No. 22-7546
(CAPITAL CASE)

IN THE
Supreme Court of the United States

ROBERT LESLIE ROBERSON III,

Petitioner,

v.

TEXAS,

Respondent.

On Petition for a Writ of Certiorari to the Texas Court of Criminal Appeals

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BRIEF OF CONCERNED PHYSICIANS AND SCIENTISTS AS *AMICI CURIAE* IN SUPPORT OF PETITIONER

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INTEREST OF *AMICI CURIAE*

Amici are 16 current and retired forensic scientists, forensic pathologists, forensic epidemiologists, medical examiners, pediatric radiologists, pediatric neurologists, pediatric pathologists, endocrinologists, neuroscientists, neuropathologists, neurosurgeons, emergency medicine physicians, pediatricians, and biomechanical engineers from 5 countries. A list of the *amici* follows in the attached Appendix. [1]

These physicians and scientists have each spent decades in their respective fields. They have treated patients, conducted research, analyzed scientific literature, and lectured on the purported evidentiary bases for shaken baby syndrome (SBS).

The scientific understanding of SBS has shifted seismically over the past two decades. The previously prevailing scientific belief regarding SBS has been discredited, and *amici* file this brief out of concern that some courts, including those below, continue to rely uncritically on outdated theories and refuse to consider the current state of the science. To be clear, *amici* do not dispute that some children are abused by parents and caretakers, sometimes through violent shaking. *Amici* fervently believe, however, that the courts must meaningfully take into account the

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[1] Counsel for *amici curiae* authored this brief in its entirety, and no party or its counsel or any other person made a monetary contribution intended to fund the preparation or submission of this brief. All counsel of record received timely notice of the *amici*'s intention to file this brief.

evolution in the scientific consensus regarding SBS and carefully consider whether individuals convicted years ago on a now-discredited shaken-baby-syndrome hypothesis are entitled to judicial relief.

SUMMARY OF ARGUMENT

When petitioner Robert Roberson's trial took place in 2003, "shaken baby syndrome" diagnoses were almost always based on three findings: subdural hematoma, encephalopathy, and retinal hemorrhages.[2] Unless a child's caretaker could provide evidence of "major trauma (typically described as equivalent to a motor vehicle accident or fall from a multistory building),"[3] the mere presence of this "triad" of physically internal symptoms was taken to mean "that a baby had been shaken hard enough to produce what were conceptualized as whiplash forces."[4]

Under that conventional view of SBS, shaking an infant created forces that caused the brain to rotate in the skull.[5] When the shaking stopped, "[a]brupt deceleration allow[ed] continuing brain rotation"—

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[2] A subdural hematoma is a collection of blood on the outside of the brain caused by a tear in a blood vessel. Encephalopathy refers to brain abnormalities. Retinal hemorrhage occurs when blood vessels in the eye's retina bleed.

[3] Keith A. Findley et al., *Shaken Baby Syndrome, Abusive Head Trauma, and Actual Innocence: Getting It Right*, 12 HOUS. J. HEALTH L. & POL'Y 209, 219 (2012) ("Findley et al.").

[4] Deborah Tuerkheimer, *The Next Innocence Project: Shaken Baby Syndrome and the Criminal Courts*, 87 WASH. U. L. REV. 1, 11 (2009) ("Tuerkheimer").

[5] *Id*.

until so-called "bridging veins," which connect the surface of the brain to the skull, were "stretched and ruptured," causing a thin pool of blood to collect on the outside of the brain.[6] Similar forces were thought to cause retinal hemorrhages.[7] As for encephalopathy, the triad hypothesis attributed it to "the traumatic rupture of axons (the nerve fibers that connect the cells throughout the brain)."[8]

Most notably, the medical establishment believed that the triad could *only* be explained by violent shaking. It also believed that shaking-induced damage to the brain would instantly cause "loss of function," such that "the child would be immediately unconscious upon infliction of the injuries."[9] Thus, the logic went, whoever was with the child at the time of collapse must have inflicted the injuries.[10] Put another way, if the triad was present, all that remained was identifying the last person with the baby and you had your abuser.[11]

"Invisible injuries" became "acceptable as proof beyond a reasonable doubt of murder."[12] Indeed, SBS was as "close as one could imagine to a medical diagnosis of murder: prosecutors use[d] it to prove the

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[6] *Id.*

[7] *Id.*

[8] Findley et al. at 215-16.

[9] *Id.* at 226, 249.

[10] *Id.* at 249.

[11] *Id.* at 226.

