

STATEMENT OF THE INNOCENCE NETWORK ON SHAKEN BABY SYNDROME/ABUSIVE HEAD TRAUMA

Shaken baby syndrome (SBS), now more frequently known as abusive head trauma (AHT), is a medico-legal diagnosis that has served as the basis in thousands of cases where children have been separated from their parents and caretakers have been sent to prison. Until recently, no independent scientific agency had reviewed the evidence basis for the diagnosis. The first to do so published its results in 2016, and it found the evidence for SBS “insufficient” and unreliable.¹

The Innocence Network is very concerned that, despite several developments that undermine core SBS/AHT tenets, including the findings of this independent review, prosecutions and family separations continue and there has been no systematic attempt to identify and correct wrongful convictions.

The SBS/AHT hypothesis has never been validated. The unproven hypothesis allows doctors to infer abuse from a “constellation of findings” that we now know appear in a wide array of situations, both accidental and natural. The independent review has shown that there has never been a reliable basis to infer shaking or other abusive trauma from these findings. This has led and continues to lead to incorrect accusations of abuse and wrongful convictions.

Origin:

The American Academy of Pediatrics’ (AAP) Committee on Child Abuse and Neglect issued a “Technical Report” on SBS in 2001, which explained that Dr. A. Norman Guthkelch hypothesized in 1971 that shaking could explain the subdural bleeding when a child has no sign of impact or external injuries.² One year later, in 1972, “pediatric radiologist John Caffey popularized the term ‘whiplash shaken baby syndrome’ to describe a constellation of clinical findings in infants, which included retinal hemorrhages, subdural and/or subarachnoid hemorrhages, and little or no evidence of external cranial trauma.”³

Despite a dearth of evidence and no validation to support the “diagnosis” or its criteria, SBS was quickly accepted as fact and became an ingrained medical diagnosis. The prevailing beliefs propagated in leading text books was that “SBS usually produces a diagnostic triad of injuries that includes diffuse brain swelling, subdural hemorrhage, and retinal hemorrhages. This triad must be considered virtually pathognomonic of SBS in the absence of documented extraordinary blunt force such as an automobile accident.”⁴

¹ Swedish Agency for Health Technology Assessment and Assessment of Social Services, *Traumatic Shaking: The Role of the Triad in Medical Investigations of Suspected Traumatic Shaking—A Systematic Review*, (2016) [hereinafter SBU Report]. Published in English in 2017. <http://www.sbu.se/en/publications/sbu-assesses/traumatic-shaking--the-role-of-the-triad-in-medical-investigations-of-suspected-traumatic-shaking/>.

² Am. Acad. Pediatr., Committee on Child Abuse & Neglect. *Shaken Baby Syndrome: Rotational Cranial Injuries-Technical Report*. 108 PEDIATRICS 206 (2001) [hereinafter 2001 SBS Technical Report].

³ *Id.* at 206.

⁴ Robert A. Kirschner, *The Pathology of Child Abuse*, in *THE BATTERED CHILD* 272-73 (Mary E. Helfer et al. eds., 5th ed. 1997).

By 2001, the AAP’s Technical Report referred to SBS as “a clearly definable medical condition” and claimed that data “support the need for a *presumption of child abuse* when a child younger than 1 year has suffered an intracranial injury.”⁵

Dismantling of the Unproven Hypothesis:

In 2012, however, Dr. Guthkelch clarified that, “SBS and AHT are hypotheses that have been advanced to explain findings that are not yet fully understood. There is nothing wrong with advancing such hypotheses; this is how medicine and science progress. It *is* wrong, however, to fail to advise parents and courts when these are simply hypotheses, not proven medical or scientific facts.”⁶

Noting the importance of “getting it right” in these cases, Dr. Guthkelch called for an independent evaluation of the evidence basis for SBS/AHT by independent scientists. “Since the issue is not what the majority of doctors (or lawyers) think but rather what is supported by reliable scientific evidence, the evidence should be reviewed by individuals who have no personal stake in the matter, and who have a firm grounding in scientific principles, including the difference between hypothesis and evidence.”⁷

Beginning in 2014, a neutral body of experts did exactly what Dr. Guthkelch had suggested. The Swedish Agency for Health Technology Assessment and Assessment of Social Services, one of the oldest medical assessment organizations in the world, appointed a panel of experts to review the scientific quality of the SBS evidence base in order to advise whether SBS is a reliable diagnosis.⁸ Over more than two years, the expert group formulated their study and systematically reviewed the literature; the group’s findings were reviewed by three scientific boards within the SBU and assessed by external scientists before publication in 2016.⁹ The authors also published their findings in a peer-reviewed medical journal in 2017, which explained that, “[t]he main problem in the reviewed publications was the high risk of bias due to circular reasoning...”¹⁰

The SBU found that no high-quality studies supporting SBS exist and that no studies based on independently witnessed or videotaped evidence of SBS exist. Instead, a few studies use confessions and/or convictions, while most use “child protection teams” to classify cases as abuse. The problem is that “Child protection teams widely assume that when the triad is

⁵ 2001 SBS Technical Report at 206, 209 (emphasis added).

