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Shaken Baby Syndrome: Who Are the True Experts

Joseph D. Hatina

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SHAKEN BABY SYNDROME: WHO ARE THE TRUE EXPERTS?

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"Guard well your baby's precious head, Shake, jerk and slap it never, Lest you bruise his brain and, twist his mind, or whiplash him dead, forever."

-JOHN CAFFEY¹

¹John Caffey, *The Whiplash Shaken Infant Syndrome: Manual Shaking by the Extremities with Whiplash-Induced Intracranial And Intraocular Bleedings, Linked with Residual Permanent Brain Damage and Mental Retardation*, 54 PEDIATRICS 396 (1974)[hereinafter Caffey, *Whiplash Shaken Infant*].

I. INTRODUCTION

For years, sexual abuse has been the focus of child abuse prosecutions.² However, mistreatment of our youth has become over time the chameleon of the modern era, because prosecutors, investigators and physicians frequently fail to recognize or deal effectively with cases of fatal child abuse.³ Homicides resulting from this type of mistreatment often go undetected and unpunished due to the lack of specialization and review procedures for suspicious child deaths.⁴ Shaken baby syndrome is a serious form of child maltreatment, often involving infants younger than six months of age.⁵ It commonly occurs, yet it is frequently overlooked in its most chronic form and underdiagnosed in its most serious expression.⁶

Under the current system, coroner/medical examiners and/or emergency room doctors are primarily responsible for making a diagnosis of shaken baby syndrome.⁷ Often, these same individuals present this evidence to the trier of fact during criminal proceedings.⁸ However, the medical literature demonstrates the difficulty of a shaken baby syndrome diagnosis made by one individual such as a coroner/medical examiner or emergency room physician.⁹ It is this elusive diagnosis which is troubling particularly once the evidence reaches a courtroom. Many times the error results in a missed diagnosis and an unpunished child abuser;¹⁰ however, there is potential for someone's liberty interest to be at stake where a misdiagnosis has occurred.

In recent years, many states have adopted a system of Child Death Review Teams in cases of suspicious child deaths.¹¹ These teams are designed to present a

²Ryan Rainey, *Medical Examiners in Child Homicide Cases: Prosecutor's Perspective*, 28 PROSECUTOR 7 (1994).

³*Id.*

⁴*Id.*

⁵Stephen Ludwig & Matt Warman, *Shaken Baby Syndrome: A Review of 20 Cases*, 13 ANNALS EMERGENCY MED. 104, 105 (1984).

⁶American Academy of Pediatrics, *Shaken Baby Syndrome: Inflicted Cerebral Trauma*, 92 PEDIATRICS 872, 872 (1993) [hereinafter A.A.P.].

⁷Rainey, *supra* note 2, at 8.

⁸*Id.*

⁹Jody W. Zylke, *Child Abuse Problems Demands Much of Physician But Also of the Community and Its Officials*, 261 JAMA 2930, 2931 (1989) ("Individual physicians alone cannot in all cases answer the questions that need to be answered. For it to happen takes an interdisciplinary approach, and for that to happen takes a community response.").

¹⁰Rainey, *supra* note 2.

¹¹Ariz. Dept. of Health Servs., *Arizona Child Fatality Review Team, 1st Annual Report*, (1994); N.C.: Office of Chief Med. Exam'r, *North Carolina Fatality Prevention Team, Child Fatalities, 1 Year Profile [Special Rep.]*, (1994); Colorado Child Fatality Review Comm., Colorado Dep't. of Health, *Annual Report* (1993); L.A. County Interagency Council on Child Abuse and Neglect, *ICAN Multi-Agency Child Death Review Team Report for 1993* (1994); Miss. Dep't. of Soc. Servs., *Mississippi Child Fatality Review Project Annual Report, 1992*, (1993); Or. Dep't. of Human Resources, *Task Force Report On Child Fatalities And Critical Injuries Due To Abuse and Neglect* (1993); Gary J. Strangler & Colleen Kivlahan, *Mississippi*

collaborative effort between various medical specialists, prosecutors, social workers, and law enforcement officers in order to effectuate a competent evaluation of each case.¹² Statistics show that these teams have reduced the likelihood of missed diagnoses, which translates into statistical increases in reported child abuse.¹³ It is just as likely that these teams diminish the number of misdiagnoses, thereby, reinforcing the certainty of a valid, proper diagnosis.

Section II of this article will discuss the symptoms, presentation, and clinical findings of shaken baby syndrome. It will conclude by looking at recommendations from the U.S. Advisory Board on Child Abuse and Neglect.

Section III delves into the history, function and statistics of Child Death Review Teams on a national level. The discussion ends by examining Ohio's proposed legislation concerning these review teams.

Section IV will take a look at Ohio's standard for presentation of scientific evidence via expert testimony. The debate centers around the proposition that Ohio's judiciary should reconsider its views regarding expert testimony. The argument encourages the judiciary to consider in its decision as to admissibility what the medical community has acknowledged in terms of expertise in this particular area. While this article is not aimed at finding fault with any particular court, nor is it an attempt at refuting sound medical evidence supporting a recognized diagnosis of shaken baby syndrome, the courts are urged to explore the possibility that physicians involved in a cooperative, multidisciplinary approach are more able to provide the trier of fact with an accurate diagnosis of shaken baby syndrome.

II. SHAKEN BABY SYNDROME MEDICAL INFORMATION

A. Historical

In 1972, pediatric radiologist John Caffey described a constellation of clinical findings that were used to coin the term "whiplash shaken baby syndrome."¹⁴ Caffey's observations in these cases noted common injuries including retinal

Child Fatality Review Project, Interim Progress Report, (Miss. Dep't. of Soc. Services and Miss. Dep't. of Health) (1993); Pamela Schirner & Harry Griggs, *Franklin County, Ohio, Deceased Child Review System*, 1991 Annual Report, (Franklin County Children Services) (1992); S.C. Dep't. of Human Resources, *Fatal Child Abuse and Neglect South Carolina*, (1993).

¹²Zylke, *supra* note 9 and accompanying text.

¹³A REPORT OF THE U.S. ADVISORY BOARD ON CHILD ABUSE AND NEGLECT, A NATION'S SHAME: FATAL CHILD ABUSE AND NEGLECT IN THE U.S., U.S. DEPT. OF HEALTH AND HUM. SERVICES, 86-90 (1995) [hereinafter A NATION'S SHAME].

¹⁴John Caffey, *On the Theory and Practice of Shaking Infants. Its Potential Residual Effects Of Permanent Brain Damage And Mental Retardation*, 124 AM. J. DISEASES CHILDREN 161 (1972)[hereinafter Caffey, *Theory And Practice Of Shaking*]; See Caffey, *Whiplash Shaken Infant*, *supra* note 1, at 397; Ann-Christine Duhaime et al., *The Shaken Baby Syndrome. A Clinical, Pathological, And Biochemical Study*, 66 J. NEUROSURGERY 409 (1987); Mark N. Hadley et al., *The Infant Whiplash-Shake Injury Syndrome: A Clinical And Pathological Study*, 24 NEUROSURGERY 536 (1989).

hemorrhages¹⁵, subdural and/or subarachnoid hemorrhages¹⁶, and minimal or absent signs of external cranial trauma.¹⁷ All of the injuries identified in Caffey's observations were the result of acceleration-deceleration stresses on the child's body.¹⁸ Although many scientists have added to Caffey's findings,¹⁹ a challenge to the breadth of his work has come from other experts who believe that shaking alone could not be the sole cause of these injuries.²⁰ They conclude that a number of the injuries attributed presumptively to shaking were actually caused by blunt force trauma to the head. It was theorized that the head's impact on a surface such as a bed or pillow may be the basis for most of these serious injuries.²¹ While there may be some dispute amongst the experts as to the exact mechanism, the symptoms and injuries sustained do not differ between the alternate mechanisms. And the result is always the same: infants are seriously injured and often die.

B. Epidemiology

In the United States there are at least 2,000 children who die annually from abuse or neglect, and approximately 18,000 who suffer permanent disabilities at the hand of their abusers.²² Most of these children are under the age of four.²³ According to estimates produced by the Centers for Disease Control and Prevention, 11.6 of every 100,000 children age four and under die from abuse and neglect each year.²⁴ This figure is greater than the nation's murder rate.²⁵ There is an extraordinarily high

¹⁵Retinal Hemorrhages are defined as bleeding from a ruptured or cut blood vessel (artery or vein) within the eye. J.E. SCHMIDT, ATTORNEY'S DICTIONARY OF MEDICINE H-80, R-121(Matthew Bender & Co. ed., 1997).

¹⁶The brain and spinal cord are covered by three layers of membranes: the outermost layer is termed the dura mater, the middle layer is termed the arachnoid, and the innermost membrane is called the pia mater. A subdural hemorrhage is bleeding into the space under, or beneath, the dura mater. A subarachnoid hemorrhage occurs when there is bleeding into the space between the arachnoid and the pia mater. J.E. SCHMIDT, ATTORNEY'S DICTIONARY OF MEDICINE S-337 (Matthew Bender & Co. ed., 1997).

¹⁷See Caffey, *supra* note 14.