[12] *Id.* at 222.

mechanism of death, the intent to harm, and the identity of the killer."[13]

Yet, the very idea of SBS was flawed from the start. The scientific evidence was inadequate. The methodology was tainted. The reasoning was circular. For the most part, when an infant presented with subdural hematoma and retinal hemorrhages, clinicians "simply concluded that . . . shak[ing]" was the cause, without investigating other possibilities.[14] The SBS paradigm was so entrenched that defense attorneys rarely, if ever, challenged the underlying assumptions.[15]

Then, science stepped in. Research established that the triad of SBS symptoms is *not* exclusively diagnostic of abuse. Subdural hematoma and retinal hemorrhages cannot conclusively prove that injury was inflicted, as opposed to being caused by the "mimics" of abuse: illnesses, medical disorders, and accidents. As the science advanced, the number of practitioners and researchers who questioned the basis for SBS grew to the point that, now, it is "no longer valid to reason backwards from the triad to a diagnosis of trauma or abuse."[16]

Although the foundations of SBS have eroded to the point that the triad-based diagnosis must be considered scientifically invalid, some in the medical community continue to defend it. But they do so by

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[13] Tuerkheimer at 5.

[14] *Id.* at 13.

[15] *Id.* at 5.

[16] Findley et al. at 216.

obscuring the shift in conventional medical wisdom and by using ever-changing terminology.[17]

The real problem, however, is that "'change has raised the real possibility of past error.'"[18] Even professionals who continue to support the SBS diagnosis concede, as they must, that the science has evolved. "No longer are physicians willing to state with certainty that the constellation of symptoms that once characterized SBS individually and collectively must in every case indicate that a child was abused."[19] In other words, "[w]hile many disagree vehemently with the contention that shaking alone cannot possibly cause the diagnostic triad, they have conceded that the triad is not necessarily induced by shaking" and alternative diagnoses must be considered.[20] And, whereas "doctors would previously have been certain that an infant was

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[17] The terminology used to describe the triad has "gone through several iterations," including: shaken baby syndrome, shaken whiplash syndrome, shaken impact syndrome, and abusive head trauma (AHT). Christopher Milroy, Forward, *The Forensic Unreliability of the Shaken Baby Syndrome*, xi (2022). AHT, the current preferred term, refers not just to shaking, but to "any deliberately inflicted injury to the head, regardless of mechanism." Findley et al. at 220.

[18] Tuerkheimer at 11 (quoting Stephen T. Goudge, *Inquiry into Pediatric Forensic Pathology in Ontario* 531 (Ontario Ministry of the Att'y Gen. 2008)).

[19] *Id.* at 17.

[20] *Id.* at 17-18; *see* Arabinda Kumar Choudhary et al., *Consensus Statement on Abusive Head Trauma in Infants and Young Children*, 48 PEDIATRIC RADIOLOGY 1048 (2018) ("The question to be answered is, 'Is there a medical cause to explain all the findings or did this child suffer from inflicted injury?'").

shaken, in many cases a fall must now be entertained as an explanation for injuries."[21]

Yet, as in this case, "the triad continues to exert an almost talismanic effect."[22]

ARGUMENT

I. "SHAKEN BABY SYNDROME" WAS NEVER BASED IN SCIENCE

The origins of SBS lie in a 1962 paper published in the Journal of the American Medical Association, by Henry Kempe and colleagues. They expressed concern that physicians were reluctant to believe that parents abused their children, and they described what was then called "battered-child syndrome."[23] They said that the syndrome was, in fact, the "frequent cause of . . . death" in young children, and they redefined as abuse certain findings that had been previously associated with natural or accidental causes.[24]

According to the authors, the syndrome "should be considered in any child exhibiting evidence of possible trauma or neglect," *i.e.*, "poor skin hygiene[] or malnutrition," or the "fracture of any bone, subdural hematoma, [or] multiple soft tissue injuries," which, they said, could result from rough handling, like

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[21] Tuerkheimer at 21.

[22] *Id.* at 26.

[23] *See* C. Henry Kempe et al., *The Battered-Child Syndrome*, 181 J. AM. MED. ASS'N 17 (1962).

[24] *Id.* at 17.

pulling a child's arm or swinging them by the legs.[25] Aside from encouraging treating physicians to assume "the role of policeman or district attorney" by questioning parents as if investigating a crime,[26] what made the paper "so remarkable" was the suggestion that "physicians should view suspicious injuries as abusive until proven otherwise."[27]

In 1971, British neurosurgeon A. Norman Guthkelch picked up where Kempe left off. Guthkelch warned of the dangers of *shaking* an infant and introduced the idea of whiplash injuries. Because a subdural hematoma could occur in an adult "after disproportionately slight head injur[y]," it "seem[ed] clear" to Guthkelch that an infant's "relatively large head and puny neck muscles . . . must render it particularly vulnerable."[28] Thus, the absence of external marks of injury "suggest[ed]" that subdural hematoma in an infant was caused by shaking "rather than direct violence."[29]

To support his hypothesis, Guthkelch relied on anecdotal evidence, including an incident in which an adult suffered a subdural hematoma after his head was jerked while on a carnival ride, and two cases of subdural hematomas in subjects who had sustained

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[25] *Id.* at 24.

[26] *Id.* at 19.

[27] Randy Papetti, *The Forensic Unreliability of the Shaken Baby Syndrome* 12 (Christopher M. Milroy ed., 2022) ("Papetti").

