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REPLY LETTER BRIEF AND APPENDIX ON BEHALF OF THE STATE OF NEW JERSEY

Honorable Judges of the Superior Court of New Jersey
Appellate Division
Richard J. Hughes Justice Complex
Trenton, New Jersey 08625

RE: STATE OF NEW JERSEY (Plaintiff-Appellant) v.
DARRYL NIEVES (Defendant-Respondent)

Indictment No. 17-06-00785; App. Div. Docket No. A-002069-21T4

Criminal Action: On Appeal From a Final Order of the Superior Court of New Jersey, Law Division, Middlesex County

Sat Below: Pedro J. Jimenez, Jr., J.S.C.

Honorable Judges:

Pursuant to Rule 2:6-2(b), this letter brief is submitted in lieu of a formal brief on behalf of the State of New Jersey.

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STATEMENT OF PROCEDURAL HISTORY AND FACTS

For purposes of this reply brief, the State relies on the statements of procedural history and facts set forth in its brief filed August 5, 2022. (Pb2-14).[1]

[1] References to the record are made as follows:
Pb = State's August 5, 2022 brief.
Pa = Appendix to State's August 5, 2022 brief.
Pra = Appendix to State's reply letter brief.
Db = Defendant's brief.
Da = Defendant's appendix.
1T = Transcript of motion, Nov. 2, 2018.
2T = Transcript of hearing, Jul. 11, 2019.
3T = Transcript of hearing, Aug. 12, 2019.
4T = Transcript of Frye hearing, Sept. 24, 2020.
5T = Transcript of Frye hearing, Sept. 29, 2020.
6T = Transcript of Frye hearing, Sept. 30, 2020.
7T = Transcript of Frye hearing, Oct. 13, 2020.
8T = Transcript of Frye hearing, Oct. 15, 2020.
9T = Transcript of decision, Jan. 7, 2020.
10T = Transcript of hearing, Jan. 28, 2022.
11T = Transcript of grand jury proceeding, June 23, 2017.

LEGAL ARGUMENT

POINT I

THE STATE ESTABLISHED THE RELEVANT SCIENTIFIC COMMUNITY'S GENERAL ACCEPTANCE OF THE DIAGNOSIS THAT WAS MADE IN THIS CASE: "ABUSIVE HEAD TRAUMA, AS OCCURS WITH A SHAKING EVENT WITH OR WITHOUT IMPACT." (Pa2-78)

As the State emphasized in its August 5, 2022 brief, "[i]t bears repeating that Dr. Medina did not opine in this case that shaking alone was the mechanism that caused D.J.'s injuries; the doctor opined that D.J. suffered from AHT 'as occurs with a shaking event with or without impact.'" (Pb49 (quoting Pa117)). Dr. Medina testified "that there could have been 'impact into a soft surface,' which would cause no 'external signs of trauma.'" (Pb49 (quoting 5T52-25 to 53-8)). Nevertheless, defendant argues Dr. Medina's proposed testimony was properly excluded because, according to defendant, "The State Was Required to Prove the Reliability of the Shaking-Only Theory, Not Abusive Head Trauma as a General Concept." (Db19). Defendant's argument lacks merit because Dr. Medina never claimed to know definitively that shaking alone caused D.J.'s symptoms and injuries, and in any case, the State established that shaking alone can cause symptoms and injuries like those suffered by D.J.

At the outset, contrary to defendant's assertion, the State has not "abandoned" on appeal any theory or argument it advanced before the trial court. (Db52). In this appeal, the State seeks reversal of the trial court's orders excluding testimony on AHT and dismissing the indictment. Thus, the arguments in the State's August 5, 2022 brief addressed the reasons stated by Judge Jimenez in support of those orders.