¹⁸*Id.* at 164. One year prior to Caffey's findings, Dr. Guthkelch postulated that subdural hemorrhages resulted from shaking infants in a whiplash type motion; thus, tearing cortical bridging veins. A. Norman Guthkelch, *Infantile Subdural Hematoma and Its Relationship to Whiplash Injury*, 2 *BMJ* 430, (1971).

¹⁹A.A.P., *supra* note 6, at 872; See Randall Alexander et al., *Incidence of Impact Trauma With Cranial Injuries Ascribed With Shaking*, 144 *AM. J. DISEASES CHILDREN* 724 (1990).

²⁰Duhaime et al., *supra* note 14, at 413.

²¹Guthkelch, *supra* note 18, at 431.

²²See Jody Tabner Thayer, *The Latest Evidence for Shaken Baby Syndrome: What Defense Lawyers and Prosecutors Need to Know*, 12 *CRIMINAL JUSTICE* 15 (1997).

²³*Id.*

²⁴A NATION'S SHAME, *supra* note 13, at 8-9.

²⁵*Id.*

incidence of morbidity and mortality among infant victims of shaking.²⁶ Moreover, shaken baby syndrome accounts for an estimated 10-12% of all deaths attributed to abuse or neglect.²⁷ Approximately 25% of all children who suffer from shaken baby syndrome will die, and 41% of shaken baby victims are under one year of age.²⁸

C. Mechanism of Injury

While many caretakers are unaware of the potential for damage when they shake a child, the act of shaking and/or slamming in fatal cases is so violent that any reasonable person observing such a display would recognize the behavior as excessive and dangerous.²⁹ The child is held by the thorax, generally with the abuser's hands either grasping the upper arms and chest or under the arms and around the chest of the infant, and violently shaken.³⁰ The pressure caused by compression of the thorax inhibits venous return and causes the blood to pool in the larger vessels of the chest. Cerebral injury in children causes increased cerebral volume;³¹ thus, the vessels of the head contain an increased amount of blood under pressure conditions which are elevated. The acceleration of the head caused by shaking enables blood to rush into the facial region, thereby increasing the volume of fluid in the venous channels of the eye.³² When venous outflow is blocked by pressure on the thorax from the abuser's hands, distention of the optic nerve sheaths can lead to subretinal, retinal and preretinal hemorrhages.³³

The head eventually stops moving as a result of either passive resistance or the chin and/or occipital bone hitting the thorax. Restoration of normal blood flow after the shaking allows blood to return to the damaged vessels.³⁴ Once this occurs, the blood continues to leak from the damaged vessels, causing retinal edema.³⁵ This mechanism is specific for producing the characteristic signs of shaken baby syndrome.

²⁶Hadley et al., *supra* note 14, at 539; See Sara H. Sinal & Marshall R. Ball, *Head Trauma Due to Child Abuse: Serial Computerized Tomography in Diagnosis and Management*, 80 S. MED. J. 1505 (1987).

²⁷Tabner Thayer, *supra* note 22, at 15.

²⁸A NATION'S SHAME, *supra* note 13, at 15, 16.

²⁹A.A.P., *supra* note 6, at 872.

³⁰Helen Carty & Jane Ratcliffe, *The Shaken Infant Syndrome*, 310 BMJ 344 (1995).

³¹Derek A. Bruce et al., *Diffuse Cerebral Swelling Following Head Injuries in Children: The Syndrome of the "Malignant Brain Edema,"* 54 J. NEUROSURGERY 170 (1981).

³²*Id.*

³³W. Scott Wilkinson et al., *Retinal Hemorrhage Predicts Neurologic Injury in the Shaken Baby Syndrome*, 107 ARCHIVES OF OPHTHALMOLOGY 1472, 1472 (1989).

³⁴*Id.* at 1473.

³⁵*Id.*

D. Clinical Findings

1. Subdural & Subarachnoid Hemorrhages

A hallmark sign of shaken baby syndrome is the subdural hematoma or hemorrhage caused by rotational shearing forces³⁶ disrupting small bridging veins over the surface of the brain.³⁷ Blood oozes from the site of the injured veins and collects over the convex surface of the brain.³⁸ Infants suffering from subdural hemorrhages often exhibit symptoms of increased irritability, vomiting, and tense, bulging fontanels.³⁹ Associated causes of subdural hemorrhages in infants include birth trauma, truly accidental trauma, meningitis and a hereditary predisposition to hemorrhagic diseases.⁴⁰ Most forms of subdural hemorrhages lacking external signs of trauma in infants are the result of abuse, typically shaken baby syndrome.⁴¹

In a subarachnoid hemorrhage, blood collects over the surface of the brain's convolutions and within the grooves that separate these convolutions.⁴² Recognition of a subarachnoid hemorrhage occurs after a spinal tap reveals bloody fluid.⁴³ Centrifuged spinal fluid that is yellow or yellowish in color should be interpreted to be the result of past cerebral trauma. In rare cases, subarachnoid hemorrhaging may be caused by aneurysms or arteriovenous malformations.⁴⁴ Additionally, an infant older than one month with hemorrhagic disease due to vitamin K deficiency may

³⁶Rotational shearing forces refer to an applied force that is sufficient to produce a shearing strain. These shearing strains are conditions in or deformations of an elastic body, such as the brain, that are caused by forces that tend to produce an opposite but parallel sliding motion of the body's planes. THE AMERICAN HERITAGE DICTIONARY 1128 (2d ed. 1985).

³⁷Jane Swenson & Carolyn Levitt, *Shaken Baby Syndrome: Diagnosis and Prevention*, 80 MINN. MED. 41 (1997).

³⁸A.G. Osborne et al., *The False Falx Sign*, 134 RADIOLOGY 421-25 (1980); Robert A. Zimmerman et al., *Computed Tomography of Craniocerebral Injury in the Abused Child*, 130 RADIOLOGY 687, 688 (1979).

³⁹Patricia A. Russell, *Subdural Hematoma Infancy*, [Aug.] B. MED. J. 446 (1965). A fontanel is a region in the skull of a fetus or an infant which is not yet bone, but consists of membrane. There are several regions in the infant's skull where this occurs commonly referred to as "soft-spots" in the skull. J.E. SCHMIDT, ATTORNEY'S DICTIONARY OF MEDICINE F-127(Matthew Bender & Co. ed., 1997).

⁴⁰Richard F. Spaide, et al., *Shaken Baby Syndrome*, 41 AM. FAM. PHYSICIAN 1145, 1147 (1990).

⁴¹*Id.*

⁴²Samuel T. Lim & Donald J. Sage, *Detection of Subarachnoid Blood Clot and Other Thin, Flat Structures by Computed Tomography*, 123 RADIOLOGY 79 (1977).

⁴³Julio O. Apolo, *Bloody Cerebrospinal Fluid: Traumatic Tap or Child Abuse?*, 3(2) PEDIATRIC EMERGENCY CARE 93 (1987).

⁴⁴Spaide et al., *supra* note 40, at 1147.

show signs of intracranial bleeding.⁴⁵ In most cases of subarachnoid hemorrhage found in infants, the injury is caused by some form of trauma or abuse.⁴⁶

2. Retinal Hemorrhage

An ocular examination is necessary in cases of suspected abuse by shaking.⁴⁷ Retinal hemorrhaging is one of the characteristic signs of shaken baby syndrome.⁴⁸ In a study by Wilkinson and colleagues,⁴⁹ the severity of hemorrhages within the eye was found to be proportional to the severity of intracranial hemorrhages in shaken babies. When the victim presents to the doctor bilateral intraocular hemorrhages, the cerebral injuries were found to be more severe than those who presented with hemorrhages contained only within one eye.⁵⁰ "In 75% to 90% of the cases, unilateral or bilateral retinal hemorrhages are present but may be missed unless the child is examined by a pediatric ophthalmologist or experienced physician who is familiar with the hemorrhages, has the proper equipment, and dilates the child's pupils."⁵¹

E. Diagnostic Imaging of SBS

Timing of injuries is generally estimated by clinicians through a combination of clinical factors and pathologic findings. Children who suffer very severe brain injuries are generally symptomatic and unconscious from the time of trauma; therefore, it is easier to date injuries where the trauma is more severe.⁵² On computed tomography⁵³ (CT) and magnetic resonance imaging⁵⁴ (MRI) scans, subdural

⁴⁵Peter A. Lane & William E. Hathaway, *Vitamin K Infancy*, 106 J. PEDIATRICS 351 (1985).

⁴⁶Spaide et al., *supra* note 40, at 1148.

⁴⁷A.A.P., *supra* note 6, at 873.

⁴⁸Donald L. Budenz et al., *Ocular And Optic Nerve Hemorrhages Abused Infants With Intracranial Injuries*, 101 OPTHALMOLOGY, 559 (1989); *see, e.g.*, Joseph Giangiacomo & Kenneth J. Barkett, *Ophthalmoscopic Findings Occult Child Abuse*, 22 J. PEDIATRIC OPTHALMOLOGIC STRABISMUS 234 (1985); Richard F. Spaide, *Shaken Baby Syndrome. Ocular and Computed Tomographic Findings*, 7 J. CLINICAL NEUROLOGICAL OPTHALMOLOGY 108 (1987); W. Scott Wilkinson, *supra* note 33.

⁴⁹Wilkinson, *supra* note 33.