⁶ A. Norman Guthkelch, *Problems of Infant Retino-Dural Hemorrhage with Minimal External Injury*, 12 HOUS. J. HEALTH L. & POL’Y 201, 202 (2012).

⁷ *Id.* at 207-08.

⁸ See Måns Rosén et al., *Shaken Baby Syndrome and the Risk of Losing Scientific Scrutiny*, 106 ACTA PAEDIATR. 1905 (2017). The experts appointed included two pediatricians, experts in forensic medicine, radiology, medical epidemiology, and medical and research ethics. Four of the experts came from the Karolinska Institute, which awards the Nobel Prize in Physiology or Medicine.

⁹ Niels Lynøe, Göran Elinder et al., *The Swedish Systematic Review is Not Flawed and Should Not be Ignored*, ACTA PAEDIATR. (2018) DOI:10.1111/apa.14575.

¹⁰ Niels Lynøe et al., *Insufficient Evidence For ‘Shaken Baby Syndrome’ - A Systematic Review*, 106 ACTA PAEDIATR 1021 (2017).

present, the infant has, by default, been violently shaken. As this assumption is used as the gold standard, the resulting, and extremely high, diagnostic accuracy of the triad is obviously based on circular reasoning and not scientific criteria.”¹¹ The Report found all studies supporting the SBS diagnosis are of “low quality” and carried a high risk of bias, except for two studies of moderate quality with additional methodological shortcomings.¹²

The Report concluded: “There is insufficient scientific evidence on which to assess the diagnostic accuracy of the triad in identifying traumatic shaking (very low quality evidence).”¹³ The Report advised that, given the lack of reliable evidence to support the SBS diagnosis, it would be “incompatible with both doctors’ professional duties and the regulations concerning legal certification” to give a definite opinion that a child was shaken based on the triad.¹⁴

The only two studies identified by the SBU Report as being of moderate quality rely on confession evidence,¹⁵ but perpetrator confessions are not scientific evidence.¹⁶ As innocence organizations, we are well aware of the prevalence of false confessions, and we have grave concerns about any diagnosis or expert testimony that rests upon such confessions. Science, in the form of DNA, has proven that people confess to crimes they did not commit with frightening regularity. Approximately 25% of all DNA exonerations in the United States involve a false confession or guilty plea. Further, some SBS/AHT confessions reviewed by courts have been found to have been coerced¹⁷ or based entirely on information provided to them as medical fact and thus, as one court noted, “worthless as evidence.”¹⁸ A medico-legal diagnosis based principally on confessions is not reliable for legal purposes.

The members of the Innocence Network collectively have reviewed well over 100 criminal convictions that are based on physician testimony that the triad or retinal and subdural

¹¹ Måns Rosén et al., *Shaken Baby Syndrome and the Risk of Losing Scientific Scrutiny*, 106 ACTA PAEDIATRICA 1905, 1907 (2017).

¹² SBU Report, *supra* n.1, at 22-25.

¹³ *Id.* at 5.

¹⁴ *Id.* at 66.

¹⁵ One study took cases that had been classified as abusive shaking and compared those with judicial admissions to those without and found no differences between the two. Catherine Adamsbaum et al., *Abusive Head Trauma: Judicial Admissions Highlight Violent and Repetitive Shaking*, 126 PEDIATR 546 (2010). The other compared confessed abuse to witnessed accidents, no details of the confessions included. Matthieu Vinchon et al., *Confessed Abuse Versus Witnessed Accidents in Infants: Comparison of Clinical, Radiological, and Ophthalmological Data in Corroborated Cases*, 26 CHILD’S NERV. SYST. 637 (2010). For discussion of additional methodological issues, see Måns Rosén et al., *Vinchon’s Responses Raise Additional Questions about the Shaken Baby Study*, 34 CHILD NERV. SYST. 11 (2018).

¹⁶ Adamsbaum, *supra* n.15 at 553. See also SM Kassin, SA Drizin, et al. *Police-Induced Confessions: Risk factors and Recommendations*. 34 LAW HUM. BEHAV. 3 (2010).

