ruesch S, Walder B, Tramèr MR. Complications of central venous catheters: internal jugular versus subclavian access--a systematic review. Crit Care Med. 2002 Feb;30(2):454-60. doi: 10.1097/00003246-200202000-00031. PMID: 11889329.

C. Challenges with intravenous access

Failure rates for peripheral intravenous catheters range from 35-50% with failures including phlebitis, infiltration, dislodgement, infection, and occlusion.[5] Phlebitis is defined as inflammation of a vein and is usually associated with a blood clot inside a damaged vein. Infiltration occurs when the medication or fluid administered through the catheter seeps outside the vein and into the local tissue. This results in the medication not reaching the targeted systemic circulatory system. This can occur if the catheter is not correctly inserted into the lumen of the vein. Infiltration can also occur if the catheter is inserted correctly into the vein. If the wall of the vein is fragile, it can burst. Furthermore, if previous attempts at insertion of the peripheral intravenous catheter resulted in more proximal holes, medication can infiltrate into the local tissue surrounding the hole or holes. Given the high incidence of failures with peripheral intravenous catheters, protocols have been developed, including the Vessel Health and Preservation protocol which helps standardize practice and maintenance.[6]

Certain patient characteristics may also affect success at finding and accessing peripheral veins. For example, dark skin, pregnancy, obesity, and anxiety have been associated with increased difficulty.[7] Anxiety creates an imbalance in our sympathetic and parasympathetic nervous systems. Increased sympathetic tone is known as the fight or flight reaction and is an involuntary reaction by human physiology. Increased parasympathetic tone is known as the rest and relaxation response by the human body. Anxiety increases sympathetic tone which results in blood flowing away from our skin and digestive system and into our muscles. The flow away

[5] R. E. Helm, J. D. Klausner, J. D. Klemperer, L. M. Flint, and E. Huang, "Accepted but unacceptable," *Journal of Infusion Nursing*, vol. 38, no. 3, pp. 189–203, 2015.
[6] Jackson T, Hallam C, Corner T, Hill S. Right line, right patient, right time: every choice matters. Br J Nurs. 2013 Apr 25-May 8;22(8):S24, S26-8. doi: 10.12968/bjon.2013.22.Sup5.S24. PMID: 23752501.
[7] Lamperti M, Pittiruti M. II. Difficult peripheral veins: turn on the lights. Br J Anaesth. 2013 Jun;110(6):888-91.

from the skin results in increased difficulty achieving peripheral intravenous access. Furthermore, patients in shock or with veins damaged by previous chemotherapy or intravenous drug abuse can present difficulty. Vasospasm occurs when the wall of the blood vessel tightens making the lumen of the vessel much smaller to the point that it can restrict blood flow. Vasospasm can occur when trying to access a blood vessel and has also been linked to anxiety.[8]

During the insertion of a peripheral intravenous catheter, patients can develop a vasovagal reaction in up to 13% of patients.[9] A vasovagal reaction occurs when the heart rate and blood pressure drop suddenly at the sight of blood or extreme emotional distress. Patients developing vasovagal reactions involuntarily develop cold, clammy skin, feel lightheaded, sweat, and can lose consciousness. In patients developing a vasovagal reaction, placing a peripheral or central venous line can be extremely difficult. Extreme emotional distress can include anxiety or nervousness over a procedure or process. In my experience as a pain physician, we have patients who undergo vasovagal reactions during the time around the procedures we perform. There are no reliable predictive factors for who will have a vasovagal reaction but extreme anxiety over a situation can precipitate the reaction.

D. Troubleshooting difficult intravenous access

In the controlled setting of optimized patients, with adequate resources and personnel, I have witnessed failed intravenous catheters with infiltration. In those cases, we have the ability to troubleshoot and replace the IV if needed. In settings where the patient is not optimized, such as

[8] Ercan S, Unal A, Altunbas G, Kaya H, Davutoglu V, Yuce M, Ozer O. Anxiety score as a risk factor for radial artery vasospasm during radial interventions: a pilot study. Angiology. 2014 Jan;65(1):67-70. doi: 10.1177/0003319713488931. Epub 2013 May 8. PMID: 23657175.

[9] Rapp SE, Pavlin DJ, Nessly ML, Keyes H. Effect of Patient Position on the Incidence of Vasovagal Response to Venous Cannulation. *Arch Intern Med.* 1993;153(14):1698–1704. doi:10.1001/archinte.1993.00410140084010

extreme distress or anxiety, shock, or trauma, failure rates are higher and can go longer without being recognized.

Surgical cutdown of the vein was previously used as a rescue to difficult intravenous access. Surgical cutdown requires a skin incision until vein is directly visualized and a catheter can be inserted under direct vision.[10] This would be performed by a surgeon or physician with surgical experience. As an Anesthesiologist, we are not routinely taught how to perform this surgery. In fact, this technique has fallen out of favor given the surgical expertise required, potential for bleeding and failure to adequately visualize the vein. Especially in well-resourced healthcare systems, the need to do a cutdown is extremely uncommon.[11]

In the peri-operative setting, we utilize, vein finding lights and ultrasound machines. Vein finding lights use near-infrared to detect and illuminate veins up to 1 centimeter deep. Ultrasound machines allow real-time guidance and visualization of blood vessels. For central venous access, the protocol at our hospital is to use real-time ultrasound guidance for placement of central lines. In 2001, the Agency for Healthcare Research and Quality recommended the use of ultrasound guidance for central line placement based on improving patient care and patient safety.[12]

With the expertise in the pre-operative preparation area, we have registered nurses who place peripheral intravenous catheters in patients who have been optimized for surgery. There are many times where the registered nurse is unable to obtain intravenous access. In those circumstances, they will call the dedicated IV team with the equipment and experience to insert

[10] Chappell S, Vilke GM, Chan TC, Harrigan RA, Ufberg JW. Peripheral venous cutdown. J Emerg Med. 2006 Nov;31(4):411-6. doi: 10.1016/j.jemermed.2006.05.026. PMID: 17046484.
[11] Beecham GB, Tackling G. Peripheral Line Placement. [Updated 2021 Aug 15]. In: StatPearls [Internet]. Treasure Island (FL): StatPearls Publishing; 2022 Jan-. Available from: https://www ncbi.nlm nih.gov/books/NBK539795/
[12] Rothschild JM. Ultrasound guidance of central vein catheterization. In: *On Making Health Care Safer: A Critical Analysis of Patient Safety Practices.* Rockville, MD: AHRQ Publications; 2001; Chapter 21: 245–255. Available at: http://www.ahrq.gov/clinic/ptsafety/chap21 htm. Accessed February, 2008.

intravenous catheters in difficult situations. If an anesthesiologist is available, the pre-operative nurse may also call upon them to use their expertise or ultrasound guidance to place the necessary intravenous catheter.