[28] A. Norman Guthkelch, *Infantile Subdural Hematoma and Its Relationship to Whiplash Injuries*, 2 BRIT. MED. J. 430 (1971).

[29] *Id.*

whiplash injuries to their necks in automobile accidents.[30] Guthkelch also posited that two cases, both involving 6-month-old babies, presented "very strong reason" to associate the injuries in question with "shaking rather than battering"; in one case, a mother said that she "might have" shaken her crying baby, and in the other case, a mother admitted that she had shaken her baby because she feared he was going to choke.[31] Guthkelch concluded that, unless proven otherwise, "*all* cases of infantile subdural hematoma" should be "*assumed* to be traumatic."[32]

Prominent pediatric radiologist John Caffey took Guthkelch's premise and ran with it. In 1972, Caffey hypothesized that "manual whiplash shaking of infants" was "the major cause" of not only subdural hematomas (which, Caffey declared, were "practically always traumatic in origin") but also retinal hemorrhages.[33] Caffey, too, relied on admittedly circumstantial evidence, including a one-page 1956 *Newsweek* article about a nanny who allegedly killed three children and injured several others,[34] though "the role that shaking played in most of the cases, if

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[30] *Id.*

[31] *Id.*

[32] *Id.* (emphasis added).

[33] John Caffey, *On the Theory and Practice of Shaking Infants: Its Potential Residual Effects of Permanent Brain Damage and Mental Retardation*, 124 AM. J. DISEASES CHILD. 161 (1972) ("Caffey-1972").

[34] *Id.* at 163.

any, is not identified."[35] Although the evidence admittedly "d[id] not lend itself to satisfactory statistical analysis" and had "not been studied systematically," Caffey nonetheless posited that some cerebrovascular injuries previously attributed to prenatal infection, congenital malformations, and birth injuries were "undoubtedly" caused by undetected whiplash-shakings.[36]

Caffey further elaborated on his shaking hypothesis in a 1974 paper, stating that the lack of an adequate explanation for intracranial and intraocular bleeding should be taken as evidence that shaking had occurred.[37] According to Caffey, although the evidence remained "manifestly incomplete," it warranted a nationwide education campaign on the dangers of habitual shaking.[38]

In the 1980s and 1990s, despite the lack of scientific support, researchers converted Caffey's beliefs into a diagnosis. "It appears that not a single medical publication between Guthkelch's 1971 article and [the year] 1987 treated the shaking hypothesis as unproven or challenged whether SBS could be diagnosed reliably."[39] Instead, "[s]everal leading figures in child abuse pediatrics published peer-

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[35] Papetti at 18.

[36] Caffey-1972 at 168-69.

[37] John Caffey, *The Whiplash Shaken Infant Syndrome*, 54 PEDIATRICS 396, 403 (1974).

[38] *Id.* at 403.

[39] Papetti at 25.

reviewed papers advocating that shaking alone could and often did cause the SBS findings."[40]

Even more significantly, in 1993, the American Academy of Pediatrics' (AAP) Committee on Child Abuse and Neglect adopted SBS as medical and scientific fact. In a statement entitled *Shaken Baby Syndrome: Inflicted Cerebral Trauma*, the AAP identified "shaken baby syndrome [as] a clearly definable medical condition" and, relying primarily on the work of Guthkelch and Caffey, focused SBS on "a constellation of [three] clinical findings in infants": retinal hemorrhages, subdural hematomas, and brain injury with little external evidence of cranial trauma.[41] The AAP's policy statement, which was considered state-of-the-art at the time, encouraged physicians to report immediately to the authorities any suspicion of head injury caused by shaking.[42] And it endorsed "a medical *presumption* of child abuse when a child younger than 1 year of age has intracranial injury."[43]

The AAP reaffirmed the triad-based presumption of abuse in 2001.[44] By that point, and as relevant to this case, the AAP had also concluded that "[t]he

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[40] *Id.* at 33.

[41] Comm. on Child Abuse & Neglect, Am. Acad. of Pediatrics ("COCAN"), *Shaken Baby Syndrome: Inflicted Cerebral Trauma*, 92 PEDIATRICS 872, 872-73 (1993).

[42] *Id.* at 872, 874.

[43] *Id.* at 872 (emphasis added).

[44] COCAN, *Shaken Baby Syndrome: Rotational Cranial Injuries—Technical Report*, 108 PEDIATRICS 206 (2001).

constellation of . . . injuries" purportedly associated with SBS "does not occur with short falls," such as falling off a stool or down a few stairs.[45] And in paper after paper, a consensus emerged that "[n]o other medical condition fully mimics all the [triad] features,"[46] that "SBS was a valid diagnosis that could be made reliably"—and those who claimed otherwise were "unscrupulous."[47]

II. OVER THE PAST TWO DECADES, THE UNDERPINNINGS OF SBS HAVE CRUMBLED

The medical community's immediate acceptance of SBS "resulted in a lack of studies into other potential causes of the constellation or triad, even while SBS itself remained unproven."[48] SBS became a "default diagnosis" that was "based solely on the finding of the triad—not for lack of other evidence, but for lack of looking for other evidence."[49]

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[45] *Id.* at 206; *see also* Mary E. Case et al., *Position Paper on Fatal Abusive Head Injuries in Infants and Young Children*, 22 AM. J. FORENSIC MED. PATHOLOGY 112 (2001).