⁵⁰*Id.*

⁵¹A.A.P., *supra* note 6, at 873; *see also* Ludwig & Warman, *supra* note 5.

⁵²Derek A. Bruce, *Head Injuries in the Pediatric Population*, CURRENT PROBS. PEDIATRICS 66, 70 (Feb. 1990); Robert A. Zimmerman et al., *Computed Tomography of Shearing Injuries of The Cerebral White Matter*, 127 RADIOLOGY 393, 395 (1978); *see* Marcus B. Nashelsky & Jay D. Dix, *The Time Interval Between Lethal Infant Shaking and Onset of Symptoms*, 16 AM. J. FORENSIC MED. & PATHOLOGY 154, 157 (1995).

⁵³Computed tomography is a form of tomography in which a computer is used to produce a series of images combined to form a three dimensional presentation an anatomical feature of a particular organ. J.E. SCHMIDT, ATTORNEY'S DICTIONARY OF MEDICINE C-313(Matthew Bender & Co. ed., 1997).

hematomas and hemorrhages between the hemispheres of the brain have different appearances depending upon the time interval beginning at trauma. Dating an injury solely on the basis of imaging alone is often difficult; however, CT and MRI are generally used in tandem to comprehensively evaluate the patient.⁵⁵

Following physical evaluation, radiographic information of shaken baby syndrome usually begins with CT to evaluate the child's brain, skull and soft tissues. The critical nature of cerebral head injuries makes CT the method of choice in the emergency setting because it can be performed quickly on an unstable patient.⁵⁶ Subdural hematomas change in appearance on the CT scan as the injury ages and the red blood cells within the hematoma break down.⁵⁷ The most important point to remember is that only acute subdural hematomas are consistently diagnosed correctly.⁵⁸ Subdural hematomas that are mixed with cerebrospinal fluid may be misdiagnosed in terms of their age in an anemic child.⁵⁹

Magnetic resonance imaging is a more recently developed diagnostic tool which in many ways is superior to CT.⁶⁰ For example, MRI appears to be better at detecting small collections of subdural hematoma due to the absence of bone artifact and the ability to image in the three different planes.⁶¹ MRI may assist physicians in diagnosing and recognizing cases of repeated abuse because it is able to detect

⁵⁴Magnetic resonance imaging is an electronic procedure utilized by physicians for producing images of internal structures of the body. This type of imaging is very useful in the examination of the brain, spinal cord, bone, male and female pelvic organs, the heart, the kidneys, and the pancreas. J.E. SCHMIDT, ATTORNEY'S DICTIONARY OF MEDICINE N-153(Matthew Bender & Co. ed., 1997).

⁵⁵Linda A. Cox, *The Shaken Baby Syndrome: A Diagnosis Using CT and MRI*, 67 RADIOLOGIC TECH. 513, 515 (1996).

⁵⁶A.A.P., *supra* note 6, at 873.

⁵⁷Paul F.J. New & Saul Aronow, *Attenuation Measurements Of Whole Blood And Blood Fractions In Computed Tomography*, 121 RADIOLOGY 635, 639 (1976) ("[C]hanges observed on CT scans are consistent with the progressive breakdown of red blood cells and removal of those elements of the red blood cells, predominantly protein contributing the most heavily to the high density of the clot.").

⁵⁸*Id.*

⁵⁹Elizabeth E. Gilles, *Abusive Head Injury in Children: A Rev.*, 20 ST. L. REV. 335, 364 (1993) ("These guidelines are not always accurate if the infant is very anemic, there is a mix of cerebrospinal fluid with blood or there are different ages of subdural hematoma."). Anemic is defined as a condition of the blood in which the number of red cells is below normal, or the amount of the oxygen-carrying red pigment is below normal. J.E. SCHMIDT, ATTORNEY'S DICTIONARY OF MEDICINE A-235 (Matthew Bender & Co. ed., 1997).

⁶⁰Robert R. Edelman & Steven Warach, *Magnetic Resonance Imaging (First of Two Parts)*, 328 NEW ENG. J. MED. 708 (1993).

⁶¹David F. Merten & Becky L.M. Carpenter, *Radiologic Imaging of Inflicted Injury in the Child Abuse Syndrome*, 37 PEDIATRIC CLINICS N. AM. 815, 815-837 (1990); Evelyn M.L. Sklar et al., *Magnetic Resonance Applications in Cerebral Injury*, 30 RADIOLOGIC CLINICAL N. AM. 353, 353-366 (1992). The three different planes in which MRI measures injury include the axial, sagittal and coronal planes. *Id.*

changes in the composition of blood.⁶² In addition to evaluating fluid collections such as those in subdural hematomas, MRI is useful in identifying small nonhemorrhagic lesions⁶³ consistent with shearing forces.⁶⁴ This is particularly important because these nonhemorrhagic lesions are often missed by CT analysis⁶⁵ which could potentially lead to a missed diagnosis. Injuries associated with the spinal cord caused by shaken baby syndrome have been detected using MRI.⁶⁶ These findings are consistent with the whiplash action associated with shaken baby syndrome and may help to "explain a fatal outcome in a child with normal CT and radiographic studies."⁶⁷

Although CT scans for the diagnosis of acute, unstable patients are preferred due to their wider availability in emergency room situations, MRI is often useful in evaluating white matter shearing injuries that are not always visible with CT.⁶⁸ Because the diagnosis of shaken baby syndrome has been elusive based on physical signs alone,⁶⁹ radiographic equipment is absolutely necessary for an accurate, comprehensive diagnosis of shaken baby syndrome.⁷⁰

F. Significance of the Technical Diagnosis

A correct diagnosis is complex because of many factors: experience and competency of the physician, accurate testing procedures, and evaluation of the circumstances surrounding injury. To illustrate the difficulty associated with the

⁶²Derek C. Harwood-Nash, *Abuse to the Pediatric Central Nervous System*, 13 AM. J. NEURORADIOLOGY 569, 569-575 (1992).

⁶³A lesion is a general term that refers to a injury, damage, or abnormal change in a tissue or organ, especially one that impairs function of the part involved or, even if it causes no impairment of function, expresses a symptom or sign of a disease. Nonhemorrhagic refers to the lack of blood produced at the site of injury. Some examples of nonhemorrhagic lesions may include a growth, a pigmentation, an inflammation, an aneurysm, an abscess, and a fracture. J.E. SCHMIDT, ATTORNEY'S DICTIONARY OF MEDICINE L-82(Matthew Bender & Co. ed., 1997).

⁶⁴*Id.*

⁶⁵*Id.*

⁶⁶Hadley et al., *supra* note 14, at 538 (Hadley et al. Reported that hematomas and contusions were noted in the high cervical region near the base of the skull in infants at autopsy.).

⁶⁷Cox, *supra* note 55, at 519.

⁶⁸*Id.*

⁶⁹*Id.*

⁷⁰Swenson & Levitt, *supra* note 37, at 42 ("Clinician's ability to suspect and then recognize the often subtle signs and symptoms associated with SBS is crucial for diagnosis. Some SBS infants are never diagnosed because of mild symptoms and poor medical history. Some children are missed because their physicians or nurse practitioners are still unfamiliar with the diagnosis of SBS and don't have access to radiographic equipment.").

diagnosis, the following case was the subject of an article in SURVEY OF OPHTHALMOLOGY.⁷¹

A seven week old infant was rushed to the Emergency Department of The Children's Hospital of Philadelphia because of irritability, vomiting, and intermittent hyperextension of the back. The infant's fontanelles were bulging, the eyes remained fixed, and there were periodic seizure-type movements of the extremities. Computed tomography revealed bleeding within the regions of the brain, both subdural and subarachnoid, as well as widespread swelling of the brain. A lumbar puncture revealed bloody cerebrospinal fluid most often associated with trauma or abuse. The infant died a few days later.⁷²

A complete autopsy was immediately performed by the medical examiner. The findings of the examination found no signs of external trauma, no internal fractures, and significant lesions found in the brain and right eye. Examination of the cranium revealed an abundant subarachnoid hemorrhage as well as blood contained at the junction of the optic nerve and the globe of the eye.⁷³

Does this sound like shaken baby syndrome? Based on the medical symptoms of the syndrome, an inexperienced physician or medical examiner may have concluded that this was a case of nonaccidental trauma. The prosecutor certainly was willing to make such a conclusion. The correct diagnosis, however, was revealed during a complicated microscopic examination on the sections of the subarachnoid hemorrhage. This infant died from a developmental defect of the vacuature within the brain. The absence of retinal hemorrhages and the location of the optic nerve sheath hemorrhage were two important distinguishing features from classic shaken baby syndrome, saving these parents from the threat of prosecution.⁷⁴

The major cause of retinal and optic nerve sheath hemorrhages is nonaccidental trauma; however, major accidental trauma such as an automobile accident is occasionally associated with these symptoms.⁷⁵ Although vascular malformations are relatively rare in children, the potential for mistake was evident in this case. A clinician confronted with an infant presenting signs of neurological dysfunction coupled with intracranial hemorrhage and no external signs of trauma would be remiss if he did not consider the possibility of nonaccidental trauma.