In circumstances where the patient is not optimized or with increased anxiety, the challenges of obtaining intravenous access increase greatly. Rarely, in the situation of a controlled medical setting, accessing the peripheral vein is so difficult, we are required to perform a central line prior to inducing anesthesia. In those circumstances, we utilize real-time ultrasound guidance and confirm the tip of the catheter using portable x-ray prior to administering medication through the catheter.

My engagement is ongoing, and should any additional material information become available to me, I reserve the right to modify or supplement my conclusions and opinions.

I declare that the foregoing is true and correct under penalty of perjury, pursuant to 28 U.S.C. § 1746.

Signed on this 18th day of October 2022,

R. Jason Yong, MD MBA

Exhibit A: Materials Considered List

Alabama Department of Corrections Execution Procedures, March 2021
Beecham GB, Tackling G. Peripheral Line Placement. [Updated 2021 Aug 15]. In: StatPearls [Internet]. Treasure Island (FL): StatPearls Publishing; 2022 Jan-. Available from: https://www.ncbi.nlm.nih.gov/books/NBK539795/
Bruenig, Elizabeth. "Dead to Rights." *The Atlantic*, Atlantic Media Company, 12 Sept. 2022, https://www.theatlantic.com/ideas/archive/2022/08/joe-nathan-james-execution-alabama/671127/.
Chappell S, Vilke GM, Chan TC, Harrigan RA, Ufberg JW. Peripheral venous cutdown. J Emerg Med. 2006 Nov;31(4):411-6. doi: 10.1016/j.jemermed.2006.05.026. PMID: 17046484.
Ercan S, Unal A, Altunbas G, Kaya H, Davutoglu V, Yuce M, Ozer O. Anxiety score as a risk factor for radial artery vasospasm during radial interventions: a pilot study. Angiology. 2014 Jan;65(1):67-70. doi: 10.1177/0003319713488931. Epub 2013 May 8. PMID: 23657175.
InformedHealth.org [Internet]. Cologne, Germany: Institute for Quality and Efficiency in Health Care (IQWiG); 2006-. How does the blood circulatory system work? 2010 Mar 12 [Updated 2019 Jan 31]. Available from: https://www.ncbi.nlm.nih.gov/books/NBK279250/
Jackson T, Hallam C, Corner T, Hill S. Right line, right patient, right time: every choice matters. Br J Nurs. 2013 Apr 25-May 8;22(8):S24, S26-8. doi: 10.12968/bjon.2013.22.Sup5.S24. PMID: 23752501.
Lamperti M, Pittiruti M. II. Difficult peripheral veins: turn on the lights. Br J Anaesth. 2013 Jun;110(6):888-91.
Miller v. Hamm, No. 2:22-cv-00506, Doc. No. 79-1 (Oct. 6, 2022)
R. E. Helm, J. D. Klausner, J. D. Klemperer, L. M. Flint, and E. Huang, "Accepted but unacceptable," *Journal of Infusion Nursing*, vol. 38, no. 3, pp. 189–203, 2015.
Rapp SE, Pavlin DJ, Nessly ML, Keyes H. Effect of Patient Position on the Incidence of Vasovagal Response to Venous Cannulation. *Arch Intern Med.* 1993;153(14):1698–1704. doi:10.1001/archinte.1993.00410140084010
Rothschild JM. Ultrasound guidance of central vein catheterization. In: *On Making Health Care Safer: A Critical Analysis of Patient Safety Practices.* Rockville, MD: AHRQ Publications; 2001; Chapter 21: 245–255. Available at: http://www.ahrq.gov/clinic/ptsafety/chap21.htm. Accessed February, 2008.
Ruesch S, Walder B, Tramèr MR. Complications of central venous catheters: internal jugular versus subclavian access--a systematic review. Crit Care Med. 2002 Feb;30(2):454-60. doi: 10.1097/00003246-200202000-00031. PMID: 11889329.
Smith v. Hamm, No. 2:22-cv-00497, Doc. No. 1 (Aug, 18, 2022)
Zingg W, Pittet D. Peripheral venous catheters: an under-evaluated problem. Int J Antimicrob Agents. 2009;34 Suppl 4:S38-42. doi: 10.1016/S0924-8579(09)70565-5. PMID: 19931816.

Exhibit B: CV

The Faculty of Medicine of Harvard University
Curriculum Vitae

Date Prepared:	June 28, 2022
Name:	Robert Jason Yong
Office Address:	Brigham and Women's Hospital Department of Anesthesiology, Perioperative and Pain Medicine 75 Francis Street Boston, MA 02115
Home Address:	[redacted]
Work Phone:	617-983-7080
Work Email:	ryong@bwh.harvard.edu
Place of Birth:	Kuching, Sarawak; Malaysia

Education:

1998-2002	BA	Biology	University of Texas, Austin, TX
2002-2007	MD	Medicine	Baylor College of Medicine, Houston, TX
2004-2006	MBA	Business Administration	Rice University, Jones Graduate School of Management, Houston, TX

Postdoctoral Training:

2007-2008	Intern	General Surgery	Beth Israel Deaconess Medical Center
2008-2011	Resident	Anesthesiology	Brigham and Women's Hospital
2010-2011	Chief Resident	Department of Anesthesia	Brigham and Women's Hospital
2011-2012	Fellow	Pain Management	Brigham and Women's Hospital

Faculty Academic Appointments:

2012-2013	Assistant Professor	Anesthesia	Johns Hopkins Medical School, Baltimore, MD
2013-2019	Instructor	Anaesthesia	Harvard Medical School, Boston, MA
2019-	Assistant Professor	Anaesthesia	Harvard Medical School, Boston, MA

Appointments at Hospitals/Affiliated Institutions:

2012-2013	Attending	Anesthesia	Johns Hopkins Hospital
2013-	Attending	Anesthesia	Brigham & Women's Hospital

Other Professional Positions:

2016-	Consultant	Medtronic	2 days per year
2016-2020	Scientific Advisory Board	axialHealthcare	12 days per year
2017-	Consultant	Nevro	2 days per year
2019-	Consultant	Endo Pharmaceuticals	12 days per year
2019-	Consultant	Abbott	2 days per year

Major Administrative Leadership Positions:

Local

2013-	Founding Co-Director, Spine Center	Brigham and Women’s Faulkner Hospital
2013-2017	Founding Medical Director of Pain Management	Brigham and Women’s Faulkner Hospital
2014-	Co-founder and Facilitator: Fellow Lecture Series	Brigham and Women’s Faulkner
2014-2021	Associate Program Director of Pain Management	Brigham and Women’s Hospital
2017-	Medical Director of Pain Management Center	Brigham and Women’s Hospital
2020-2021	Associate Chief of Pain Medicine Division	Brigham and Women’s Hospital
2021-	Chief of Pain Medicine Division	Brigham and Women’s Hospital

Committee Service:

Local

2010-2011	Residency Admissions Interview Committee	Department Anesthesiology, Brigham and Women's Hospital
2012-2013	Residency Admissions Interview Committee	Department Anesthesiology, Johns Hopkins Hospital
2013-	Fellowship Admissions Interview Committee	Brigham and Women's Hospital
2013-2015	Medical Executive Committee	Brigham and Women's Faulkner
2014-	Ambulatory Advisory Council	Brigham and Women's Faulkner
2014-	Pain Fellowship Clinical Competency Committee	Brigham and Women's Hospital
2014-	Program Evaluation Committee	Brigham and Women's Hospital
2015-2018	Opioid Management Subcommittee	Brigham and Women's Faulkner
2015-2019	Opiate Ad Hoc Committee	Harvard Medical School
2016-	B CORE Standards Committee	Brigham and Women's Faulkner
2016-2020	Office for Multicultural Careers Advisory Committee	Brigham and Women's Hospital
2017-	Residency Admissions Committee	Brigham and Women's Hospital
2017-	Residency Clinical Competency Committee	Brigham and Women's Hospital
2019-	Faculty Board, Department of Anesthesiology	Brigham and Women's Hospital

National

2014-	Program Director Committee, Representing BWH Pain Medicine Fellowship	American Board of Anesthesiology
2016-	MOCA Minute: Pain Medicine Subcommittee	American Board of Anesthesiology
2022-2022	Program and Evaluation Committee, Summer 2022 Meeting	Eastern Pain Association

Professional Societies:

2007-	American Society of Anesthesiologists
2007-	Massachusetts Medical Association
2007-	Massachusetts Society of Anesthesiologists
2007-2012	American Medical Association
2011-2019	American Pain Society
2014-	American Society of Interventional Pain Physicians

2014-	American Academy of Pain Medicine
2014-2016	International Spine Intervention Society
2016-	North American Neuromodulation Society
2016	American Society of Regional Anesthesia

Editorial Activities:

Ad hoc Reviewer

Headache Journal
The Journal of Delivery Science and Innovation
Pain Practice
Spine Journal

Other Editorial Roles

2017	Editor in Chief	Pain Medicine: An Essential Review, 1st Ed. Springer International
2020	Editor	Interventional Management of Chronic Visceral Pain Syndromes, 1st Ed. Elsevier, 2020

Honors and Prizes:

1998	Texas Valedictorian Scholarship, Texas	University of Texas, Austin, TX
2002	Baylor College of Medicine Community Service Scholarship	Baylor College of Medicine, Houston, Texas
2005	Rice University's Jones Graduate School of Management Academic Scholarship	Rice University, Jones Graduate School of Management,, Houston, TX
2011	Distinguished Resident of the Year	Anesthesia Department, Brigham & Women's Hospital, Boston, MA
2011	Foundation for Anesthesia Education and Research (FAER) Practice Management	Resident Scholar Program, Pittsburgh, Pennsylvania
2011	Grant Finalist, Center for Integration of	CIMIT, Boston, MA

	Medicine and Innovative Technology (CIMIT) Research	
2011	National Collegiate Inventors and Innovators Alliance Award for participation in the Ventures Lab	Venture Lab, Cambridge, MA
2011	Young Innovator Award	Harvard School of Engineering & Applied Science, Boston, MA
2013	Distinguished Intraoperative Teaching and Clinical Mentorship	Department of Anesthesiology, Johns Hopkins Hospital, Baltimore, MD
2013	Outstanding Teacher of the Year	Department of Anesthesiology, Johns Hopkins Hospital, Baltimore, MD
2014, 2015, 2016, 2020, 2021	Pain Attending of the Year Award	Department of Anesthesiology, Brigham and Women's Hospital, Boston, MA
2014, 2018	Partners in Excellence Award for Leadership and Innovation	Brigham and Women's Hospital, Boston, MA
2018	Outstanding Mentoring Award	Department of Anesthesiology, Brigham and Women's Hospital, Boston, MA
2018	Pain Attending of the Year Award,	Department of Anesthesiology, Brigham and Women's Hospital, Boston, MA

Report of Funded and Unfunded Projects

Past

2015-2019 Prediction of Persistent Post-Mastectomy Pain	Prediction of Persistent Post-Mastectomy Pain NIH (NIGMS); K23 GM110540 Co-Investigator (PI: K. Schreiber) This project investigates the ability of preoperatively assessed variables

	including psychosocial evaluation and QST to predict risk of chronic pain after surgery, and allow development of a study enrichment tool to investigate existing and novel perioperative preventive therapies
2016-2018	ReActiv8-B trial Mainstay Medical Limited Co-Investigator (PI: Christopher Gilligan) An international, multi-center, prospective randomized sham-controlled IDE trial at up to 40 clinical trial sites and for 128 randomized subjects to be implanted with an innovative implantable neurostimulation system (Reactiv8). Device is intended to reduce the pain and disability of Chronic Lower Back Pain (CLBP) by helping to restore control to the muscles that dynamically stabilize the lumbar spine
2017-2020	Prevention of Post-Mastectomy Pain with perioperative ketamine administration: A randomized, controlled trial. NIH (NIGMS); K23 GM110540 Site - PI (PI: K. Schreiber) This project investigates the role of ketamine in the prevention or modulation of post mastectomy pain syndrome following mastectomy.
2018-2019	Algovita Post-Market Clinical Study: Spinal Cord Stimulation to Treat Chronic Pain Nuvectra Medical PI Multi-center, prospective post market study following patients implanted with Nuvectra's Algovita spinal cord stimulator ($1800 per patient with 10 estimated patients)
2018-2019	Algovita Ultra High Pulse Width Clinical Study: Spinal Cord Stimulation to Treat Chronic Pain Nuvectra Medical PI Multi-center, prospective study following patients implanted with Nuvectra's Algovita spinal cord stimulator utilizing ultra high pulse width settings ($1800 per patient with 10 estimated patients).
2018-2019	Pilot Study to Examine the Feasibility of the DISCSS (Dynamic Interferential Spinal Cord Stimulation System) Meagan Medical Inc PI Multi-center, prospective pilot study following patients using a spinal cord stimulator trial with a novel dynamic interferential system and measuring outcomes compared to traditional stimulation ($4490 per patient with 10 estimated patients).
2019-2020	Clonidine Micropellet Clinical Study for Radiculopathy Sollis Therapeutics, Inc. PI Prospective, multi-center, randomized, double-blinded, sham-controlled study to evaluate the efficacy and safety of clonidine micropellets for the

	treatment of pain associated with lumbosacral radiculopathy in adults ($9,633 per patient with 20 estimated patients).
2019-2022	PROLONG Neuromodulation Study for Post Laminectomy Syndrome Abbott PI prospective, multi-center, open-label, post-market study following patients who have failed stimulation previously and are now using BurstDR waveforms or Dorsal Root Ganglion stimulation with restored efficacy ($ per patient with 10 estimated patients).
2021	RELIEF Boston Scientific PI ($25,941) The primary objective of this study is to compile characteristics of real-world clinical outcomes for Boston Scientific commercially approved neurostimulation systems for pain in routine clinical practice, when used according to the applicable Directions for Use. The secondary objective of this study is to evaluate the economic value and technical performance of Boston Scientific commercially approved neurostimulation systems for pain in routine clinical practice