[46] Ann-Christine Duhaime et al., *Nonaccidental Head Injury in Infants—The "Shaken-Baby Syndrome*," 338 NEW ENG. J. MED. 1822, 1827 (1998).

[47] Papetti at 37; *see id.* at 46-69 (summarizing SBS beliefs as of 2001).

[48] *Jones v. State*, No. 0087, Sept. Term 2019, 2021 WL 346552, at *11 (Md. Ct. of Spec. App. Feb. 2, 2021).

[49] *Id.* (quoting Rubin Miller & Marvin Miller, *Overrepresentation of Males in Traumatic Brain Injury of Infancy and in Infants with Macrocephaly: Further Evidence*

Scientific research has since undermined the very foundations of SBS orthodoxy. Rather than confirming Caffey's hypothesis about whiplash shaking, science has reduced to rubble the previously accepted presumption of abuse-by-shaking.[50]

A. Around the Time of Petitioner's Trial, Significant Questions About the "Triad" Presumption Began to Percolate in the Medical Community

By 2002, although SBS was a widely accepted medical diagnosis, doubts began to surface. John Plunkett, a forensic pathologist, had published a report describing a toddler's videotaped fall from indoor playground equipment that resulted in the triad findings and death after a short lucid interval,[51] and a group of leading child-abuse pediatricians had published a paper identifying numerous nontraumatic causes of subdural hematomas—including a short fall.[52]

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that Questions the Existence of the Shaken Baby Syndrome, 31 AM. J. FORENSIC MED. PATHOLOGY 165, 169, 170 (2010)) (cleaned up).

[50] *See generally* Papetti at 104-42.

[51] John Plunkett, *Fatal Pediatric Head Injuries Caused by Short-Distance Falls*, 22 AM. J. FORENSIC MED. PATHOLOGY 1 (2001).

[52] Kent P. Hymel et al., *Intracranial Hemorrhage and Rebleeding in Suspected Victims of Abusive Head Trauma: Addressing the Forensic Controversies*, 7 CHILD MALTREATMENT 329 (2002).

Doubts intensified following the publication of a 2002 paper addressing the biomechanics of pediatric head injury. The authors, a neurosurgeon (Ayub Khan Ommaya) and two biomechanical engineers (Werner Goldsmith and Larry Thibault), agreed that a short fall could clearly produce brain hemorrhages; a fall from a height no greater than three to four feet could create forces about ten times greater than whiplash shaking.[53] Retinal hemorrhaging from a "shaken eye" was, they said, biomechanically improbable; such bleeding was much more likely to result from increased intracranial pressure.[54] And, they found, the first structure to experience injury under whiplash conditions is the neck.[55]

In another 2002 paper, Patrick Barnes, a pediatric radiologist, concluded that most evidence purporting to support the diagnostic criteria for SBS was relatively weak.[56] He emphasized that "more recent reports . . . based upon clinical, surgical, imaging, pathologic, biomechanical, social, and legal observations . . . raise[d] serious doubt[s]" about the triad.[57] Based on those reports, he concluded that subdural hematomas and retinal hemorrhages could

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[53] Ayub Khan Ommaya et al., *Biomechanics and Neuropathology of Adult and Paediatric Head Injury*, 16 BRIT. J. NEUROSURGERY 220, 225-26 (2002).

[54] *Id.* at 233.

[55] *Id.* at 228.

[56] Patrick D. Barnes, *Ethical Issues in Imaging Nonaccidental Injury: Child Abuse*, 13 TOPICS IN MAGNETIC RESONANCE IMAGING 85, 86 (2002).

[57] *Id.*

be attributed to any number of non-abuse causes, and that "medical and imaging evidence . . . cannot accurately diagnose presumed intentional injury."[58]

Although this series of critiques began to spark doubts about the SBS hypothesis and, in the end, exposed the lack of scientific underpinnings, years passed before the flaws became more widely known.[59] Those offering criticism were dismissed as a "fringe group," and their ideas were not sufficiently developed in time for Roberson to scientifically attack SBS at trial. Indeed, in the absence of a body of critical commentary regarded as valid at the time, his counsel conceded the legitimacy of the State's SBS causation theory and did not challenge it.