There are numerous other symptoms and diagnoses which tend to mimic signs of shaken baby syndrome such as folding of the retinas commonly seen in Terson syndrome.⁷⁶ In a study conducted by Keithahn,⁷⁷ it was concluded that retinal folds

⁷¹See generally, David J. Weissgold et al., *Ruptured Vascular Malformation Masquerading as Battered/Shaken Baby Syndrome: A Nearly Tragic Mistake*, 39 SURVEY OF OPHTHALMOLOGY 509 (1995).

⁷²*Id.*

⁷³*Id.* at 510.

⁷⁴*Id.* at 511.

⁷⁵*Id.* at 512.

⁷⁶In 1900, Albert Terson reported on a patient who presented vitreous hemorrhages in association with subarachnoid hemorrhages. The presence of bleeding within the semifluid material filling the eye with any form of intracranial bleeding is commonly diagnosed as Terson's syndrome. See, Keithahn et al., *Retinal Folds in Terson Syndrome*, 100 OPHTHALMOLOGY 1187, 1187 (1993).

occurring in Terson syndrome are clinically similar to those seen in the shaken baby syndrome.⁷⁸ Even though the patients used in this study were adults, the scientists hypothesized that similar hemorrhages typically seen in cases of shaken baby syndrome may be formed in situations other than shaking.⁷⁹ Although this conclusion undermines the mechanism for producing one of the hallmark signs of shaken baby syndrome⁸⁰, retinal hemorrhages, it reinforces the proposition that several specialists trained to deal with these cases need to evaluate the patient prior to making the diagnosis of abuse.

These are only two examples where the expertise needed for a correct diagnosis is evident. Based on the complexity of the diagnosis, a jury is likely to become confused and easily distracted from its obligation as truth-finder. It is probable that a coroner will be the one to testify as to the symptoms of an infant and its eventual cause of death without having previous experience with the syndrome. This type of testimony cannot be permitted. In addition, a defense attorney has ample opportunity to use the complexity of the diagnosis and to call "professional" expert witnesses to assist him in blurring the line between the important and unimportant information. This testimony cannot be permitted without critical evaluation of the expert's qualifications.

For these reasons, it is the responsibility of the judge to serve as the gatekeeper to this information. The judge should use his power to determine who may testify on the subject based on the legal standards already set in place: *State v. Williams* and rule 702 of the Ohio Rules of Evidence.⁸¹ Judges must apply these standards more rigorously than they have in the past.

G. Recommendations from the U.S. Advisory Board

The serious problems associated with diagnosis and the need for a multidisciplinary procedure for detection of this specific type of child abuse have been recognized by the United States Advisory Board on Child Abuse and Neglect,⁸² along with the medical community in general.⁸³ The Board noted a plethora of problems in cases associated with child homicides, including deaths resulting from shaken baby syndrome. "For example, most prosecutors have little or no experience with abuse and neglect cases; police often fail to gather sufficient evidence; and

⁷⁷See, Keithahn et al., *Retinal Folds in Terson Syndrome*, 100 OPTHALMOLOGY 1187, 1187 (1993).

⁷⁸*Id.*

⁷⁹*Id.* at 1190; but see Gaynon et al., *Retinal Folds in the Shaken Baby Syndrome*, 106 OPTHALMOLOGY 423 (1988) (The study analyzes two case reports on children with presumed shaken baby syndrome. Both children suffered head trauma resulting in severe neurological damage and intracranial bleeding. The authors conclude that upon ocular examination they revealed diffuse retinal hemorrhages, but could not determine from clinical evaluation alone whether such bleeding was the result of vitreous traction or increased intracranial pressure, such as that seen in Terson's syndrome. *Id.* at 424.)

⁸⁰*Id.*

⁸¹446 N.E.2d 444 (Ohio 1983).

⁸²(hereinafter "Advisory Board").

⁸³A NATION'S SHAME, *supra* note 13, at 43; A.A.P., *supra* note 6, at 874.

autopsies are seldom performed by medical examiners with pediatric experience."⁸⁴ The board has recommended increasing the quantity and level of training of professionals to form joint investigative teams, and has encouraged the enactment of laws establishing child autopsy protocols.⁸⁵ In addition, and with specific reference to the difficulties of shaken baby syndrome diagnoses, the American Academy of Pediatrics has stated "[shaken baby syndrome] requires integration of specific clinical management and community intervention in an interdisciplinary fashion."⁸⁶

The provision for Child Death Review Teams is incumbent upon Ohio's legislature. Moreover, once legislation providing for these teams is enacted, Ohio's judiciary should more closely scrutinize the admissibility of testimony offered by so-called experts when discussing the diagnosis or opinion as it relates to shaken baby syndrome.

III. LEGISLATION FOR DEATH REVIEW TEAMS

A. *History of the Teams Nationally*

In response to the increasing awareness of severe violence against children in the United States, Dr. Michael Durfee created the first large-scale systematic Child Death Review Team in Los Angeles, California in 1978,⁸⁷ under the tutelage of the Inter-Agency Council on Child Abuse and Neglect (ICAN), a group representing various disciplines gathered to evaluate child deaths which were suspected to be caused by abuse or neglect.⁸⁸ In the late 1980's and the early 1990's, as a result of cooperation from public agencies and other multidisciplinary child abuse review teams that shared information with each other, Child Death Review Teams began to proliferate in an effort to understand and prevent child deaths.⁸⁹

Currently, forty-five States have local and/or statewide Child Death Review Teams. These teams have become the richest source of understanding and accurately assessing the factors surrounding the untimely deaths of children and infants.⁹⁰ Approximately 100 million Americans or 40% of the nation's population are served by either state or local teams.⁹¹ Ohio is yet to be one of the states that have such statewide teams.

⁸⁴A NATION'S SHAME, *supra* note 13, at 43 (emphasis added).

⁸⁵*Id.*

⁸⁶A.A.P., *supra* note 6, at 874.

⁸⁷A NATION'S SHAME, *supra* note 13, at 77. Dr. Michael Durfee is a California child psychologist who was frustrated by lack of execution by professionals in the area to determine why large numbers of children and infants were dying in the Los Angeles area under vague and suspicious circumstances. *Id.*

⁸⁸*Id.*

⁸⁹*Id.*

⁹⁰Michael J. Durfee et al., *Origins and Clinical Relevance of Child Death Review Teams*, 267 JAMA 3172, 3172 (1992).

⁹¹*Id.*

B. Child Death Review Team Function

Multiagency child death review teams involve a systematic, multidisciplinary approach to coordinate and integrate data and resources from coroners, law enforcement, courts, child protective services, and health care providers.⁹² The purpose of these teams is not confined to the administration of justice, but also to integrate principles aimed at determining circumstances surrounding the death of a child.⁹³ The core of the team includes various members representing the coroner/medical examiner's office, law enforcement agencies, prosecuting attorneys, child protective services, pediatricians with child abuse expertise, and health professionals, including public health nurses.⁹⁴

The medical examiner or other medical professionals interpret autopsy findings and medical history for the nonmedical personnel of the team.⁹⁵ Law enforcement officers and prosecutors assist the team on issues of criminal law and pursue appropriate litigation of certain cases.⁹⁶ Child protective services provide information on previous family history if available and safeguard surviving siblings.⁹⁷ Medical professionals specializing in pediatrics interpret clinical findings of trauma or abuse, educate the team on those findings, and may provide referrals for health care evaluation for the surviving parties.⁹⁸

C. Statistics to Support Need for Child Death Review Teams

Statistics validate the need for these Child Death Review Teams in many states across the nation. Missouri, for example, with a population of 5.1 million, found more than forty child abuse and neglect deaths in both 1992 and 1993 using its extensive child death review system. Moreover, Oregon's state team discovered a markedly increased rate of fatalities involving shaken baby syndrome.⁹⁹ Michigan, on the other hand, a state with almost twice the number of residents as Missouri, has never reported more than nineteen child abuse or neglect deaths.¹⁰⁰ The logical inference to draw from these statistics is that the Child Death Review Teams in Missouri are identifying more child abuse cases, while Michigan appears to be misdiagnosing or missing the abuse or neglect diagnosis altogether.

Furthermore, dozens of experts in the field testified before the Advisory Board in 1993 and 1994 and agreed that well-designed Child Death Review Teams are likely

⁹²*Id.*

⁹³A NATION'S SHAME, *supra* note 13, at 83.

⁹⁴*Id.*

⁹⁵Durfee et al., *supra* note 90, at 3174.

⁹⁶*Id.*

⁹⁷*Id.*

⁹⁸*Id.*

⁹⁹*Id.*

¹⁰⁰A NATION'S SHAME, *supra* note 13, at 86.

to offer the greatest hope for defining the underlying causes of fatalities due to child abuse and neglect, including shaken baby syndrome.¹⁰¹

D. Ohio's Proposed Legislation

Ohio has several communities that have in place a Child Death Review Team.¹⁰² Ohio's General Assembly is now considering a bill which will require mandatory formation of these Child Death Review Teams in every county within the state.¹⁰³ The bill is focused on enhancing the investigative techniques employed in child fatality cases through a uniform procedure engaging a multidisciplinary approach.¹⁰⁴ The design of the bill will require the board of county commissioners of each county to appoint a health commissioner to establish a review team for the purposes of reviewing deaths of persons under age eighteen.¹⁰⁵

According to the text of the bill, a child death review team consists of at least ten members. Each member must represent one of the following: county coroners; law enforcement officers employed by the police or sheriffs; public children's service agencies; public health officials; county boards of mental retardation and developmental disabilities; boards of alcohol, drug addiction, and mental health services; physicians specializing in pediatric or family medicine; facilities that provide health care to children; elementary or secondary school teachers and administrators; and juvenile courts.¹⁰⁶

A literal reading of the bill's text shows that once passed, the Ohio legislature will have made its intentions clear: child death review requires a multidisciplinary team approach.