Current

2020-	A Phase 3, Randomized, Double Blinded, Active Controlled, Multicenter Study to Evaluate the Efficacy, Safety and Pharmacokinetics of EXPAREL admixed with Bupivacaine vs Bupivacaine only administered as Combined Sciatic (in popliteal fossa) and Adductor Canal Nerve Block for Postsurgical Analgesia in Subjects Undergoing Lower Extremity Surgeries Co-Investigator (PI: Srdjan Nedeljkovic) This study will evaluate the efficacy of liposomal bupivacaine when given as a Sciatic (in popliteal fossa) and Adductor Canal nerve block following foot and ankle surgery compared to plain bupivacaine
2020-	SCOPE Superion Study for Neurogenic Claudication Boston Scientific PI ($40,159.00) Multi-center, propective, observational, single-arm, post-approval study to evaluate the Superion interspinous process spacer outcomes in patients with lumbar spinal stenosis resulting in neurogenic claudication
2020-	SKOAP Sequenced strategy for improving outcomes in people with knee osteoarthritis pain Co-Investigator (PI: Robert Edwards) There is an urgent public health need to reduce our reliance on opioids for effective long-term pain management, particularly in knee osteoarthritis (KOA). This effectiveness trial will compare recommended treatments to reduce pain and functional limitations in KOA and identify clinical and patient-level factors associated with treatment response.

These results will lead to improved patient selection for treatment and inform evidence-based guidelines by offering well-tested, effective, non-opioid alternatives.

Unfunded Current Projects

2019-	IRB pending Case Series Evaluating the Compliance and Efficacy of Smart Pill-bottles PI Single-center, prospective cohort evaluating patient compliance of Bluetooth enabled smart pill dispensers for opioid medication and efficacy of reducing opioid misuse and abuse
2020-	IRB pending Utilizing a Cadaver-Training Simulator to Teach Interventional Spine Procedures PI Single-center, analyzing an innovative approach to educating fellows and residents on interventional spine procedures measuring accuracy, comfort, radiation exposure, and time

Report of Local Teaching and Training

Teaching of Students in Courses:

2011	BUS 2107 Commercializing Science Class Clinical advisor to graduate students	Harvard Business School, Cambridge, MA 1 hour / year
2011	ES227 Medical Device Design Class graduate students	Harvard Graduate School of Engineering, Cambridge, MA 1 hour / year
2011	Introduction to Anesthesia: What does a career in anesthesia look like? medical students	Harvard Medical School 1 hour / week

Formal Teaching of Residents, Clinical Fellows and Research Fellows (post-docs):

2010	Interpretation of an Arterial Blood Gas Critical Care residents, fellows and staff	SICU Lecture Series, BWH Dept. Anesthesia, Perioperative and Pain Medicine 1 hour / year
2010	Malignant Hyperthermia. Residents/fellows	Sunrise Lecture Series, BWH Dept. Anesthesia, Perioperative and Pain Medicine 1 hour / year
2011	Hypertension in Pregnancy, OB anesthesia residents	OB Lecture Series, BWH Dept. Anesthesia, Perioperative and Pain

		Medicine 1 hour / week
2011-2012	High Yield Board Topics Anesthesia residents	Sunrise Lecture Series, BWH Dept. Anesthesia, Perioperative and Pain Medicine 1 hour / year 30 minute lecture annually
2012	Complex Regional Pain Syndrome Anesthesia residents, fellows	Sunrise Lecture Series, BWH Dept. Anesthesia, Perioperative and Pain Medicine 1 hour / week
2012	Complications of Back Surgery Anesthesia fellows	Fellow's Curriculum Series, BWH Dept. Anesthesia, Perioperative and Pain Medicine 1 hour / week
2012	Methadone Anesthesia residents, fellows	Sunrise Lecture Series, BWH Dept. Anesthesia, Perioperative and Pain Medicine 1 hour / week
2012-2013	Acute Pain Management medical students	College Day Lecture Series, Johns Hopkins Hospital, Dept of Anesthesia and Perioperative Medicine 1 hour / year
2012-2013	Cancer Pain medical students	College Day Lecture Series, Johns Hopkins Hospital, Dept of Anesthesia and Perioperative Medicine 1 hour / year
2013-	Advanced Pain Medicine Department CA-2/3 Residents	BWH Dept. Anesthesia, Perioperative and Pain Medicine 3 hours / year
2013-	Basics of Pain Medicine Department CA-1 Residents	Residency Didactic Lecture Series, BWH Dept. Anesthesia, Perioperative and Pain Medicine 3 hours / year
2013-	Cancer Pain Medicine Department CA-2/3 Residents (	Residency Didactic Lecture Series, BWH Dept. Anesthesia, Perioperative and Pain Medicine 3 hours / year
2013	Minimally Invasive Lumbar Decompression, residents, fellows	Pain Management Lecture Series, BWH Dept. Anesthesia, Perioperative and Pain Medicine 1 hour / week

2015-	Interventional Pain Management Coding and Billing, residents, fellows	Faulkner Pain Management Center Lecture Series, Brigham and Women's Faulkner Hospital, Department of Anesthesia 1 hour / year

Clinical Supervisory and Training Responsibilities:

2012-2013	Supervision Residents and CRNA's	Johns Hopkins Hospital, Department of Anesthesiology 8 hours / week
2013-	Supervision Residents, Fellows, Nurse Practitioners, and Physician Assistants	BWH APPM, Division of Pain Medicine 6 hours / week
2013-	Supervision Residents and CRNA's	BWH APPM, Department of Anesthesiology 2 hours / week

Other Mentored Trainees and Faculty:

2012-2013	Liang Shen, MD / Instructor, Weill Cornell Medical College Career stage: Resident. Mentoring role: Clinical guidance and performance evaluation. Accomplishments: multiple first authored scholarship; Fellowship in Critical Care
2013-2014	Ehren Nelson, MD / Instructor, Brigham and Women's Hospital Career stage: Resident and Fellow. Mentoring role: Clinical guidance, performance evaluation, and academic mentoring. Accomplishments: Multiple national and international invited lectures; Fellowship in Pain Medicine
2014-2015	Isaac Tong, MD / Pain Medicine Attending, San Antonio Career stage: Resident and fellow, Brigham and Women's Hospital. Mentoring role: Faculty mentor during Residency and Pain Fellowship with guidance and performance evaluation Established a strong reputation as a key opinion leader and expert in pain medicine and practice development.
2014-2017	Jessica Hellums, MD / Pain Medicine Fellow, Brigham and Women's Hospital Career stage: Resident. Mentoring role: Faculty mentor during CA-1/2/3 year with guidance and performance evaluation Established a strong reputation as a key opinion leader and expert in pain medicine and practice development.