B. Over the Next Decade, Scientific Evidence Emerged That Directly Contradicted the Assumptions Underlying the Triad Hypothesis

As time went on, research accelerated and ultimately reinforced Barnes' conclusion: the triad of symptoms previously associated with SBS could arise from many medical conditions, including "birth trauma and congenital malformations[], accidental trauma, genetic and metabolic disorders, hematologic diseases and coagulopathies, infectious diseases, autoimmune and vasculitic conditions, oncological disease, toxins, poisons, nutritional deficiencies, and

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[58] *Id.* at 87.

[59] Tuerkheimer at 8.

medical and surgical complications."[60] In 2007, Barnes urged radiologists to avoid a "*rush to judgment* regarding [nonaccidental injuries]."[61] He cautioned that "a timely and thorough multidisciplinary evaluation may be the difference between an appropriate child protection and an improper breakup of the family or a wrongful indictment and conviction."[62]

In the years that followed, research further undermined the hypothesis that shaking a baby creates subdural hematomas by rupturing bridging veins.[63] Many other natural causes of subdural hematomas were identified, "including HIE [hypoxic

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[60] Patrick D. Barnes & Michael Krasnokutsky, *Imaging of the Central Nervous System in Suspected or Alleged Nonaccidental Injury, Including the Mimics*, 18 TOPICS IN MAGNETIC RESONANCE IMAGING 53, 67 (2007) (citing A. Sirotnak, *Medical Disorders That Mimic Abusive Head Trauma*, *in Abusive Head Trauma in Infants and Children: A Medical, Legal, and Forensic Reference* 191-226 (L. Frasier et al., eds., GW Medical Publishing, 2006)).

[61] *Id.* at 66.

[62] *Id.* at 71.

[63] Julie Mack et al., *Anatomy and Development of the Meninges: Implications for Subdural Collections and CSF Circulation*, 39 PEDIATRIC RADIOLOGY 200 (2009); *see* Michael D. Jones et al., *Development of a Computational Biomechanical Infant Model for the Investigation of Infant Head Injury by Shaking*, 55 MED. SCI. & L. 291 (2015) (computational model indicates that shaking alone cannot produce injury thresholds associated with subdural hematoma).

ischemic encephalopathy],[64] clotting abnormalities, infections, and old bleeds."[65]

In one study, Michael Prange, a biomechanical engineer, created a dummy infant with the same head mass and brain mass as a human infant, but a hinge where the neck would otherwise be, to reduce resistance and create even higher levels of rotational acceleration than could be obtained with a real infant.[66] Prange then asked volunteers to shake the dummy as hard as possible and measured the levels of rotational acceleration within the head.[67] The result? Participants could not achieve the intensity needed to cause head injury.[68] Echoing Ommaya, Goldsmith, and Thibault, Prange also concluded that even if an adult could, by shaking, create the force necessary to inflict head injury on a child, the victim would sustain serious neck injuries as well; in other words, the mechanism of shaking itself was

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[64] HIE is a type of brain injury that reflects hypoxiaischemia, or a lack of oxygen; it can be attributed to "any medical condition that affect[s] the flow of oxygen to the brain." Findley et al. at 216, 230, 244.

[65] *Jones v. State*, 2021 WL 346552, at *7.

[66] Michael T. Prange et al., *Anthropomorphic Simulations of Falls, Shakes, and Inflicted Impacts in Infants*, 99 J. NEUROSURGERY 143, 143, 149 (2003) ("Prange").

[67] *Id.* at 145.

[68] *See id.* at 149; *Del Prete v. Thompson*, 10 F. Supp. 3d 907, 928-29 (N.D. Ill. 2014).

insufficient to produce brain injury without first causing catastrophic neck injury to the victim.[69]

Other studies demonstrated the flaws in tying retinal hemorrhages to SBS. Although retinal bleeding could indicate abusive head trauma, it is also found in any number of other conditions, both traumatic and non-traumatic,[70] including heightened intracranial pressure.[71] Such hemorrhages could not, therefore, specifically indicate abusive head trauma. Moreover, shaking an eyeball and causing a retinal hemorrhage "has never been done in a model and it has not occurred in people known to have been shaken."[72] Ophthalmologists don't even know "the precise mechanism in the body that causes retinal hemorrhaging," much less have they "established a causative relationship between abusive head trauma and retinal hemorrhages."[73]

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[69] *Del Prete*, 10 F. Supp. 3d at 929; *see* Mark A. Davison et al., *A Biomechanical Assessment of Shaken Baby Syndrome: What About the Spine?*, 163 WORLD NEUROSURGERY e223 (2022) (cervical spine injury is 30 times more likely than head injury in whiplash).

[70] *See* Michael V. Emerson et al., *Ocular Autopsy and Histopathologic Features of Child Abuse*, 114 OPHTHALMOLOGY 1384 (2007) ("much of what we think we know about the systemic and ocular findings of child abuse will continue to be the result of speculation rather than based on sound evidence").

[71] *Commonwealth v. Epps*, 53 N.E. 3d 1247, 1257 (Supreme Judicial Court of Mass. 2016).

[72] *Id.*

[73] *Del Prete*, 10 F. Supp. 3d at 932.