¹⁷ *People v. Thomas*, 8 N.E.3d 308, 316 (N.Y. 2014) (Police threatened to arrest Thomas’s wife if he did not confess and told him 21 times that doctors could not treat or save his son until he confessed, ultimately eliciting an agreement from the father that he had done what they claimed he must have. “Every scenario of trauma induced head injury equal to explaining the infant’s symptoms was suggested to defendant by his interrogators. Indeed, there is not a single inculpatory fact in defendant’s confession that was not suggested to him.”).

¹⁸ *Aleman v. Village of Hanover Park*, 662 F. 3d 897, 907 (7th Cir. 2011). (Justice Posner explained how the child’s caretaker was told that the only medical explanation for the child’s injury was shaking and the caretaker concluded that his own shaking to revive his son, no matter how gentle it seemed, must have caused his injuries).

hemorrhaging are medical evidence of SBS/AHT. Based largely or exclusively on such testimony, caretakers otherwise described as loving, calm, and caring have been convicted of murder and sentenced to death or anywhere from years to life in prison. These cases must be systematically identified and evaluated.

Even prior to the SBU Report, debate had begun to accelerate in the courts and in the medical, scientific and legal literature over whether one can reliably diagnose SBS or any form of abuse from this constellation of findings.¹⁹ The AAP's 2009 revision of its SBS/AHT position paper noted that, "[f]ew pediatric diagnoses engender as much debate as AHT. Controversy is fueled" in part because "there is no single or simple test to determine the accuracy of the diagnosis and the legal consequences of the diagnosis can be so significant."²⁰

This controversy, and the reasons therefore, are on their own sufficient for courts to exclude expert testimony and reverse convictions based on this unreliable diagnosis. Now, however, there is more than a controversy. There is widespread agreement regarding the existence of past error, that the studies supporting SBS/AHT are plagued with circular reasoning²¹, and that the best evidence for the diagnosis is alleged confessions by people so

¹⁹ **Courts:** See, e.g., *Gimenez v. Ochoa*, 821 F. 3d 1136, 1145 (9th Cir. 2016) (there is "a vigorous debate about its validity within the scientific community... The debate continues to the present day"); *Del Prete v. Thompson*, 10 F. Supp. 3d 907, 957 n. 10 (N.D. Ill. 2014) (current evidence "suggests that a claim of shaken baby syndrome is more an article of faith than a proposition of science"); *Commonwealth v. Millien*, 50 N.E.3d 808, 826 (Mass. 2016) ("there is a vigorous debate on this subject"); *Commonwealth v. Epps*, 53 N.E.3d 1247, 1267 (Mass. 2016) (discussing "hotly debated issues" regarding short falls and shaking and "published articles that identified the methodological shortcomings of the research supporting the majority view on shaken baby syndrome"); *In re Yarbrough Minors*, 885 N.W.2d 878, 890 (Mich. Ct. App. 2016) ("The science swirling around cases of shaken baby syndrome and other forms of child abuse is highly contested..."); *People v. Ackley*, 870 N.W.2d 858, 864 (Mich. 2015) (there is "prominent controversy within the medical community regarding the reliability of SBS/AHT diagnoses"); *State v. Edmunds*, 746 N.W.2d 590, 596 (Wis. Ct. App. 2008) (recognizing a "significant and legitimate debate in the medical community").

Medical Journals: For example, the journal, *Forensic Science, Medicine and Pathology*, invited a series of debate articles on this topic. The opening article, while supportive of the diagnosis, notes that AHT, or SBS "as it was once known, has become a very contentious and hotly debated area in the field of forensic pathology and medicine of infants and young children." See Roger Byard, "Shaken Baby Syndrome" and *Forensic Pathology: an Uneasy Interface*, 10 FORENSIC SCI. MED. PATHOL. 239, 239 (2014); see also, e.g., JW Finnie et al., *Neuropathological Changes in a Lamb Model of Non-Accidental Head Injury (the Shaken Baby Syndrome)*, 19 J. CLIN. NEUROSCI. 1159 (2012) ("The pathological and biomechanical aspects of this paediatric disorder remain controversial..."); Evan Matshes et al., *Shaken Infants Die of Neck Trauma, Not of Brain Trauma*, 1 ACAD. FORENSIC PATHOL. 82 (2011) ("However, in the forensic and legal communities, there is ongoing controversy about the definition, diagnosis, and even the very existence of SBS.") For a detailed discussion of the nature and extent of the SBS/AHT controversy, see Randy Papetti, THE FORENSIC UNRELIABILITY OF THE SHAKEN BABY SYNDROME § 4.1 (Christopher Milroy ed. 2018).