2015-2016	Mona Patel, MD / Pain Medicine Attending, Irvine, California Career stage: Fellow, Brigham and Women's Hospital. Mentoring role: Faculty mentor during Pain Fellowship with guidance and performance evaluation Established a strong reputation as a key opinion leader and expert in pain medicine and academic publications.
2015-2016	Jeffrey McLaren, MD / Pain Medicine Fellow, Virginia Mason Career stage: Resident, Brigham and Women's Hospital. Mentoring Role: Faculty mentor during CA-3 year with guidance and performance evaluation Established a strong reputation as a key opinion leader and expert in pain medicine.
2015-2018	Brandon Napstad, MD / Anesthesiology Resident, Brigham and Women's Hospital Career stage: Resident. Mentoring role: Faculty mentor during CA-1-3 year with guidance and performance evaluation Established a strong reputation as a clinical anesthesiologist.
2016-2017	Victor Wang, MD / Instructor, Brigham and Women's Hospital Career stage: Fellow. Mentoring role: Faculty mentor during Pain Fellowship with guidance and performance evaluation. Accomplishments: Multiple first authored scholarship
2016-2019	David Buric, MD / Anesthesiology Resident, Brigham and Women's Hospital Career stage: Resident. Mentoring role: Faculty mentor during CA-1-3 year with guidance and performance evaluation Completed cardiac and ICU fellowships with significant academic productivity.
2016-2019	Andrew Pisansky, MD / Anesthesiology Resident, Brigham and Women's Hospital Career stage: Resident. Mentoring role: Faculty mentor during CA-1-3 year with guidance and performance evaluation Completed a pain fellowship and is now director of acute pain at Vanderbilt with significant academic productivity.
2017-2018	Fang Fang Xing, MD / Pain Management Fellow, Brigham and Women's Hospital Career stage: Fellow. Mentoring role: Faculty mentor during Pain Fellowship with guidance and evaluation. Accomplishments: multiple first authored scholarship

2017-2020	Shafiq Boyaji, MD / Anesthesiology Resident, Brigham and Women's Hospital Career stage: Resident. Mentoring role: Faculty mentor during CA-1-3 year with guidance and performance evaluation Established a strong reputation as a key opinion leader and expert in pain medicine and practice development with academic productivity.
2018-2019	Michael Lubrano, MD / Pain Management Fellow, Brigham and Women's Hospital Career Stage: Fellow. Mentoring role: Faculty mentor during Pain Fellowship with guidance and evaluation. Accomplishments: multiple first authored scholarship
2019-2020	Bilal Dar, MD / Pain Management Fellow, Brigham and Women's Hospital. Career Stage: Fellow Mentoring role: Faculty mentor during Pain Fellowship with guidance and evaluation. Accomplishments: case reports
2019-2022	Kunal Mandavawala, MD – Anesthesiology Resident, Brigham and Women's Hospital. Career Stage: Resident. Mentoring role: Faculty mentor during CA 1-3 year with guidance and performance evaluation Will be completing cardiac and ICU fellowships with significant academic productivity.
2020-2023	Michael Fiore, MD, pharmD – Anesthesiology Resident, Brigham and Women's Hospital. Career Stage: Resident. Mentoring role: Faculty mentor during CA 1-3 year with guidance and performance evaluation Will be applying for pain with significant research involving medical education.

Formal Teaching of Peers (e.g., CME and other continuing education courses):

☒ *No presentations below were sponsored by 3rd parties/outside entities*

2015	Chronic Venous Insufficiency, Comprehensive Review of Pain Medicine, [Directed by Dr. Edgar Ross. Recorded CME video lecture] sponsored by Oakstone	single presentation Boston

Local Invited Presentations:

☒ *No presentations below were sponsored by 3rd parties/outside entities*

2014	Pain Treatment Modalities and Palliative Care for Cognitively Impaired and Terminally Ill Patients / Invited Lecture 2nd Annual Pain Management Lecture, Brigham and Women's Hospital
2014	Spine Views for Interventional Pain Procedures / Invited Lecture Massachusetts Society of Radiologic Technologists, Brigham and Women's Hospital
2018	Post-operative Pain and the Chronic Pain Patient / Invited Lecture PACU Lecture Series. Brigham and Women's Faulkner Hospital

Report of Regional, National and International Invited Teaching and Presentations

☒ *No presentations below were sponsored by 3rd parties/outside entities*

Regional

2015	Advances in Chronic Pain Management / Grand Rounds Tufts University, Anesthesiology, Boston, MA
2021	Opioid Management / Invited Speaker New Hampshire Medical Society, Conway, NH

National

2013	Perioperative Pain Management, Optimal Anesthesia Management / Invited Lecture Johns Hopkins Anesthesia Continuing Education, Baltimore, MD
2013	Pharmacology of Anesthetics / Invited Lecture Johns Hopkins Regional Live Meeting Series, Boston
2013	Preoperative Patient Assessment / Invited Lecture Johns Hopkins Regional Live Meeting Series, Boston
2015	Cutting Edge Chronic Pain / Grand Rounds George Washington University, Anesthesiology, Washington, DC
2016	Innovation: Treatment and Prescribing Panelist and Moderator, Tennessee Pain Opioids Problems Solutions Forum / Symposium Nashville, TN
2017	Current Topics in Pain Medicine / Grand Rounds Kaiser Permanente, Department of Anesthesiology, San Diego, CA
2017	Novel Therapies in Pain Medicine / Grand Rounds Medical University of South Carolina, Department of Anesthesiology, Charleston, SC
2018	On and Off Label Applications for Pain Control / Invited Lecture NYC Neuromodulation Conference and NANS Summer Series, New York, NY

2019	Interpretation of Spinal Diagnostic Imaging Studies: Learning a Structured Approach / Invited Speaker American Society of Anesthesiology, Orlando, FL
2020	Lumbar Spinal Stenosis Novel Therapies / Invited Speaker Multi-institution COVID-19 Lecture Series, Sponsored by University of Washington
2020	Peripheral Nerve Stimulation / Invited Speaker American Society of Neuro Radiologists, Las Vegas, NV
2020	Waveform Innovation in Spinal Cord Stimulation / Invited Speaker Multi-institution COVID-19 Lecture Series, Sponsored by University of Washington
2021	Pain Medicine: Practice Management and Billing Compliance University of Miami
2022	Pain Management and Opioid Stewardship OhioHealth
2022	Spinal Cord Stimulation: New Devices and Advances / Invited Lecture Brown University, Medical School, Department of Anesthesiology
2022-2022	Keynote: CDC Opioid Prescribing Guidelines Update – Thoughts, Impacts & Where do we go from here / Keynote Lecture Eastern Pain Association Annual Meeting
2022-2022	Pathophysiology of Pain - A 2022 Update / Invited Lecture Harvard Medical School, Evaluating & Treating Pain Conference Lecture and Panel