In fact, one study showed that both subdural and retinal bleeding could be caused by short falls; the study's authors unequivocally "contradict[ed] the prevalent belief of many physicians dealing with suspected child abuse that low-height falls by young children . . . cannot cause fatal intracranial injuries and severe retinal hemorrhages."[74] A team of biomechanical engineers further validated the point: their experiments yielded no data showing that the force created by shaking could trigger a subdural hematoma in an infant; instead, a fall of only 12 inches could create force *greater* than that produced by shaking.[75] And, by this point, "there were still no witnessed accounts of the shaking of a previously well child resulting in the triad, casting further doubt on the mechanism."[76]

In 2011, Barnes, who had already challenged the triad hypothesis, *see supra* p. 13, reviewed the latest SBS literature and agreed that subdural hemorrhages and retinal hematomas could result from short falls.[77] The literature also revealed that a

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[74] Patrick E. Lantz & Daniel E. Couture, *Fatal Acute Intracranial Injury, Subdural Hematoma, and Retinal Hemorrhages Caused by Stairway Fall*, 56 J. FORENSIC SCI. 1648 (2011).

[75] Prange at 143, 149; *see also* Scott Denton et al., *Delayed Sudden Death in an Infant Following an Accidental Fall*, 24 AM. J. FORENSIC MED. PATHOLOGY 371 (2003) (case study of lucid interval following brain injuries from short fall).

[76] Findley et al. at 237.

[77] Patrick D. Barnes, *Imaging of Nonaccidental Injury and the Mimics: Issues & Controversies in the Era of Evidence-Based*

child can remain conscious even after suffering abusive head trauma.[78] Barnes concluded that there was no evidentiary basis for reliably distinguishing between nonaccidental and accidental injury or the medical "mimics."[79]

In short, "historical assumptions regarding the causation and timing of the triad of signs and symptoms that would lead to a Shaken Baby Syndrome diagnosis were and are no longer considered medically sound."[80] "[N]o scientific evidence based on biomechanical models or animal studies . . . support the claims made by proponents of

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Medicine, 49 RADIOLOGY CLINICS N. AM. 205, at 215-16 (2011) ("Barnes").

[78] *Id.*; *see Del Prete*, 10 F. Supp. 3d at 951 (crediting expert testimony indicating that "a child may have a lucid interval after an incident of abusive head trauma and may 'go unresponsive' only much later, and thus the onset of unresponsiveness does not necessarily indicate that the caretaker present at the time was responsible for inflicting the injury.").

[79] Barnes at 223. Dr. Barnes was a "key prosecution witness" in the highly publicized 1997 trial of British nanny Louise Woodward, who was convicted of second-degree murder of an infant under a shaken-baby theory. In 2011, however, Barnes stated that he would not give the same testimony again; the "'revolution' in the understanding of head injuries in the past decade" has shown that "a number of medical conditions" can have the same effect on a baby's brain previously attributed to SBS. A.C. Thompson et al., *The Child Cases: Guilty Until Proven Innocent*, Nat'l Pub. Radio (June 28, 2011), https://www.npr.org/2011/06/28/137454415/the-child-cases-guilty-until-proven-innocent.

[80] *Vanek v. Wofford*, No. 14-cv-4427, 2016 WL 6783340, at *10 (C.D. Cal. July 26, 2016).

shaken baby syndrome,"[81] and shaking alone is unlikely to injure the brain without first causing injury to the spinal cord, spinal column, or neck.[82]

C. As Research Further Undermined the SBS Hypothesis, Many Medical Organizations and Physicians Changed Course

In light of the growing body of scientific evidence, key organizations began to reevaluate their embrace of the SBS triad hypothesis. In 2006, the National Association of Medical Examiners ("NAME"), the professional association for forensic pathologists, withdrew a position paper in which the organization had endorsed the SBS hypothesis. Although NAME itself did not provide an explanation, its conference of medical examiners criticized the triad hypothesis as "not scientifically valid" and "mythical."[83]

In 2009, the AAP revisited its position papers from 1993 and 2001. *See supra* pp. 10-11.[84] The AAP admitted that "advances in the understanding of the mechanisms and clinical spectrum of injury associated with abusive head trauma" showed that

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[81] *Epps*, 53 N.E. 3d at 1256.

[82] *Vanek*, 2016 WL 6783340, at *10-11.

[83] Findley et al. at 240-41 (presentations from a 2006 NAME conference included "Use of the Triad of Scant Subdural Hemorrhage, Brain Swelling, and Retinal Hemorrhages to Diagnose Non-Accidental Injury is Not Scientifically Valid" and "'Where's the Shaking?' Dragons, Elves, the Shaking Baby Syndrome and Other Mythical Entities.'").

[84] Cindy W. Christian et al., *Abusive Head Trauma in Infants and Children*, 123 PEDIATRICS 1409 (2009).