Judge Jimenez's reasons for excluding AHT testimony in this case, which are stated under the heading "Legal Parameters" in the court's written decision, include no mention of bridging veins or vitreoretinal traction. (Pa67-77). Judge Jimenez did not address defendant's specific arguments regarding shaking as a possible cause of bridging-vein rupture, bridging-vein rupture as a possible cause of small subdural hemorrhages (SDH), or vitreoretinal traction as a possible cause retinal hemorrhages (RH). (Db43-44). The State did not address those specific issues in its August 5, 2022 brief because those specific issues were not addressed by the trial court.

Defendant claims "Dr. Medina did not provide a reliable basis to conclude that shaking can cause subdural hematomas" (Db43) and the doctor "conceded that '[n]o study shows' that shaking causes bridging veins to tear or that her theory had been validated." (Db43). In fact, the question Dr. Medina was asked in the passage cited by defendant was, "[T]here is no study that

shows the tearing of the bridging vein; right?" (4T169-23 to 24). To that question, the doctor answered, "No." (4T169-25). Dr. Medina did not make the concessions claimed by defendant.

Moreover, in one of the studies in which lambs were shaken, which defendant cites in support of his arguments (Db40-41), the authors noted that "[a] small subdural haemorrhage was found in two shaken lambs, due to tearing of fragile bridging veins between the cortical surface and dural sinuses during shaking." John W. Finnie et al., Diffuse neuronal perikaryal amyloid precursor protein immunoreactivity in an ovine model of non-accidental head injury (the shaken baby syndrome), 17 J. Clinical Neuroscience 237, 239 (2010). (Pa377) (emphasis added). Another study cited by defendant (Db40) acknowledged,

> Rotation produces differential displacements of adjacent spherical brain layers due to the outwardly increasing translational velocity with respect to the axis of rotation, which is most often located either at the occipital condyles or at the base of the neck. This results in shearing of the tissue, the cause of diffuse axonal injury and various forms of vascular disruptions. The relative motion of the brain with respect to the skull is also responsible for any rupture of vessels such as the bridging veins at the skull/brain interface, which is the most likely cause of subdural haematomas.
>
> [A.K. Ommaya et al., Biomechanics and Neuropathology of Adult and Paediatric Head Injury, 16 Brit. J. of Neurosurg. 220, 224 (2002). (Da46).]

Scientific literature discussing infants' bridging veins when examined during autopsy has noted not only that "[r]otational movement of the brain within the cranium," as occurs during violent shaking, "creates shearing or tearing of the bridging veins on its surface and thus bleeding into the subdural compartment" but also that

> [t]he amount of blood at the surface of the brain in the infants with non-accidental head injury who die may be minimal. First, because the bleeding is venous, and therefore slow, and second because the encephalopathy causes so much brain swelling that it presses the ends of the ruptured vessels against the skull.
>
> [Caroline Rambaud, Bridging veins and autopsy findings in abusive head trauma, 45 Pediatric Radiology 1126, 1127 (2015) (emphasis added). (Pra1-2).]

In addition, certain features of the bridging veins imply that they "are more fragile in the subdural portion than in the subarachnoid portion. . . . The anteroposterior acceleration or deceleration of the head can easily cause traction of the bridging veins, and they will rupture at their weakest point, that is, in the subdural space." Id. at 1128. (Pra3).

This scientific research contradicts defendant's claim, which based on Dr. Mack's testimony, "that bridging veins do not rupture easily due to their strength and elasticity, and that such a rupture would result in a significant loss of blood, constituting 'a surgical emergency[,]' rather than a benign

hematoma." (Db43). Notably, defense counsel asked Dr. Mack, "[W]hat specific research has shown you that bridging vein ruptures are not to be presumed when there [are] subdural hemorrhages?" (6T18-14 to 16). In answering that question, Dr. Mack cited no research. (6T18-17 to 19-11).

Even if no biomechanical study definitively establishes that every shaking event causes bridging-vein rupture resulting in SDH—neither Dr. Medina nor the State ever claimed any did—the important point is that State has established through the testimony at the Frye hearing and the most current scientific literature that violent shaking with or without impact can cause SDH in an infant. This fact is evidenced by, among other studies, the recent Feldman study, in which infants who were independently witnessed to have been shaken were found to have SDH without evidence of impact. Kenneth W. Feldman, et al., Abusive head trauma follows witnessed infant shaking, Child Abuse Rev. e2739 (2022), available at https://doi.org/10.1002/car.2739. (Pa540-49).