International

2017	Difficult Airway Management / Anesthesiology Grand Rounds Kanombe Military Hospital, Kigali, Rwanda
2017	Nerve Blocks for Facial Surgery / Anesthesiology Grand Rounds Santa Casa Hospital, Sao Paulo, Brazil
2019	Perioperative Pain Management and Alternatives to Opioids / Invited Speaker Korean American Spine Society Annual Meeting, Vancouver, CA
2019	State of the Art in Interventional Pain Procedures / Invited Speaker Korean American Spine Society Annual Meeting, Vancouver, CA

Report of Clinical Activities and Innovations

Current Licensure and Certification:

2005-	American Heart Association, Basic and Advanced Cardiac Life Support
2008-	Permanent Licensee, State of Massachusetts
2012-	Diplomate, American Board of Anesthesiology
2012-	Diplomate, American Board of Anesthesiology Pain Medicine
2012-2014	Permanent Licensee, State of Maryland

Practice Activities:

2012-2013	General and regional anesthesia	Johns Hopkins Hospital, Baltimore, MD	40 hours / week
2013-	General and regional anesthesia	Brigham and Women's Hospital, Boston, MA	10 hours / week
2013	Pain Medicine Physician	Brigham and Women's Hospital, Boston, MA	30 hours / week

Clinical Innovations:

Cofounder of multidisciplinary spine center / BWF (2014)	As founding medical director of Brigham and Women's Faulkner Hospital's Pain Management Center, a high priority was increased collaboration with the other services in the hospital. After our initial collaboration with the Graham Headache Center proved to be successful, we decided to build a spine center with operative and non-operative services focused on comprehensive spine care. We used a wing of the newly built Orthopedic center at Faulkner to carve out 6 exam rooms and a multi-use work area to build a center where Orthopedics or Neurosurgery was collocated with Physiatry or Pain Medicine. Serving on the governance committee since the inception, I have actively been involved with the creation of workflows, marketing, and management of the spine center. Over the previous 4 years, we have grown the spine center tremendously while solidifying collaboration between all services.
Implemented changes for practice efficiency / BWH Pain Ctr (2017)	Because of the significant clinical and financial growth of the Brigham and Women's Faulkner Hospitals Pain Management Center, I was selected to be the Medical Director of Brigham and Women's main Pain Management Center. In this position, I created several processes and work flow changes to improve efficiency. First, I changed the schedule to split out procedures and evaluations into separate sessions. Doing this provided each attending physician dedicated geography and resources to see more patients in less time while reducing wasted footsteps. Next, I worked with Epic to create several shortcuts and orders so providers could quickly enter an order for a procedure which would then automatically enter the work queue for managed care services to obtain prior authorization. The new orders have helped to minimize denials while ensuring the proper time and location are allocated for the desired procedure. I also helped create the new order system providers use to refer patients to our multiple locations of Pain Medicine.
Creator of new reporting for Pain Management Center / BWH pain Ctr	Also in my role as Medical Director of Brigham and Women's Pain Management Center, I created two new reports the administration and staff use monthly. The first report is a gaps analysis to determine sessions where we have inadequate provider coverage. The second report is a productivity report that marries our billing database with the scheduling system to provide the physicians aggregate productivity data

(2017)	that can then be drilled down into individual days. The report is now used by attending physicians to track their productivity and by the finance division to cross verify their reporting measures.
Introduction of Radiofrequency Identification to measure time driven activity based costing / (2018)	In collaboration with MIT and Harvard Business School I am coordinating the implementation of radiofrequency identification (RFID) tags and readers to more accurately and robustly calculate costs of a given activity using time driven activity based costing (TDABC). The current models utilizing TDABC in healthcare rely on manual recordings of each step in an activity. Utilizing RFID would minimize the measurement bias and allow for a larger sample size.

Report of Teaching and Education Innovations

Co-founder for the Faulkner Lecture Series (2014)	I co-created a lecture series for the Pain Medicine fellows. In the lecture series, we invite lecturers from other specialties including orthopedics, radiology, psychiatry, and law to discuss practical concepts in Pain Management to prepare them for their early careers. The feedback from the fellows is superb and an integral part of their education.
Creator and manager of Faulkner Hospital Pain rotation (2016)	Since founding the Brigham and Women's Faulkner Hospital's Pain Management Center in 2013, we have been asked to host rotation for interns, residents, and fellows. Each year we have a growing number of residents requesting the rotation for the CA-3's pain medicine elective – even for residents not specializing in Pain Medicine. Additionally, we now host Neurology Headache fellows, Regional Anesthesia fellows, and categorical anesthesia interns. I coordinate and evaluate all rotating trainees through the Pain Center.
Introduction of pain simulation (2018-)	Simulation in anesthesiology is now a standard for resident education, however, within Pain Medicine simulation has not gained traction. I worked with a company called Biotras to bring a spine simulator with cadaveric bone and ballistic gel to the Pain Management Center at Brigham and Women's Hospital. We organized two sessions for the 2018-2019 fellow class to practice obtaining the correct views and directing the needle for four of our most common procedures. The feedback was so overwhelmingly positive from the fellows that we are adding teaching modules on the spine simulator to the 2019-2020 Pain Medicine fellowship curriculum.

Report of Education of Patients and Service to the Community

☒ *No presentations below were sponsored by 3rd parties/outside entities*

Activities

1999	Medical Mission Medical mission to Guatemala with Sending Out Servants

2000-2002	Big Brothers Big Sisters Over 500 hours spent as a mentor in Austin, TX
2000-2002	Habitat for Humanity Habitat for Humanity via Texas Blazers
2010	Global Smile Foundation Medical Mission to Cote D'Ivoire, Global Smile Foundation (Anesthesiologist)
2011	Global Smile Foundation Medical Mission, Ecuador with the Global Smile Foundation (Anesthesiologist)
2012, 2015	Global Smile Foundation Medical Mission, Guatemala with the Global Smile Foundation (Anesthesiologist)
2017	Face the Future Foundation Medical Mission, Rwanda with Face the Future (Anesthesiologist)
2017	Global Smile Foundation Medical Mission, Brazil with Global Smile Foundation (Anesthesiologist)
2018, 2019	Face the Future Foundation Medical Mission, Rwanda with Face the Future Foundation (Anesthesiologist)

Educational Material for Patients and the Lay Community:

Patient educational material

2015	Managing with Low Back	BWF, Community Lecture Series
2016	Novel Techniques for Treating Low Back Pain	BWF, Community Lecture Series

Recognition:

2010	Featured in Brigham and Women's Hospital Bulletin	12/13/2010 article: Driving Clinical Innovations at BWH
2011	Featured in the Harvard Gazette (September 20, 2011) Surgical Precision at SEAS	9/20/2011 article: Innovation and Medical Device Design
2016	Featured in Tennessean (April 5, 2016)	4/5/2016 article: Health care leaders urge action on opioid abuse
2016	Highlighted in educational marketing video for Brigham and Women's Hospital	5/6/2016 video: Managing Back Pain