IV. OHIO'S STANDARD FOR SCIENTIFIC EVIDENCE

A. Introduction

Once Ohio's General Assembly enacts the Child Death Review Team proposal, the judiciary may be forced to reconsider its methodology regarding the admissibility of expert witness testimony when confronted with a suspected case of shaken baby syndrome. The current procedure for admitting expert testimony is sufficient to facilitate this change in judicial approach; however, the perspective of the judiciary

¹⁰¹*Id.* at 77.

¹⁰²Felix Hoover, *Deaths of Children Decrease; Decreased Infant Rate Didn't Drop*, *County Rep. Says*, THE COLUMBUS DISPATCH, May 19, 1993, at 2B; *see also* Wendy Hundley, *Child Protection: Group Endorses Rev. Panel*, DAYTON DAILY NEWS, Aug. 6, 1996, at 2B ("Several metropolitan counties, including Cuyahoga, Franklin and Summit, already have child death review panels.").

¹⁰³H.R. 287, 122nd Leg., 1997-1998 Regular Session (Ohio 1997).

¹⁰⁴*Id.*

¹⁰⁵*Id.* This bill will amend sections 121.22, 149.43, 2151.421, 2317.02, and 4731.22 of the Ohio Revised Code and will enact sections 307.621, 307.622, 3701.043, and 3705.071 of the Ohio Revised Code.

¹⁰⁶H.R. 287, 122nd Leg., 1997-1998 Regular Session (Ohio 1997).

and its application of the rules must be altered in light of recent medical evidence regarding the multidisciplinary approach necessary for accurate diagnosis.¹⁰⁷

The national outcry for a solution to the problems associated with untrained professionals handling cases of child abuse has been heard by many other jurisdictions and answered with the creation of these review teams.¹⁰⁸ Ohio must respond with equal force and compassion.

The American Association of Pediatrics has acknowledged the need for a cooperative approach and has made some recommendations concerning the formation of these teams.¹⁰⁹ The medical community recognizes the lack of specialists in rural or medically underserved areas, but insists that a regional specialist network should be instituted to assist the diagnostic team with the diagnosis.¹¹⁰ The literature also suggests that diagnosis of shaken baby syndrome is extremely difficult, even in its most acute form, for individuals working without the benefit of this coactive environment.¹¹¹

The medical evidence that exists today concerning shaken baby syndrome and the statistical success of the Child Death Review Teams morally obliges the judiciary of this nation, and specifically Ohio, to alter its viewpoint as to who shall be permitted to qualify as an expert and what methodology for diagnoses shall be considered legally acceptable. It is proposed that a change in judicial attitude concerning expert testimony will allow for presentation of a more accurate set of facts from which the jury may work.

B. Frye and Daubert Standards

It is axiomatic that a determination of the admissibility of evidence is a matter within the sound discretion of the trial court and may only be overturned upon a showing of an abuse of discretion.¹¹² An abuse of discretion implies that the court has made an unreasonable, unconscionable or arbitrary decision.¹¹³ Since the decision in *Frye v. United States*,¹¹⁴ scientific evidence has been viewed under the same standard for the better part of this century; however, in 1993, the federal standard for admissibility of scientific evidence changed as a result of the decision in *Daubert v. Merrell Dow Pharmaceuticals*.¹¹⁵

¹⁰⁷A.A.P., *supra* note 6, at 874.

¹⁰⁸*See supra* note 11.

¹⁰⁹A.A.P., *supra* note 6, at 874 ("The clinical team should include a physician who can immediately resuscitate and stabilize the baby while diagnostic radiologic studies are being done. Specialists in pediatric radiology, neurology, neurosurgery, and ophthalmology, as well as a pediatrician specializing in child abuse, should form the diagnostic team.").

¹¹⁰*Id.*

¹¹¹*Id.*

¹¹²*Columbus v. Taylor*, 529 N.E.2d 1382, 1384 (Ohio 1988).

¹¹³*State v. Adams*, 404 N.E.2d 144, 148 (Ohio 1980).

¹¹⁴293 F. 1013 (D.C. Cir.1923).

¹¹⁵509 U.S. 579 (1993).

Frye was the first appellate case in the United States to address the issue of admissibility of lie detector examination results.¹¹⁶ The defendant appealed from his murder conviction on the grounds that the trial court had improperly disallowed expert testimony that he passed a systolic blood pressure deception test, the precursor of the modern polygraph test.¹¹⁷ In considering the defendant's claim, the Court of Appeals for the District of Columbia affirmed the trial court's exclusion of the evidence because the device had "not yet gained such standing and scientific recognition among physiological and psychological authorities as would justify the courts in admitting expert testimony deduced from the discovery, development, and experiments thus far made."¹¹⁸

The *Frye* test is based upon the general acceptance of novel scientific evidence within a particular scientific community. Justifying its precondition for admissibility in *Frye*, the Court of Appeals for the District of Columbia stated:

[j]ust when a scientific principle or discovery crosses the line between the experimental and demonstrable stages is difficult to define. Somewhere in this twilight zone the evidential force of the principle must be recognized, and while the courts will go a long way in admitting expert testimony deduced from a well-recognized scientific principle or discovery, the thing from which the deduction is made must be sufficiently established to have gained general acceptance in the particular field in which it belongs.¹¹⁹

Although the court in *Frye* did not elaborate on the standard of general acceptance in the scientific community, various jurisdictions have refined the test to incorporate an indicia of reliability.¹²⁰ Ohio has taken yet another approach in the adaptation of *Frye* which will be discussed below.¹²¹

In 1993, the United States Supreme Court expressly rejected the *Frye* standard in the case of *Daubert v. Merrell Dow Pharmaceuticals*.¹²² The Court held that rule 702

¹¹⁶See James R. McCall, *Misconceptions and Reevaluation--Polygraph Admissibility After Rock and Daubert*, 1996 U. ILL. L. REV. 363, 367 (1996).

¹¹⁷The theory behind the systolic blood pressure examination was that if a person lied, that person's blood pressure would rise because of the fear and/or anxiety the person would experience in anticipation of being caught. The systolic pressure deception test was invented and administered during the *Frye* case by William Marston. Mr. Marston was the creator of the "Wonder Woman" comic book character and her famous truth-inducing magic lasso. Richard H. Underwood, *Truth Verifiers: From the Hot Iron to the Lie Detector*, 84 KY.L.J. 597, 629 (1995-96).

¹¹⁸*Frye*, 293 F. 1013, at 1014.

¹¹⁹*Id.*

¹²⁰The Court of Appeals of New York has stated that "the test is not whether a particular procedure is unanimously endorsed by the scientific community, but whether it is generally accepted as reliable." *People v. Quinn*, 580 N.Y.S.2d 818, 826 (1991) (quoting *People v. Middleton*, 429 N.E.2d 100, 103 (1981)); see also *State v. Witte*, 836 P.2d 1110, 1111 (1992); *Commonwealth v. Apollo*, 603 A.2d 1023, 1027 (1992).

¹²¹*State v. Williams*, 446 N.E.2d 444 (Ohio 1983).

¹²²*Daubert*, 509 U.S. at 584.

of the Federal Rules of Evidence, which was enacted in 1975, had superseded the *Frye* test.¹²³ Federal Rule 702 states: "If scientific, technical, or other specialized knowledge will assist the trier of fact to understand the evidence or to determine a fact in issue, a witness qualified as an expert by knowledge, skill, experience, training, or education, may testify thereto in the form of an opinion or otherwise."¹²⁴

The Court concluded that "[n]othing in the text of [rule 702] establishes 'general acceptance' as an absolute prerequisite to admissibility . . . That austere standard, absent from, and incompatible with, the Federal Rules of Evidence, should not be applied in federal trials."¹²⁵

The movement among the state courts away from *Frye* and toward the *Daubert* approach has continued since the *Daubert* decision.¹²⁶ Many other courts have explicitly stated that their jurisprudence had already been in conformity with the *Daubert* approach.¹²⁷

C. Ohio's Evaluation and Reconfiguration of *Frye*

To date, most of the states with an analogue to rule 702 of the Federal Rules of Evidence have rejected the *Frye* approach and adopted the standard set out in

¹²³*Daubert*, 509 U.S. at 587. In total, twenty states had already rejected *Frye* and adopted a "helpfulness" or "relevance" test for admissibility of scientific evidence by the time *Daubert* was decided in 1993. See Joseph R. Meaney, *From Frye to Daubert: Is a Pattern Unfolding?* 35 JURIMETRICS J. 191, 194-198 (1995).

¹²⁴FED. R. EVID. 702.