Defendant further claims that "the vitreoretinal traction theory" is unsupported as an explanation for "how shaking can cause severe retinal hemorrhages." (Db43). Contrary to defendant's suggestion (Db43), the vitreoretinal traction theory is not Dr. Medina's theory alone; it is a theory supported by medical literature referenced at the Frye hearing. The Morad

study, referenced as Exhibit S-17 at the Frye hearing (4T67-2 to 21), explains that the vitreoretinal traction theory

> is supported by post-mortem examinations [showing] victims have significantly more haemorrhages in orbital fat and optic nerve dura than children who died from accidental trauma, and by optical coherence tomography studies on [AHT] victims that demonstrated multiple vitreo-retinal traction sites that may be coupled with intraretinal haemorrhages. The frequency of haemorrhage at the retinal periphery is anatomically consistent with the increased vitreoretinal adhesiveness in that area.
>
> [Yair Morad et al., Retinal haemorrhage in abusive Head trauma, 38 Clinical & Experimental Ophthalmology 514, 515 (2010) (citing studies "supporting the mechanism of vitreoretinal traction"). (Pa331-32).]

Another article, referenced at the Frye hearing as Exhibit S-12 (4T59-24 to 64-1), explains,

> The most likely contributing cause of retinal hemorrhages in abusive head trauma is vitreoretinal traction injury due to deceleration forces resulting from shaking and/or impact. This theory is supported by the anatomical location of retinal hemorrhages, which are often concentrated in areas of strongest attachment between the retina and vitreous, including the macula, along the retinal vessels and at vitreous base in the far peripheral retina; the presence of macular retinoschisis and retinal folds, again centered in an area of strong attachment; and animal models of inertial injury demonstrating intraocular hemorrhage in areas of strong vitreoretinal attachment.

> [Gil Binenbaum & Brian J. Forbes, The eye in child abuse: Key points on retinal hemorrhages and abusive head trauma, 44 Pediatric Radiology S571, S574 (2014). (Pa299).]

Yet another article, referenced as Exhibit S-13 at the Frye hearing (4T61-8 to 20), similarly states that "[v]itreoretinal traction injury to the retinal vessels caused by repetitive deceleration injury is the leading and most-supported hypothesized mechanism underlying [RH], based on clinical, autopsy, laboratory, and finite element modeling evidence." Gil Binenbaum et al., Patterns of Retinal Hemorrhage Associated With Increased Intracranial Pressure in Children, 132 Pediatrics 430, 431 (2013). (Pa304).

More recent research further supports the general acceptance of the vitreoretinal traction theory. See Cindy W. Christian & Gil Binenbaum, The eye in child abuse, Child's Nervous Sys., available at https://doi.org/10.1007/s00381-022-05610-8 (citing studies from 2020 and 2021 and noting that "[t]he use of increasingly sophisticated bedside imaging and other technology . . . support[s] vitreoretinal traction during deceleration forces as the primary mechanism for traumatic retinal hemorrhages"). (Pra9-10).

Again, the fact that no biomechanical study definitively establishes vitreoretinal traction as the cause of severe RH in an infant does not mean that the vitreoretinal traction theory lacks a reliable scientific basis. The aforementioned scientific literature establishes a reliable scientific basis for the

theory. More importantly, however, scientific literature such as the Feldman study establish that shaking can cause severe RH in an infant without evidence of impact. (Pa540-49). The State did not fail to provide a reliable scientific basis for Dr. Medina's opinion that shaking an infant with or without impact can cause severe RH.