2016	Highlighted in marketing video for Faulkner Hospital Pain Management Center	5/12/2016 video: Pain Management Center at BWFH

Report of Scholarship

ORCID: 0000-0001-6960-9621

* Co-author, ** Mentee

Peer-Reviewed Scholarship in print or other media:

Research Investigations

1. Brattain LJ, Floryan C, Hauser OP, Nguyen M, **Yong RJ**, Kesner SB, Corn SB, Walsh CJ. Simple and effective ultrasound needle guidance system. Annu Int Conf IEEE Eng Med Biol Soc. 2011;2011:8090-8093. PMID: 22256219, https://doi.org/10.1109/IEMBS.2011.6091995
2. **Yong RJ**, Nelson ER, Urman RD, Kaye AD. A primer for billing in interventional pain management. J Med Pract Manage. 2015 Mar-Apr;30(6 Spec No):51-54. PMID: 26062319
3. Imran TF, Malapero R, Qavi AH, Hasan Z, de la Torre B, Patel YR, **Yong RJ**, Djousse L, Gaziano JM, Gerhard-Herman MD. Efficacy of spinal cord stimulation as an adjunct therapy for chronic refractory angina pectoris. Int J Cardiol. 2017 Jan 15;227:535-542. PMID: 27836302, https://doi.org/S0167-5273(16)33323-X
4. Kim AJ, **Yong RJ**, Urman RD. The Role of Transversus Abdominis Plane Blocks in Enhanced Recovery After Surgery Pathways for Open and Laparoscopic Colorectal Surgery. J Laparoendosc Adv Surg Tech A. 2017 Sep;27(9):909-914. PMID: 28742435, https://doi.org/10.1089/lap.2017.0337
5. Pak DJ, **Yong RJ**, Kaye AD, Urman RD. Chronification of Pain: Mechanisms, Current Understanding, and Clinical Implications. Curr Pain Headache Rep. 2018 Feb 5;22(2):9. PMID: 29404791, https://doi.org/10.1007/s11916-018-0666-8
6. Xing F, **Yong RJ**, Kaye AD, Urman RD. Intrathecal Drug Delivery and Spinal Cord Stimulation for the Treatment of Cancer Pain. Curr Pain Headache Rep. 2018 Feb 5;22(2):11. PMID: 29404792, https://doi.org/10.1007/s11916-018-0662-z
7. Simopoulos T, **Yong RJ**, Gill JS. Treatment of Chronic Refractory Neuropathic Pelvic Pain with High-Frequency 10-kilohertz Spinal Cord Stimulation. Pain Pract. 2018 Jul;18(6):805-809. PMID: 29106051, https://doi.org/10.1111/papr.12656
8. Wang VC, Preston MA, Kibel AS, Xu X, Gosnell J, **Yong RJ**, Urman RD. A Prospective, Randomized, Double-Blind, Placebo-Controlled Trial to Evaluate Intravenous Acetaminophen Versus Placebo in Patients Undergoing Robotic-Assisted Laparoscopic Prostatectomy. J Pain Palliat Care Pharmacother. 2019 Jan 15;32(2-3):82-89. PMID: 30645153, https://doi.org/10.1080/15360288.2018.1513436

9. Atkinson TJ, Pisansky AJB, Miller KL, **Yong RJ**. Common elements in opioid use disorder guidelines for buprenorphine prescribing. Am J Manag Care. 2019 Mar 1;25(3):e88-e97. PMID: 30875177

10. Morales A, **Yong RJ**, Kaye AD, Urman RD. Spinal Cord Stimulation: Comparing Traditional Low-frequency Tonic Waveforms to Novel High Frequency and Burst Stimulation for the Treatment of Chronic Low Back Pain. Curr Pain Headache Rep. 2019 Mar 14;23(4):25. PMID: 30868285, https://doi.org/10.1007/s11916-019-0763-3

11. Valimahomed AK, Haffey PR, Urman RD, Kaye AD, **Yong RJ**. Regenerative Techniques for Neuraxial Back Pain: a Systematic Review. Curr Pain Headache Rep. 2019 Mar 11;23(3):20. PMID: 30854599, https://doi.org/10.1007/s11916-019-0758-0

12. Boyaji S, Merkow J, Elman RNM, Kaye AD, **Yong RJ**, Urman RD. The Role of Cannabidiol (CBD) in Chronic Pain Management: An Assessment of Current Evidence. Curr Pain Headache Rep. 2020 Jan 24;24(2):4. PMID: 31980957, https://doi.org/10.1007/s11916-020-0835-4

13. Coppes OJM, **Yong RJ**, Kaye AD, Urman RD. Patient and Surgery-Related Predictors of Acute Postoperative Pain. Curr Pain Headache Rep. 2020 Feb 18;24(4):12. PMID: 32072315, https://doi.org/10.1007/s11916-020-0844-3

14. Costelloe C, Burns S, **Yong RJ**, Kaye AD, Urman RD. An Analysis of Predictors of Persistent Postoperative Pain in Spine Surgery. Curr Pain Headache Rep. 2020 Feb 18;24(4):11. PMID: 32072357, https://doi.org/10.1007/s11916-020-0842-5

15. Merkow J, Varhabhatla N, Manchikanti L, Kaye AD, Urman RD, **Yong RJ**. Minimally Invasive Lumbar Decompression and Interspinous Process Device for the Management of Symptomatic Lumbar Spinal Stenosis: a Literature Review. Curr Pain Headache Rep. 2020 Feb 18;24(4):13. PMID: 32072362, https://doi.org/10.1007/s11916-020-0845-2

16. Blevins Peratikos M, Weeks HL, Pisansky AJB, **Yong RJ**, Stringer EA. Effect of Preoperative Opioid Use on Adverse Outcomes, Medical Spending, and Persistent Opioid Use Following Elective Total Joint Arthroplasty in the United States: A Large Retrospective Cohort Study of Administrative Claims Data. Pain Med. 2020 Mar 1;21(3):521-531. PMID: 31120529, PMCID: PMC7060398, https://doi.org/10.1093/pm/pnz083

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18. Morales ME, **Yong RJ**. Racial and Ethnic Disparities in the Treatment of Chronic Pain. Pain Med. 2021 Feb 4;22(1):75-90. PMID: 33367911, https://doi.org/10.1093/pm/pnaa427

19. Henson JV, Varhabhatla NC, Bebic Z, Kaye AD, **Yong RJ**, Urman RD, Merkow JS. Spinal Cord Stimulation for Painful Diabetic Peripheral Neuropathy: A Systematic Review. Pain Ther. 2021 Dec;10(2):895-908. PMID: 34244979, PMCID: PMC8586096, https://doi.org/10.1007/s40122-021-00282-9

20. **Yong RJ**, Mullins PM, Bhattacharyya N. Prevalence of chronic pain among adults in the United States. Pain. 2022 Feb 1;163(2):e328-e332. PMID: 33990113, https://doi.org/10.1097/j.pain.0000000000002291