¹²⁵*Daubert*, 509 U.S. at 588-89. Before *Daubert* was decided, several federal courts had rejected *Frye* because it lacked adequate judicial gatekeeper functions. These courts rejected the rigid 'nose-counting' of *Frye* and instead based admissibility decisions on the "helpfulness to the fact finder of proffered evidence. *DeLuca v. Merrell Dow Pharmaceuticals, Inc.*, 911 F.2d 941, 951, 955 (3d Cir. 1990); see also *United States v. Jakobetz*, 955 F.2d 786 (2d Cir.), cert. denied, 506 U.S. 834 (1992); *Clinchfield R. Co. v. Lynch*, 784 F.2d 545 (4th Cir. 1986); *United States v. Downing*, 753 F.2d 1224 (3d Cir. 1985); *United States v. Mustafa*, 479 U.S. 953 (1986). Many state courts have followed the federal judiciary lead in holding *Frye* invalid for lack of gatekeeping functions. See, e.g., *Barmeyer v. Montana Power Co.*, 657 P.2d 594, 598 (Mont. 1983); *State v. Brown*, 687 P.2d 751, 759 (Or. 1984); *State v. Dery*, 545 A.2d 1014, 1017 (R.I. 1988).

¹²⁶*Newhart v. State*, 669 N.E.2d 953, 955 (Ind. 1996); *Harrison v. State*, 644 N.E.2d 1243, 1252 (Ind. 1995); *Cecil v. Commonwealth*, 888 S.W.2d 669, 675 (Ky. 1994); *State v. Foret*, 628 So.2d 1116, 1123 (La. 1993); *Commonwealth v. Lanigan*, 641 N.E.2d 1342, 1353 (Mass. 1994); *Taylor v. State*, 889 P.2d 319, 328-39 (Okla. Crim. App. 1995); *State v. Hofer*, 512 N.W.2d 482, 484 (S.D. 1994); *State v. Brooks*, 643 A.2d 226, 230 (Vt. 1993); *Craddock v. Watson*, 475 S.E.2d 62, 66-67 (W.Va. 1996).

¹²⁷*Jones v. State*, 862 S.W.2d 242, 246 (Ark. 1993); *Nelson v. State*, 628 A.2d 69, 73 (Del. 1993); *State v. Quattrocchi*, 681 A.2d 879, 884 (R.I. 1996).

Daubert.¹²⁸ Ohio has taken its own approach with regard to scientific evidence and the presentation of expert testimony.¹²⁹

In *State v. Williams*, the Ohio Supreme Court expressly declined to adopt the *Frye* test with respect to scientific evidence.¹³⁰ The court promulgated a "more flexible standard,"¹³¹ which was formed in accordance with rules 402,¹³² 403,¹³³ and 702 of the Ohio Rules of Evidence.¹³⁴ The Ohio Supreme Court stated in its opinion:

We refuse to engage in scientific nose counting for the purpose of deciding whether evidence based on newly ascertained or applied scientific principles is admissible. We believe the Rules of Evidence establish adequate preconditions for admissibility of expert testimony, and we leave to the discretion of this state's judiciary, on a case by case basis, to decide whether the questioned testimony is relevant and will assist the trier of fact to understand the evidence or to determine a fact in issue.¹³⁵

The term 'assist the trier of fact' had been established by case law to incorporate two distinct admissibility requirements. The first requirement stated that the expert's testimony will only "assist the trier of fact" if the testimony relates to a matter which is "beyond the ken" of the ordinary person.¹³⁶ The second requirement for expert

¹²⁸*See, e.g., supra* notes 113-114. *But see*, *Lattarulo v. State*, 401 S.E.2d 516, 519 (Ga. 1991) (Even in the absence of a rule 702 analogue to the Federal Rules of Evidence, Georgia's test for admissibility of scientific evidence is "whether the procedure or technique 'has reached a scientific stage of verifiable certainty'"). *See generally*, *Meaney, supra* note 123, at 199.

¹²⁹Because *Daubert* was premised on an interpretation of a federal rule of evidence, the Court's rejection of *Frye* is not binding authority on state courts. Thus, Ohio is not obligated to follow *Daubert* and, therefore, has chosen to adapt a limited variation of *Frye*. *Williams*, 446 N.E.2d at 448.

¹³⁰*Id.*

¹³¹*Id.* at 447.

¹³²OHIO R. EVID. 402 reads as follows: "All relevant evidence is admissible, except as otherwise provided by the Constitution of the United States, by the Constitution of the State of Ohio, by statute enacted by the General Assembly not in conflict with a rule of the Supreme Court of Ohio, by these rules, or by other rules prescribed by the Supreme Court of Ohio. Evidence which is not relevant is not admissible."

¹³³OHIO R. EVID. 403 holds: "(A) Exclusion mandatory. Although relevant, evidence is not admissible if its probative value is substantially outweighed by the danger of unfair prejudice, of confusion of the issues, or of misleading the jury."

"(B) Exclusion discretionary. Although relevant, evidence may be excluded if its probative value is substantially outweighed by considerations of undue delay, or needless presentation of cumulative evidence."

¹³⁴*See supra* note 121. The Ohio Rule of Evidence as originally adopted employed the same language as FED. R. EVID. 702. The OHIO R. EVID. 702 was amended in 1994.

¹³⁵*Williams*, 446 N.E.2d at 448.

¹³⁶*State v. Koss*, 551 N.E.2d 970, 973 (Ohio 1990) (when the subject matter is "within the ken of the jury", the expert's testimony is not admissible); *State v. Buell*, 489 N.E.2d 795, 803 (Ohio 1980) (the knowledge must be "sufficiently beyond common experience" in order for the testimony to be admissible); *State v. Thomas*, 423 N.E.2d 137, 139 (Ohio 1981) (expert

testimony to be deemed to "assist the trier of fact" was that the knowledge must meet a threshold standard of reliability, as established either through testimony or judicial notice.¹³⁷ A definitive test had not been clearly defined by the Ohio judiciary. This lack of cohesion throughout the court system has led to misleading results for attorneys and courts seeking guidance on the admissibility of challenged testimony.¹³⁸

In 1994, Ohio Rule 702 was amended to clarify the circumstances in which expert testimony is admissible.¹³⁹ The language of the amendment codifies prior Supreme Court of Ohio rulings,¹⁴⁰ uses a similar approach to *Daubert v. Merrell Dow Pharmaceuticals*,¹⁴¹ and incorporates language used in an executive order issued by President Bush¹⁴² in place of the vague "assists the trier of fact" language. Thus, amended Rule 702 clearly provides the requirements for the admission of expert testimony.¹⁴³ However, judicial application of this rule concerning testimony on shaken baby syndrome is seriously called into question with the recent advent of medical information regarding the syndrome and its elusiveness from many physicians.¹⁴⁴

testimony is not admissible if the subject matter is not "beyond the ken of the average lay person").

¹³⁷See *State v. Bresson*, 554 N.E.2d 1330, 1334 (Ohio 1990) (prior case law acknowledging test was sufficient to show that the test was reliable as a general matter, and the test was admissible on a case by case basis showing the tester's qualifications and the reliability of the test's administration); see also *State v. Pierce*, 597 N.E.2d 107, 109 (Ohio 1992) (scientific evidence was admissible where the unreliability of the evidence was not shown in the particular case and the probative value and reliability was such that the possibility of misleading the jury was negligible).

¹³⁸OHIO R. EVID. 702, staff notes.

¹³⁹See *infra* note 140.

¹⁴⁰See *supra* text accompanying note 134.

¹⁴¹*Daubert*, 509 U.S. at 595 (The focus "must be solely on principles and methodology, not on the conclusions they generate.").

¹⁴²Exec. Order No. 12,778, 56 Fed. Reg. 55,195 (1991). The phrase "widely accepted" now used in Rule 702(C)(1) was taken from President Bush in an executive order.

¹⁴³OHIO R. EVID. 702 states: A witness may testify as an expert if all of the following apply: (A) The witness' testimony either relates to matters beyond the knowledge or experience possessed by lay persons or dispels a misconception common among lay persons; (B) The witness is qualified as an expert by specialized knowledge, skill, experience, training, or education regarding the subject matter of the testimony; (C) The witness' testimony is based on reliable scientific, technical, or other specialized information. To the extent that the testimony reports the result of a procedure, test, or experiment, the testimony is reliable only if all of the following apply: (1) The theory upon which the procedure, test, or experiment is based is objectively verifiable or is validly derived from widely accepted knowledge, facts, or principles; (2) The design of the procedure, test, or experiment reliably implements the theory; (3) The particular procedure, test, or experiment was conducted in a way that will yield an accurate result.

¹⁴⁴See *Cox*, *supra* note 55, at 513.