Defendant nevertheless argues "study after study has shown that shaking without impact cannot cause the injuries associated with AHT and that, even if enough force could be created, it would also result in neck injuries inconsistent with the [shaking-only] theory." (Db2). As discussed, the Feldman study and other studies cited by the State in its August 5, 2022 brief show that shaking without impact can cause the injuries associated with AHT (SDH, RH, and encephalopathy). (Pb23-28, 35-39). Moreover, defendant's argument that neck injuries would be present if an infant were shaken violently is flawed.

As explained in the consensus statement on AHT, "[t]he absence of external trauma to the head and neck is common, . . . and sometimes soft-tissue injuries including scalp hematomas are only evident at autopsy." Aribinda Kumar Choudhary et al., Consensus Statement on Abusive Head Trauma in Infants and Young Children, 48 Pediatric Radiology 1048, 1052-53 (2018). (Pa142-43). For example, the 1987 Duhaime study examined fifty-seven children "with suspected shake injury," thirteen of whom had died as a result

of their injuries. Ann–Christine Duhaime et al., The Shaken Baby Syndrome: A Clinical, Pathological, and Biomechanical Study, 66 J. Neurosurgery 409, 410 (1987). (Pa193). The researchers observed that "[a]ll fatal cases had signs of blunt impact to the head" but that "in more than half of them these findings were noted only at autopsy." (Pa192) (emphasis added). See also Del Prete v. Thompson, 10 F. Supp. 3d 907, 937 (N.D. Ill. 2014) (expert on child abuse pediatrics "testified that doctors frequently fail to recognize neck (cervical) injuries in cases of abusive head trauma because of the manner in which autopsies typically are done").

Thus, it should not be assumed based on the absence of externally visible injuries either that no impact occurred or that no internal neck injury was suffered. That is significant in this case because, as Dr. Scheller acknowledged, an MRI focusing on D.J.'s neck might have shown an injury to the neck, but no such MRI was taken. (5T199-12 to 15). Once again, Dr. Medina did not diagnose D.J. with "shaking-only AHT" as defendant argues (Db17-62); Dr. Medina diagnosed D.J. with AHT "as occurs with a shaking event with or without impact" (Pa117), and the State has established through the expert testimony at the Frye hearing and the "authoritative scientific and legal writings" provided that this diagnosis is generally accepted as valid. State v. J.L.G., 234 N.J. 265, 281 (2018).

The State also established the general acceptance of this diagnosis through "judicial opinions," ibid., as explained in the State's August 5, 2022 brief. (Pb29-31, 52-53). Defendant overstates the degree to which other courts "have questioned the validity of the shaking theory." (Db59).

For example, in Commonwealth v. Millien, 50 N.E.3d 808 (Mass. 2016), the first case cited by defendant (Pb59), the court itself did not express an opinion on "the view that shaking alone cannot produce injuries of the type and severity suffered by" the victim in that case, who had a skull fracture. Id. at 820. The court only held that defense counsel was ineffective "because he failed to seek funds from the court to retain an expert witness for his indigent client" as part of "an available, substantial ground of defense." Id. at 818, 824. That defense expert, the court explained, could have challenged the opinion of the State's expert, who at the time of trial opined that the victim's "brain injuries and retinal hemorrhaging were caused by shaking alone," and could have cited "numerous scientific studies supporting the view that shaking alone cannot produce injuries of the type and severity suffered by" the victim, which, again, included a skull fracture. Id. at 816, 820. The court noted, however, that the testimony of the State's experts also "finds support in scientific research, and that numerous scientific studies were cited in support of their opinions." Id. at 823.

Similarly, in State v. Edmunds, 746 N.W.2d 590 (Wis. Ct. App. 2008) (Db59), the court did not find the testimony of the State's experts unreliable; the court simply held that "the emergence of a legitimate and significant dispute within the medical community" regarding "shaken baby syndrome" (SBS) constituted "newly discovered evidence" entitling the defendant to a new trial. Id. at 599. Notably, the court did not bar the testimony of the State's experts as Judge Jimenez did here. Rather, the court concluded that "a jury would be faced with competing credible medical opinions in determining whether there is a reasonable doubt as to [defendant's] guilt." Ibid. Also noteworthy is the fact that the Edmunds decision was issued in 2008, before the SBS diagnosis was replaced with the broader AHT diagnosis made in this case and before the publication of many of the studies supporting Dr. Medina's diagnosis.