Other peer-reviewed scholarship

1. Rohan Jotwani, Michael Fiore, Robert Jason Yong, David Hao,
Virtual reality for procedural education: Lumbar medial branch radiofrequency neurotomy,
Interventional Pain Medicine,
Volume 1, Issue 1,
2022,
100088,
ISSN 2772-5944,
https://doi.org/10.1016/j.inpm.2022.100088.
(https://www.sciencedirect.com/science/article/pii/S2772594422000796)
Abstract: Virtual reality (VR) simulation is an emerging tool in medical education. Simulation conducted in VR can reproduce procedural scenarios and allow for immersive interaction with anatomic models. This has the potential to improve understanding of anatomy and concepts relevant to interventional procedures. Here, we present a “proof-of-concept” modeling of lumbar thermal radiofrequency neurotomy through cost-effective, commercially available VR hardware and software. With this technology, we can demonstrate key fluoroscopic views and needle trajectories based on specific recommendations from Spine Intervention Society guidelines. Furthermore, the learner can manipulate the model in multiple 3-dimensional axes to visualize anatomy relevant to key fluoroscopic views. Finally, the content can be exported by recording a live casting stream, thus offering an approach for future content creation and collaboration. VR technology is an emerging educational modality that offers immersive and interactive features that may offer advantages to traditional visual teaching modalities.

Non-peer reviewed scholarship in print or other media:

Reviews, chapters, monographs and editorials

1. **Yong RJ**, Nedeljkovic S. Assessment of pain: Patient evaluation. In: Pocket Pain Medicine, Urman RD, Vadivelu N (eds), Philadelphia: Lippincott
2. Tong I,**Yong RJ**. Pain Emergencies: Averting catastrophe through diagnosis and treatment. In: Fundamentals of Pain Care. Oxford University Press, 2015
3. Smith J, **Yong RJ**, Nedeljkovic S. “Minimally Invasive Treatments for Spinal Stenosis: Percutaneous Lumbar Decompression.” Surgical Pain Management. Oxford University Press, 2016
4. Yazdi C, **Yong RJ**, Nguyen, M. “Endovenous Ablation.” Surgical Pain Management. Oxford University Press, 2016

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6. Patel M, **Yong RJ**. Corticosteroids. In: Pain Medicine: An Essential Review, RJ Yong, Nguyen M, Nelson E, Urman RD (eds), 1st Ed. Switzerland: Springer International Publishing, 2017; p.181-184
7. Tong I, **Yong RJ**. "Sacroiliac Joint Pain.L5 Dorsal Ramus and S1-S3 Lateral Branch Radiofrequency Ablation. In: Pain Medicine: An Essential Review, RJ Yong, Nguyen M, Nelson E, Urman RD (eds), 1st Ed. Switzerland: Springer International Publishing, 2017; p.245-248
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Narrative Report

As an academic anesthesiologist specializing in pain medicine at Brigham and Women's Hospital, my efforts are focused on developing clinical expertise, innovating pain medicine through novel implantable devices and opioid management strategies, and educating fellows and residents. My major supporting activity involves administrative and institutional service with leadership roles and committee service.

Approximately half of my time is devoted to direct patient care within pain medicine including time spent evaluating patients in clinic, performing office-based procedures, and surgically implanting devices to help manage pain. I spend twenty percent of my time as an anesthesiologist supervising residents and nurse anesthetists with a focus on regional anesthesia and acute post-operative pain management. The remainder of my time is divided among administrative duties including institutional committee service and serving as Chief of Pain Medicine, Medical Director of the Pain Management Center, and Associate Program Director for the Pain Medicine Fellowship.

Clinically, I have developed expertise in surgically implantable technologies for the treatment of chronic pain and opioid management strategies. Since fellowship, I have been fascinated by neuromodulation using spinal cord and peripheral stimulators to modulate pain signals. Using this passion, I have taught fellows and residents extensively on the technology, and introduced the Nevro high frequency stimulator to Brigham and Women's Hospital becoming the first implanting physician in New England. I am now receiving direct referral from across the Northeast for evaluation of neuromodulation and targeted drug delivery using intrathecal pumps. I am currently the Principal Investigator in 3 prospective case-series examining the efficacy of novel neuromodulation technologies. With my focus on neuromodulation, I have been fortunate enough to become the top implanter of spinal cord stimulators in the Northeast.

Given the recent impact of the national opioid epidemic, I have devoted significant time and effort to shaping opioid management strategies. I have been involved in the Harvard Medical School Opiate Ad Hoc committee, the Opioid Management subcommittee, and BCore Standards committee.

I am continuing to develop my career in research and have joined on as a co-investigator on three clinical research studies. In addition to the neuromodulation studies, I am working on

IRB approval for other studies involving Platelet Rich Plasma and its application to Pain Medicine, tracking outcomes of implantable devices at our center, and using RFID technology to perform Time Driven Activity Based Costing at our Pain Management Center. In response to my personal struggles and those of fellows starting their careers, I conceptualized and was first editor for Pain Medicine: An Essential Review which focuses on relevant clinical pearls.

On a national level, I have been invited to give 4 grand rounds and was invited to serve on the American Board of Anesthesiology MOCA Minute for Pain Medicine question writing committee. Internationally, I participate in 1-2 medical missions per year providing anesthesia and have been invited to give multiple international presentations.

As the founding medical director of the Pain Management Center at Brigham and Women's Faulkner Hospital, I helped grow the pain medicine services at the hospital focusing on the integration of high quality pain management to all areas of the hospital. Our volume tripled to over 400 pain patients per month in the span of 3 years. Due in part to that success, in 2017, I was selected as the Medical Director of the Pain Management Center at Brigham and Women's Hospital. In this role, I am focused on operational efficiency and financial viability. With the early changes I helped manage and develop, our productivity has increased with an improvement in patient satisfaction. The rapid turnaround then led to the appointment as Associate Chief and now interim Chief of the Division of Pain Medicine. I was also elected to serve on the Faculty Board in the Department of Anesthesiology.

As the Associate Program Director for the Pain Management Center at Brigham and Women's Hospital, I am involved with recruitment, curriculum development, and overall management of the 10 fellows per year. My involvement in this role extends to committee service on a hospital and national level with the American Board of Anesthesiology. As a product of our own residency and fellowship, I am appreciative of the extensive curriculum and mentorship by the world renown experts at our institution. I have strived to reciprocate using innovative teaching methods such as the introduction of medical simulation with pain procedures, and I am honored to have my passion in mentorship and teaching reflected in the Pain Fellow's Pain Attending of the Year award for excellence in teaching for 5 of the previous 7 years.

In addition to my clinical work, I have been an active member in our department and the hospital. I was elected to serve on the Medical Staff Executive Committee for Brigham and Women's Faulkner Hospital and currently serve on the Ambulatory Advisory Council at Brigham and Women's Faulkner Hospital and the Office for Multicultural Careers Advisory Committee at the Brigham and Women's Hospital.