"the mechanisms and resultant injuries of accidental and abusive head injury overlap" and "there is no single or simple test to determine the accuracy of the diagnosis."[85] The AAP no longer claimed that short falls cannot cause the findings attributable to SBS. And, the AAP no longer adhered to the presumption of abuse; instead a diagnosis of abusive head trauma could be made "only after consideration of all clinical data."[86] In other words, the AAP "acknowledged that the mechanism of injury is unclear and that abuse[] can no longer be presumed from the presence of the triad."[87]

In 2016, a Swedish governmental agency undertook a thorough evaluation of all accumulated pediatric child-abuse literature to determine "how reliably the triad or its components can be explained by traumatic shaking," focusing on cases without external signs of trauma.[88] The review concluded that "[t]here is insufficient scientific evidence on which to assess the diagnostic accuracy of the triad in identifying traumatic shaking (very low quality evidence)."[89]

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[85] *Id.* at 1409.

[86] *Id.*

[87] *Jones*, 2021 WL 346552, at *12.

[88] Swedish Agency for Health Tech. Assessment & Assessment of Soc. Servs., Report No. 255E, *Traumatic Shaking: The Role of the Triad in Medical Investigations of Suspected Shaking—a Systematic Review* 7 (2016).

[89] *Id.* at 22.

Notably, physicians who remained prominent supporters of the SBS hypothesis acknowledged that the evidence was not as strong as previously thought.[90] Indeed, even at a conference "limited to supporters of the [SBS] hypothesis," the participants "repeatedly acknowledged" the "lack of evidentiary support for SBS."[91] In a preface to the conference proceedings, a Program Director at the National Institutes of Health stated:

> Because there is very little scientific experimental or descriptive work, the pathophysiology [of SBS] remains obscure, and the relationship to mechanics even cloudier . . . . What we need is science—research and evidence that just isn't there right now. The evidence that does exist has not been subjected to evidence-based scrutiny in a multidisciplinary scientific forum.[92]

Even more striking, many experts who originally supported the SBS hypothesis began to actively back

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[90] *See* Mark S. Dias, *The Case for Shaking*, *in Child Abuse and Neglect: Diagnosis, Treatment and Evidence* 364 (Carole Jenny et al. eds., 2011) (noting that "[u]nfortunately, nobody has yet marshaled a coherent and comprehensive argument in support of shaking as a causal mechanism for abusive head injury"); Findley et al. at 214 n.7, 244, 276-78 (referencing Dr. Carole Jenny's child abuse training session for prosecutors in which she described the triad as a "myth" and recognized that abuse is not the only possible explanation for these symptoms).

[91] Findley et al. at 234.

[92] *Id.* (quoting Am. Acad. of Pediatrs., Inflicted Childhood Neurotrauma: Proceedings of a Conference Sponsored by the Dep't of Health & Human Servs., NIH, et al. at IX (Robert M. Reece & Carol E. Nicholson eds., 2003)).

efforts to prevent or vacate convictions that were based on the old assumptions.[93] Most prominent among them was Dr. Guthkelch, the neurosurgeon whose 1971 paper sparked the genesis of the SBS hypothesis. *See supra* p. 7. In 2012, Guthkelch published an essay in which he reflected on the evolution of accepted SBS science and cautioned that just because parents should be advised to avoid shaking, it "does not follow . . . that one can infer shaking (or any other form of abuse) from a finding of retino-dural hemorrhage in infancy."[94] Pointing to "[n]ew work" in the field, he stated that one cannot assume that such "findings are caused by trauma, rather than natural causes" and emphasized that SBS is simply a hypothesis, "not proven medical or scientific fact[]."[95] Guthkelch had reviewed cases in which the alleged perpetrator had continued to proclaim their innocence, and was "struck by the high proportion of those in which there was a significant

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[93] At least nine such medical professionals were profiled in the *Washington Post*. They had "once diagnosed Shaken Baby Syndrome" but were "swayed by more than a decade of research that's documented how diseases, genetic conditions and accidents can, in some cases, produce the conditions long attributed to violent shaking." *See* Debbie Cenziper, *Shaken Science: A Disputed Diagnosis Imprisons Parents*, WASH. POST (Mar. 20, 2015), https://www.washingtonpost.com/graphics/investigations/shaken-baby-syndrome/ ("Cenziper").

[94] A. Norman Guthkelch, *Problems of Infant Retino-Dural Hemorrhage with Minimal External Injury*, 12 HOUS. J. HEALTH L. & POL'Y 201 (2012).