The decision in People v. Bailey, 999 N.Y.S.2d 713 (N.Y. Cty. Ct. 2014), aff'd, 41 N.Y.S.3d 625 (App. Div. 2016) (Db59), is also inapposite because it considered only whether scientific literature published after the defendant's 2001 trial constituted newly discovered evidence entitling the defendant to a new trial. A New York trial judge's finding that a defense expert testified credibly at a post-conviction motion hearing should not persuade this court that Dr. Medina's proposed testimony in this case, which is

supported by current scientific literature, is so unreliable as to be inadmissible under Frye.

At most, the cases from other jurisdictions cited by defendant (Db59) stand for the proposition that a defendant should be permitted to present expert testimony challenging a diagnosis of AHT, not that expert testimony about an AHT diagnosis should be barred as unreliable. See Del Prete, 10 F. Supp. 3d at 958 n.10 (emphasis added) (noting that the absence of established injury thresholds, along with other developments "arguably suggests that a claim of shaken baby syndrome is more an article of faith than a proposition of science" but also noting the court was "not persuaded that the experimental testing cited by [the biomechanical engineer] definitively establishes that shaking alone cannot cause injuries of the type that [the victim] suffered"); Cavazos v. Smith, 565 U.S. 1, 13 (2011) (Ginsburg, J., dissenting) (quoting previously addressed Edmunds opinion in dissent). See also Joëlle Anne Moreno & Brian Holmgren, Dissent into Confusion: The Supreme Court, Denialism, and the False "Scientific" Controversy over Shaken Baby Syndrome, 2013 Utah L. Rev. 153 (2013) (addressing Cavazos dissenting opinion).

Furthermore, when defendant asserts that "our courts have more recently excluded shaking-only testimony," defendant is referring to the Law Division judge in this case and the Law Division judge in State v. Jacoby, Indictment

No. 15-11-0917-I (Law Div. Aug. 17, 2018), whose unpublished decision this court could not be appealed. (Db54-55; Da 23-41). Neither decision is precedential, R. 1:36-3, or persuasive. The Law Division's decision in this case is unpersuasive for the reasons argued in the State's August 5, 2022 brief. (Pb15-54). The Law Division's decision in Jacoby is also unpersuasive and distinguishable for several reasons.

First, the Jacoby decision addressed whether the court found defendant guilty following a bench trial. "[T]he parties elected to deal with the issues involved in the previously filed Frye motion during the trial, rather than by way of a separate hearing." (Da25). Thus, the court's assessment of whether expert testimony was sufficiently reliable to be admissible was intertwined with its assessment of whether all of the evidence together proved defendant was guilty beyond a reasonable doubt. Second, in Jacoby, none of the experts had examined the victim. (Da33). Here, the only expert to examine the victim was the State's expert, Dr. Medina. (4T96-17 to 20). Third, in Jacoby, other than the State's expert's "own credentials and testimony, the State did not provide any additional evidence that her expert opinion is generally acceptable." (Da33). Here, the State cited numerous scientific studies, legal writings, and judicial opinions supporting and establishing the general acceptance of Dr. Medina's expert opinion. (Pb15-54).

Additionally, the Jacoby court's most significant finding is not even inconsistent with the State's position in this case. The judge in Jacoby stated, "[T]he Court finds that presently there is no sufficiently reliable evidence and no general consensus in the scientific and medical community that the presence of subdural hematomas and retinal hemorrhages should automatically lead to a presumption of abusive head trauma to satisfy the Frye standard." (Da35). In this case, neither Dr. Medina nor the State has ever supported an automatic presumption of AHT based on findings of SDH and RH. Beyond being nonbinding, the Jacoby decision is unpersuasive and inapposite to this case.