²⁰ Cindy W. Christian et al., Committee on Child Abuse and Neglect of the Am. Acad. Pediatr., *Abusive Head Trauma in Infants and Children*. 123 PEDIATRICS 1409 (2009). The 2009 revision also removed its previous claim that the evidence supports the need for a presumption of abuse.

²¹ S. Piteau et al., *Clinical and Radiographic Characteristics Associated with Abusive and Nonabusive Head Trauma: A Systematic Review*, 130 PEDIATRICS 1, 7 (2012). A systematic review of the "best available evidence" to help front-line clinicians in the "difficult task of distinguishing between AHT and nAHT" found that the best studies supporting the diagnosis are "fraught with circular reasoning."

accused.²² Most importantly, there is confirmation by an independent scientific agency that the evidence basis is unreliable.²³ These developments are more than sufficient for courts to feel confident that SBS/AHT diagnoses or any diagnosis of abuse based on the presence of retinal and subdural hemorrhaging do not meet *Frye* and *Daubert* tests for admissibility.²⁴

Past Error

There is also widespread agreement regarding past error. For example, the AAP's 2001 Technical Report SBS asserted what was then the widely accepted but erroneous belief that the "constellation of these injuries does not occur with short falls."²⁵ The Department of Justice similarly advised that, "children do not die of simple falls," and that retinal hemorrhages only occur with severe auto accidents or falls from several stories onto a hard surface.²⁶ These teachings were wrong.

Biomechanical studies and witnessed and videotaped accidents have proven that accidental household falls can in fact cause these findings.²⁷ As one court found in vacating a wrongful conviction, "the mainstream belief in 2001-2002, espoused by the prosecution's expert witnesses at trial, that children do not die from short falls, has been proven to be false."²⁸ The AAP's 2009 revision of its position paper removed its prior assertion that short falls do not

²² *Del Prete v. Thompson*, 10 F. Supp. 3d 907, 936-37 (N.D. Ill. 2014) (Dr. Carol Jenny, a prominent supporter of the diagnosis explained in her testimony that, "one of the best chapters" in the "definitive text on child abuse," which she edited, "states that no one has marshalled a coherent argument to support shaking alone as a causal mechanism for abusive head injury, and that the only evidence basis for this proposition consists of perpetrator confessions.")

²³ SBU Report, *supra* n.1

²⁴ *See, State v. Jacoby*, No. 15-11-0917-I, 2018 WL 5098763, at *12 (Super. Ct. N.J. Aug. 17, 2018) ("[T]he Court finds that presently there is no sufficiently reliable evidence and no general consensus in the scientific and medical community as to both the age and causation of retinal hemorrhages to satisfy the *Frye* standard. As such, retinal hemorrhage evidence in this case is not admissible."); Evan Matshes & Randy Papetti, *Law, Child Abuse, and the Retina*, *The Champion* 38, 42 (Dec. 2018) ("Although the beliefs regarding retinal hemorrhages were widely accepted for decades, and still clung to by many pediatric physicians, they lack sufficient reliability for legal purposes.")

²⁵ 2001 SBS Technical Report, *supra*, n. 2, at 206.

²⁶ *See* Rob Parrish, U.S. Dep't of Justice, *Battered Child Syndrome: Investigating Physical Abuse and Homicide* 7-8 (4th printing 2002).

²⁷ *See, e.g.,* A. K. Ommaya et al., *Biomechanics and Neuropathology of Adult and Paediatric Head Injury*, 16 BRIT. J. NEUROSURG. 220 (2002); W Goldsmith, J Plunkett, *A Biomechanical Analysis of the Causes of Traumatic Brain Injury in Infants and Children*, 25 AM. J. FOR. MED. PATHOL. 89 (2004). For a detailed summary of the biomechanical literature, see Papetti, *supra* n. 19, § 3.1.1.

²⁸ *People v. Bailey*, 999 N.Y.S.2d 713, 724 (Crim. Ct. Monroe Cty. 2014), *aff'd*, 41 N.Y.S.3d 625 (App. Div. 2016); *see also Commonwealth v. Millien*, 50 N.E.3d 808, 817-18, 821 (Mass. 2016) (expressing "serious doubt whether the jury's verdict would have been the same" had the jury heard expert testimony that the child's injuries could have come from the fall Millien described); *Commonwealth v. Epps*, 53 N.E.3d 1247, 1267 (Mass. 2016) ("We have a serious doubt ... whether the jury verdict would have been the same had the jury heard [now available] expert testimony regarding the possibility that short falls can cause severe head injuries in young children"); *People v. Ackley*, 870 N.W.2d 858, 865-68 (Mich. 2015) (finding a reasonable probability the outcome would have been different had an impartial, scientifically trained expert corroborated the defendant's theory of an accidental fall); *Ex Parte Henderson*, 384 S.W.3d 833, 834 (2012) (finding no reasonable jury would have convicted in light of new evidence from expert witnesses that the accidental fall onto concrete described at trial could have caused the child's injuries and death).

cause the constellation of injuries and instead noted the AHT diagnosis is so controversial in part because “the mechanisms and resultant injuries of accidental and abusive head injury overlap...”²⁹ Yet there has been no systematic attempt to locate and correct the wrongful convictions that have been based on expert testimony that we now know was false.