[95] *Id.* at 204, 207.

history of previous illness . . . suggesting that the problem was natural . . . rather than abusive."[96]

Consistent with these views, Guthkelch submitted a declaration in support of vacating the 2002 "shaken-baby" conviction of a Phoenix man, as did the medical examiner who originally ruled the death a homicide.[97] Guthkelch said that the triad-based presumption was a "distortion" of his paper,[98] and he later told the *Washington Post*: "I am doing what I can so long as I have a breath to correct a grossly unjust situation . . . I think they've gone much too far."[99]

III. BECAUSE IT IS SCIENTIFICALLY UNRELIABLE, SBS DOES NOT BELONG IN THE COURTROOM

At Roberson's 2003 trial, the triad hypothesis was taken as gospel. From the get-go, the State invoked SBS: during voir dire and in its opening statement, the prosecution invited the jury to imagine just how violent the shaking must have been to cause the death of Roberson's daughter, Nikki. Pet. 9. In its own opening statement, defense counsel *agreed* with the prosecution that this was a shaken-baby case. *Id.* From there, experts testified that Nikki's subdural

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96 *Id.* at 203-04.

97 *See* Emily Bazelon, *The Exoneration of Drayton Witt: An Arizona Father Convicted of Shaking His Infant Son to Death Can Rebuild His Life*, SLATE (Oct. 31, 2012), https://slate.com/news-and-politics/2012/10/what-the-exoneration-of-arizona-father-drayton-witt-means-for-shaken-baby-syndrome-prosecutions.html.

98 Papetti at 80.

99 Cenziper, *supra* n.93.

hematoma was caused by some component of shaking. Pet. 10-12. Her retinal hemorrhages supposedly "really let[] you know that those eyes [had been] shaken." Pet. 11, 27. And, according to the experts, a short fall from the bed could not possibly have caused those conditions (Pet. 10, 26); a lack of neck injuries was irrelevant (Pet. 12); and it was perfectly acceptable to assume that when the triad of symptoms appears, abusive shaking was the cause (Pet. 11).

Yet, the key medical propositions relied on at Roberson's trial are now demonstrably wrong, and the medicolegal presumption of guilt has been abolished. The supposed "fringe views" critical of SBS that emerged in the late 1990s and early 2000s are today recognized as legitimate and "part of a significant debate."[100]

At his state habeas hearing, Roberson introduced into evidence expert testimony from leading medical professionals—including Drs. Janice Ophoven, Kenneth Monson, John Plunkett, and Ronald Auer—who described in detail the evolution of the scientific understanding of SBS and how those changes have discredited the evidence presented at Roberson's trial: numerous mechanical and physiological causes can lead to the "triad" symptoms (Pet. 16); only as of 2016 was there a clinical consensus that low-level falls could produce such symptoms (Pet. 18-19); it is now common practice to consider alternative diagnoses (Pet. 16); and, in any event, modern science has raised significant doubts that shaking a *two-year-old child*

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[100] *Wis. v. Edmunds*, 746 N.W. 2d 590, 595 (Wis. Ct. App. 2008).

(like Nikki), as opposed to an infant, could produce the triad at all (Pet. 17).

Many courts "have recognized [the] new medical and scientific [SBS] research as newly discovered evidence in overturning convictions."[101] And, along with Justice Ginsburg, they have found it "unlikely that the prosecution's experts would today testify as adamantly" as they did before,[102] creating "a significant possibility" that SBS trials involving the triad hypothesis would now end very differently.[103]

The courts in this case, however, failed to appreciate the materiality of the newly developed evidence introduced by Roberson at his state habeas hearing. They ignored credible scientific developments and bought into the State's position that SBS "is still a recognized diagnosis in the medical field,"[104] as if no one in the past two decades had recognized that "a claim of shaken baby syndrome [wa]s more an article of faith than a proposition of science."[105] The courts should have considered overwhelming evidence of non-triad causes of Nikki's

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[101] *Jones*, 2021 WL 346552, at *15 (collecting cases).

[102] *Cavazos v. Smith*, 565 U.S. 1, 14 (2011) (Ginsburg, J., dissenting).

[103] *Jones*, 2021 WL 346552, at *13.

[104] Findings of Fact & Conclusions of Law ¶ 9, Trial Cause No. 26162-A, CCA Cause No. WR-63,081-03, 87th Judicial District Court, Anderson Co., TX (Feb. 14, 2022); Proposed Findings of Fact & Conclusions of Law ¶ 9, Trial Cause No. 26162-A, CCA Cause No. WR-63,081-03, 87th Judicial District Court, Anderson Co., TX (Jan. 24, 2022).

[105] *Del Prete*, 10 F. Supp. 3d at 957 n.10.

death, including pneumonia. Neither court acknowledged that the science discrediting SBS in the years since Roberson's conviction not only undermines the State's theory and the testimony of the State's experts, but also creates a defense that Roberson could not have presented at the time of his trial.

Roberson was granted leave to proceed under a new state habeas statute that was designed specifically to address criminal convictions based on discredited or incorrect science.[106] In this case, the rights established by that very statute were rendered meaningless, and the courts reviewing Roberson's case left in place a very substantial risk of a miscarriage of justice.

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[106] Tex. Code Crim. P. art. 11.073.

CONCLUSION

Amici respectfully urge the Court to grant the petition for a writ of certiorari.

Respectfully submitted,
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APPENDIX

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