The few unpersuasive judicial opinions cited by defendant do not undermine the many persuasive judicial opinions cited by the State, which support the general acceptance of AHT as a valid diagnosis, including where the child-victim shows no external signs of impact or injury. See, e.g., Sissoko v. State, 182 A.3d 874, 887 (Md. Ct. Spec. App. 2018). (Pb29-31, 52-53). Those opinions, along with the Frye hearing testimony and the "authoritative scientific and legal writings" provided by the State, J.L.G., 234 N.J. at 281, establish that the AHT diagnosis as rendered by Dr. Medina in this case satisfies the Frye general-acceptance standard for reliability. Dr. Medina should not have been barred from testifying on AHT.

Defendant argues the relevant scientific community should include both biomechanics and medicine. However, child abuse pediatricians like Dr. Medina do take biomechanical research into account. Although Dr. Medina did not claim to be an expert in biomechanics and stated on cross-examination that she had not been trained specifically in the field of biomechanics, she testified on direct examination that her training in child abuse pediatrics included training in biomechanics and that she had "become very familiar with the biomechanics of trauma." (4T13-24 to 14-10; 4T36-11 to 40-12; 4T170-10 to 16).

As defendant acknowledges, an AHT diagnosis by a child abuse pediatrician involves a multidisciplinary team and may include consultations "in radiology, ophthalmology, neurosurgery, and other subspecialties," including genetics and hematology. (Db25). Biomechanics should not be ignored, but it also should not be elevated above the aforementioned medical specialties to the point where disagreement among biomechanical engineers trumps the clear and demonstrable consensus among numerous groups of medical specialists regarding shaking as a mechanism of AHT. (Pa142-43). The lack of consensus among biomechanical engineers regarding AHT does not justify ignoring the consensus among medical professionals who incorporate biomechanical research in their opinions.

Contrary to defendant's claim that "study after study has shown that shaking without impact cannot cause the injuries associated with AHT" (Db2), defendant's own biomechanics expert testified that biomechanical studies related to AHT had failed to disprove that shaking alone could cause subdural hematomas and retinal hemorrhages. (7T100-18 to 109-24). This inconclusive research was not a sound basis for finding Dr. Medina's AHT diagnosis in this case unreliable, given the voluminous evidence establishing the general acceptance of AHT's validity as a diagnosis. Judge Jimenez erred in excluding testimony on AHT, and that decision must be reversed.

POINT II

THE TRIAL COURT ABUSED ITS DISCRETION BY DISMISSING THE INDICTMENT ON THE BASIS OF ITS ERRONEOUS EXCLUSION OF DR. MEDINA'S TESTIMONY. (Pa87)

Regarding the trial court's dismissal of the indictment, the State relies on the arguments presented under Point II of its August 5, 2022 brief. (Pb55-57). The State maintains that Judge Jimenez abused the court's discretion primarily by dismissing the indictment on the basis of the court's erroneous exclusion of Dr. Medina's testimony. The State adds only that defendant's argument on this point underscores the error in the trial court's decision. As the State has previously argued (Pb56), Dr. Medina should be permitted to testify based on her own experience as a practicing physician in the field of child abuse that inflicted trauma can cause injuries like the ones suffered by D.J. (5T55-13 to 19). According to defendant's argument (Db63-65), Dr. Medina could only comply with the trial court's ruling if she not only denied the existence of AHT as a diagnosis but also ignored her experience as a practicing child abuse physician who examined the victim in this case. An evidentiary ruling that leads to such a result is not a sound exercise of judicial discretion and not a sound basis for dismissing an indictment. The trial court's order dismissing the indictment in this case must be reversed.

CONCLUSION

For the foregoing reasons and those argued in the State's August 5, 2022 brief, the State urges this court to reverse the trial court's orders barring AHT testimony and dismissing the indictment.

Respectfully submitted,

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Date: December 12, 2022