D. Problems with Ohio's Approach for SBS Evidence

Shaken baby syndrome as a valid medical diagnosis has made its way into many of Ohio's courts.¹⁴⁵ Judicial recognition first appeared implicitly in *State v. Weeks*,¹⁴⁶ when the court acknowledged expert testimony on shaken baby syndrome, without questioning the validity or acceptability of the diagnosis in the medical community, nor did it deem it necessary to question the qualifications of the expert.¹⁴⁷ Since the diagnosis was first discovered, numerous other jurisdictions have accepted the shaken baby syndrome as a reliable scientific premise.¹⁴⁸ The general

¹⁴⁵*State v. Rakes*, No. 11-97-9, 1997 WL 791525, (Ohio App. 3rd D. Dec. 30, 1997); *State v. Thompson*, No. 96APA12-1660, 1997 WL 599178, (Ohio App. 10th D. Sep. 23, 1997); *In re Fordyce*, No. CA96-09-193, 1997 WL 589062, (Ohio App. 12th D. Sep. 22, 1997); *Matter of Smith*, No. 17919, 1997 WL 423035, (Ohio App. 9th D. Jul. 23, 1997); *In re Cloud*, No. CA96-01-002, 1997 WL 264264, (Ohio App. 12th D. May 19, 1997); *State v. Payne*, No. L-95-317, 1996 WL 748164, (Ohio App. 6th D. Dec. 30, 1996); *State v. Traster*, No. 17548, 1996 WL 603850, (Ohio App. 9th D. Oct. 23, 1996); *State v. Hadi*, No. 17294, 1996 WL 122006, (Ohio App. 9th D. Mar. 20, 1996); *State v. Wiley*, No. 17190, 1995 WL 752696 (Ohio App. 9th D. Dec. 20, 1995); *In Matter of Rogers*, No. 2894, 1994 WL 721872, (Ohio App. 9th D. Dec. 30, 1994); *State v. Reynolds*, No. 65342, 1994 WL 449743, (Ohio App. 8th D. Aug. 18, 1994); *State v. Sandefur*, No. 15787, 1993 WL 303279, (Ohio App. 9th D. Aug. 11, 1993); *State v. Banks*, No. 92AP-859, 1993 WL 194118, (Ohio App. 10th D. Jun. 3, 1993); *State v. Williams*, No. 91AP-653, 1992 WL 42815, (Ohio App. 10th D. Mar. 5, 1992); *State v. Weeks*, 582 N.E.2d 614 (Ohio Ct. App. 1989); *State v. Munici*, No. 52579, 1987 WL 20206, (Ohio App. 8th D. Nov. 19, 1987).

¹⁴⁶*State v. Weeks*, 582 N.E.2d 614, 615 (Ohio Ct. App. 1989).

¹⁴⁷*Id.* at 614. At the time of the trial, Dr. Shapiro was the director of Children's Hospital Child Abuse Team in Cincinnati. Dr. Shapiro testified that the child, Aaron, had suffered extensive bruising and subdural hematomas. The doctor proceeded to ask for a consultation for Aaron with the director of Pediatric Ophthalmology who diagnosed the retinal hemorrhages. Both Dr. Shapiro and Dr. Burke, in a collaborative effort, diagnosed Aaron as having suffered from shaken baby syndrome.

¹⁴⁸Explicit judicial recognition has been accorded in at least two states. See *State v. Lopez*, 412 S.E.2d 390, 393 (S.C. 1991); *State v. McClary*, 541 A.2d 96, 101-03 (Conn. 1988); see also *In re Renae Ebony W.*, 452 S.E.2d 737, 741 (W.Va. 1994); *In re Lou R.*, 499 N.Y.S.2d 846, 848-50 (N.Y. Fam. Ct. 1986). Many more courts have implicitly recognized the condition by acknowledging expert testimony describing the syndrome or treating it as an accepted medical condition without further commenting on its merits. See *Dabbs v. State*, 518 So.2d 825, 826-27 (Ala. Crim. App. 1987); *In re B.S.*, 697 So.2d 914, 916 (Fla. Dist. Ct. App. 1997); *Jones v. State*, 439 S.E.2d 645, 647 (Ga. 1994); *State v. Robinson*, 922 P.2d 358, 361-62 (Haw. 1996); *State v. Ojeda*, 810 P.2d 1148, 1150-51 (Idaho Ct. App. 1991); *People v. Rader*, 651 N.E.2d 258, 260 (Ill. 1995); *Brown v. State*, 512 N.E.2d 173, 176 (Ind. 1987); *State v. Weaver*, 554 N.W.2d 240, 241-44 (Iowa 1996); *State v. Altum*, 941 P.2d 1348, 1350 (Kan. 1997); *State v. Discher*, 597 A.2d 1336, 1338-39 (Me. 1991); *State v. Olson*, 435 N.W.2d 530, 531-32 (Minn. 1989); *Monk v State*, 532 So.2d 592, 594-96 (Miss. 1988); *State v. Broseman*, 947 S.W.2d 520, 524 (Mo. Ct. App. 1997); *State v. Andrews*, 274 Mont. 292, 907 P.2d 967, 968-69 (1995); *State v. Reynolds*, 483 N.W.2d 155, 157-58 (Neb. 1992); *State v. Wojcik*, 472 N.W.2d 732, 734 (Neb. 1991); *State v. Evans*, 594 A.2d 154, 156-57 (N.H. 1991); *State v. Mallar*, 508 A.2d 1070, 1071 (N.H. 1986); *People v. Van Norstrand*, 647 N.E.2d 1275, 1276-77 (N.Y. 1995), *appeal denied after remand*, 678 N.E.2d 511 (N.Y. 1997); *State v. Burr*, 461 S.E.2d 602, 609 (N.C. 1995), *cert. denied*, 116 S. Ct. 1359, (1996); *In re A.V.*, 554 N.W.2d 461, 462-63 (N.D. 1996); *State v. Weeks*, 582 N.E.2d 614, 615 (Ohio

acceptability of the diagnosis in both the medical and legal communities is not in dispute. The potential legal problem centers around the reliability of the method used to arrive at a diagnosis and the qualifications of the individual engaging that methodology. It is the judiciary's responsibility to deal with these issues under Rule 702(B) and (C) of the Ohio Rules of Evidence.¹⁴⁹

1. Qualifications of Expert Witnesses

Rule 702(B) provides that a witness "is qualified as an expert by specialized knowledge, skill, experience, training, or education regarding the subject matter of the testimony."¹⁵⁰ Read literally, the knowledge and skill discussed in this provision is directly related to "the subject matter of the testimony."¹⁵¹ The reevaluation by judges must begin with what is meant in this provision as to skill, training and specialized knowledge and how that will assist the trier of fact concerning the true subject matter of the testimony. If the American Academy of Pediatrics has set up guidelines stating which medical specialties should be included in a diagnostic team and which sub-specialties should be used for consultation by that diagnostic team,¹⁵² then it appears that the judiciary should take these facts into consideration when determining someone's expertise in a particular field.

Determination of whether a witness is qualified as an expert is a decision of the trial court pursuant to Rule 104(A)¹⁵³ of the Ohio Rules of Evidence. The trial court must decide whether the expert's knowledge on the subject matter is such that his opinion will most likely assist the trier of fact in arriving at the truth.¹⁵⁴ An expert qualified on one subject may not be qualified on another related subject.¹⁵⁵

1989); State v. Pollard, 888 P.2d 1054, 1056, *rev. denied*, 894 P.2d 469 (Or. 1995); State v. Olsen, 680 A.2d 107, 109 (Vt. 1996); West Virginia ex rel. Wright v. Doris S., 475 S.E.2d 865, 870, 875-76 (W.Va. 1996); State v. Rundle, 500 N.W.2d 916, 918 (Wis. 1993). *Cf.* State v. P.Z., 666 A.2d 1000 (N.J. Super. Ct. App. Div. 1995), *rev'd*, 703 A.2d 901 (N.J. 1997).

¹⁴⁹See *infra* note 150 and accompanying text.

¹⁵⁰OHIO R. EVID. 702(B).

¹⁵¹*Id.*

¹⁵²See A.A.P., *supra* note 109, at 874 and accompanying text.

¹⁵³OHIO R. EVID. 104(A) provides: "Preliminary questions concerning the qualifications of a person to be a witness . . . shall be determined by the court." See also, Scott v. Yates, 643 N.E.2d 105, 106 (Ohio 1994) ("[A] threshold determination must first be made under Evid. R. 104(A) concerning the qualifications of the witness to testify."); State v. Grant, 620 N.E.2d 50, 64 (Ohio 1993) ("[T]he qualification of an expert is a matter for determination by the court and rulings with respect to such matters will ordinarily not be reversed absent a clear abuse of discretion."); State v. Tomlin, 590 N.E.2d 1253, 1256 (Ohio 1992) ("[A]s a threshold to the introduction of expert testimony, the trial court must first determine if the expert is qualified under Evid.R. 104(A).").

¹⁵⁴United States v. Barker, 553 F.2d 1013, 1024 (6th Cir. 1977) (quoting Holmgren v. Massey-Ferguson, Inc., 516 F.2d 856, 858 (8th Cir. 1975)).

¹⁵⁵MAGUIRE, EVIDENCE: COMMON SENSE AND COMMON LAW, 30-31 (1947) ("It goes without saying that an expert qualified to testify upon one topic may be completely unqualified to testify about another as to which he lacks special knowledge, skill, experience, or training, but some applications of this principle take the unwary by surprise.").