Further, prosecutions in such cases continue with caretakers’ explanations of falls being rejected in favor of diagnoses of abuse, based on the ecological fallacy that short falls rarely cause such findings and death. We are concerned that this area of medicine has required, and continues to require, more evidence to prove innocent explanations than to presume guilt. For decades, parents and caretakers reported that their children had fallen and sought medical care, but if the tests revealed subdural and retinal hemorrhaging, and/or if the child died, those reports were presumed false by medical professionals who instead concluded that providing such a “discrepant history” was actually additional evidence that the parent or caregiver was guilty of abuse. Families were separated and caretakers were sent to prison. It was not until there were multiple cases of independently witnessed and videotaped short falls resulting in these findings and death, and biomechanical studies proving the forces from short falls are sufficient to meet known and proposed threshold levels for injury, that these innocent explanations began to be even occasionally accepted.

As medicine and biomechanical science has progressed, so has our understanding of these findings and their potential causes. There is now an ever-expanding list of medical conditions associated with the retinal and subdural hemorrhaging.³⁰ While the studies and expert testimony in courts reference major forces and extreme trauma, it is important to note that the medical findings often include only a thin layer of blood over the brain, microscopic bleeding behind the eyes, and, in some cases, a brain swollen from lack of oxygen. All of these findings are now known to occur in a wide array of situations, both natural and accidental.

Despite these advances and the problems with the evidence base, the proponents of SBS/AHT continue to testify that, in their expert opinion, children were abused, but have also threatened or attempted to intimidate experts who testify on behalf of caretakers, calling for censure, termination from employment, removal of licenses, and other sanctions.³¹ Such intimidation is inappropriate and contrary to the search for justice, truth, and objectivity.

Recommendations:

In order to identify and correct wrongful convictions, prevent the future conviction of innocent parents and wrongful separation of families, and to improve the reliability of the legal process in these complex cases, the Innocence Network recommends the following:

- 1) Convictions in which the prosecution’s experts provided testimony now known to be false, such as rejecting an accidental fall or testifying that retinal hemorrhages are

²⁹ Christian, *supra*, n. 20, at 1410.

³⁰ See, e.g., Patrick D. Barnes, *Imaging of Nonaccidental Injury and the Mimics: Issues and Controversies in the Era of Evidence-Based Medicine*, 40 *RADIOL. CLIN. N. AM.* 205 (2011); see also SBU Report, *supra* n.1, Appendix A.

³¹ See, e.g., Papetti, *supra* n. 19, § 4.2.

caused only by abuse or major trauma equivalent to an automobile accident, should be identified, evaluated, and vacated if that testimony was potentially material to the outcome.

- 2) Prosecutions should not be based on disputed medical evidence. Expert testimony purporting to “diagnose” SBS/AHT or any form of abuse based on the presence of retinal and/or subdural hemorrhage should not be admitted because it is unreliable.
- 3) Expert testimony in SBS/AHT cases purporting not only to identify the medical conditions found in a child but also the conduct (*actus reus*) and mental state (*mens rea*—e.g., intentional, reckless, knowing, or the like) of a third party, should not be permitted as it is scientifically unreliable and usurps the province of the legal factfinder.
- 4) Since the SBS/AHT hypothesis and the causes of subdural and retinal hemorrhaging involve unresolved scientific questions, experts with various perspectives must be allowed to speak, testify, conduct research, and express their opinions without the threat of personal or professional censure, intimidation, or sanction.
- 5) Serious consideration should be given to the suggestion of Dr. Guthkelch and other experts that medical terminology in this area should be changed to distinguish between medical findings and legal conclusions. “Abusive Head Trauma” and “Shaken Baby Syndrome” do not describe medical findings, but invoke a legal conclusion that goes beyond what the medical science can support. Dr. Guthkelch observed that a more appropriate name might be “retino-dural hemorrhage of infancy” with or without encephalopathy, because “[t]his would allow us to investigate causation without appearing to assume that we already know the answer.”³²

³² Guthkelch, *supra* n. 6, at 202.