There are generally three common law rules that courts follow to guide them in making a determination of whether the individual qualifies as an expert. First, the expert "need not be the best witness on the subject,"¹⁵⁶ nor "an outstanding practitioner in the field in which he professes expertise."¹⁵⁷ Second, the expert's qualifications should be assessed by examining the basis for the expert's knowledge and not the title which is possessed by the witness.¹⁵⁸ Third, experience alone may qualify the witness to express an opinion.¹⁵⁹ "Qualifications which may satisfy the requirements of Evid.R. 702 are multitudinous. . . . [T]here is no degree requirement, per se. Professional experience and training in a particular field may be sufficient to qualify one as an expert."¹⁶⁰

In cases of alleged shaken baby syndrome, the expert testifying should have skill, experience, specialized knowledge, or training in disciplines most apt to make diagnoses of this syndrome.¹⁶¹ For example, when an expert is testifying on the findings of retinal hemorrhages in a suspected case of abuse, it is only reasonable that the expert should have some type of specialized knowledge either from dealing with shaken babies, or in an area specializing in ocular pathologies.¹⁶² While it is true that the expert need not be "the best in the business", the physician must have the requisite knowledge that is likely to assist the trier of fact in reaching the truth.¹⁶³

*State of Ohio v. Schneider*¹⁶⁴ is a case, although not an isolated one,¹⁶⁵ which seriously calls into question the decision of a judge to allow testimony of the Coroner concerning information that was not contained within an area in which he is proficient. The Coroner who testified at trial had based his diagnosis, in part, on the advise of two neuropathologists and a podiatrist.¹⁶⁶ The original diagnosis was suspected to be shaken baby syndrome; however, the Coroner asked a foot doctor

¹⁵⁶Scott v. Yates, 643 N.E.2d 105, 106 (Ohio 1994).

¹⁵⁷Barker, 553 F.2d at 1024.

¹⁵⁸Jenkins v. United States, 307 F.2d 637, 645 (D.C. Cir. 1962).

¹⁵⁹State v. Mack, 653 N.E.2d 329, 337 (Ohio 1995).

¹⁶⁰*Id.*

¹⁶¹See A.A.P., *supra* text accompanying note 109.

¹⁶²*Id.*

¹⁶³Alexander v. Mt. Carmel Med. Center, 383 N.E.2d 564, 566 (Ohio 1978); *accord* Ishler v. Miller, 384 N.E.2d 296, 300 (Ohio 1978); Faulkner v. Pezeshki, 337 N.E.2d 158, 164 (4th D. 1975).

¹⁶⁴No. L-84-214, 1984 WL 3719, (Ohio App. 6th D. Dec. 21, 1984).

¹⁶⁵State v. Thompson, No. 96APA12-1660, 1997 WL 599178, (Ohio App. 10th D. Sep. 23, 1997). The trial judge simply remarked that Dr. Patrick Fardal was a forensic pathologist employed by the Franklin County Coroner's office, but failed to inquire as to Dr. Fardal's experience with children, specifically abused children or those suffering from shaken baby syndrome. *Id.* at *3; See, e.g., State v. Payne, No. L-95-317, 1996 WL 748164, (Ohio App. 6th D. Dec. 30, 1996); State v. Wiley, No. 17190, 1995 WL 752696 (Ohio App. 9th D., Dec. 20, 1995); State v. Banks, No. 92AP-859, 1993 WL 194118, (Ohio App. 10th D. Jun. 3, 1993); State v. Schneider, No. L-84-214, 1984 WL 3719, (Ohio App. 6th D. Dec. 21, 1984).

¹⁶⁶Thompson, 1997 WL 599178, at *1.

and two pathologists to diagnose retinal hemorrhages for confirmation in his report.¹⁶⁷ The final diagnosis may or may not have been correct; however, the potential for error is evident, because the three individuals were making a diagnosis that was outside their area of expertise. A podiatrist, by definition, is a specialist in the diagnosis and treatment of foot disorders;¹⁶⁸ while, the neuropathologist studies the pathologies of the nervous system.¹⁶⁹ Usually, experience may substitute for lack of formal education or degree requirements;¹⁷⁰ however, there was no evidence in *Schneider* that any of the persons handling this infant had any "specialized knowledge, skill, experience, training, or education regarding the subject matter of the [Coroner's] testimony."¹⁷¹

Although a commonly held public myth suggests that coroners are experts in any form of death by virtue of their title, the Advisory Board suggests otherwise:

The vast majority of medical examiners and forensic pathologists lack specific training in identifying the cause of a child fatality Complicating the situation, 28 states¹⁷² rely upon coroners or justices of the peace who are elected to office based only on the qualifications that they are at least 18 years of age and a resident of that county.¹⁷³

Moreover, persons in the medical community claim that "autopsies of young children require a specialized understanding of pediatrics . . . ", a lack of which often results in misclassification and mismanagement of child deaths.¹⁷⁴

Schneider, makes it apparent that by professional definition and lack of experience, these individuals should not have been permitted to handle cases of shaken baby syndrome and testify in court. In other cases,¹⁷⁵ however, subtleties exist that show purported experts contradicting the reported and accepted literature relative to the most basic characteristics of the syndrome.¹⁷⁶ In *State v. Wiley*,¹⁷⁷ the

¹⁶⁷*Id.* at *1.

¹⁶⁸J.E. SCHMIDT, ATTORNEY'S DICTIONARY OF MEDICINE P-328(Matthew Bender & Co. ed., 1997).

¹⁶⁹*Id.* at N-85.

¹⁷⁰*Mack*, 653 N.E.2d at 337.

¹⁷¹OHIO R. EVID. 702(B)

¹⁷²Ohio maintains a coroner system pursuant to Ohio Revised Code § 313 for determination and manner of death.

¹⁷³A NATION'S SHAME, *supra* note 13, at 52

¹⁷⁴Durfee, et al., *supra* note 90, at 3173.

¹⁷⁵*State v. Reynolds*, No. 65342, 1994 WL 449743, (Ohio App. 8th D. Aug. 18, 1994).

¹⁷⁶*Id.* at *3. Dr. Thelma Jean Citta-Pietrolungo testified that "based upon her own examination . . . Amber Reynolds head injury was an inflicted injury which occurred either when she fell from a high distance of two or three feet, with someone watching her, or from shaken baby syndrome." (emphasis added) *Id.* Dr. Carolyn Levitt, director of the Mid West Children's Resource Center in St. Paul, remarks that the six articles in the pediatric literature covering 1,500 short falls show that the minimum height from which a child fell to death was from a second story window. Tabner Thayer, *supra*, note 22, *20; see also David Chadwick et al., *Deaths from Falls in Children: How Far Is Fatal?*, 31 J. TRAUMA 1355, 1355 (1991).

Summit County Coroner admitted on cross-examination that he did not find retinal hemorrhages, and agreed erroneously that they only occur in 50% of the reported cases of Shaken Baby Syndrome.¹⁷⁸ To the contrary, retinal hemorrhages are one of the hallmark signs of shaken baby syndrome¹⁷⁹ and the Coroner's testimony with regard to the statistics is in dissension with the medical literature.¹⁸⁰ The American Academy of Pediatrics clearly indicates that "[i]n 75% to 90% of the [shaken baby] cases, unilateral or bilateral retinal hemorrhages are present *but may be missed unless the child is examined by a pediatric ophthalmologist* or experienced physician who is familiar with the hemorrhages, has the proper equipment, and dilates the child's pupils."¹⁸¹

One may logically infer that when an alleged expert is not aware of the classic signs of a particular illness, that particular expert testifying may be lacking a certain degree of expertise pertaining to that illness. It is likely that this problem could have been avoided had the judge looked into the qualifications of the witness and his expertise regarding the subject matter of the testimony.

These situations offer further evidence that the qualifications of alleged experts should be more closely scrutinized by the judges. This is not to imply that judges need to predict the competency of witnesses who appear to have sufficient credentials. Instead, the reevaluation needs to take place to ensure that witnesses who offer testimony are competent based on their education, skill, or experience and not solely by virtue of their being either physicians or coroners.

These cases present examples of experts who misquote the most basic characteristics of the syndrome found in the medical literature and judges who refuse to question the physicians' qualifications;¹⁸² however, there are several cases which approach the admissibility of this testimony systematically.¹⁸³ For example, in *State*

¹⁷⁷Wiley, 1995 WL 752696, at *4.

¹⁷⁸*Id.* at *4.

¹⁷⁹Swenson & Levitt, *supra* note 37, at 42; *see also* Alexander et al., *supra* note 19, at 724; Michael W. Gaynon et al., *Retinal Folds in the Shaken Baby Syndrome*, 106 AM. J. OPHTHALMOLOGY 423 (1988); Cox, *supra* note 55, at 514.

¹⁸⁰*See* Elaine Billmire & Patricia A. Meyers, *Serious Head Injuries in Infants: Accident or Abuse?*, 75 PEDIATRICS 340, 341 (1985) (84 children under one year with head injury and/or abnormal CT findings, 28 abused and 54 nonabused; "89% of the shaken infants had retinal hemorrhages . . . Retinal hemorrhages were not seen in any accidentally injured infants."); Budenz, *supra* note 48, at 560 (autopsies of 19 infants, 13 abused and 6 sudden infant death syndrome; 11 of the abused and none of the nonabused had retinal hemorrhages); Yvonne M. Buys, *Retinal Findings After Head Trauma in Infants and Young Children*, 99 OPHTHALMOLOGY 1718, 1722 (1992) (78 children 36 months or younger with head injury; 3 abused and 75 nonabused; none of the accidentally injured children and all 3 abused children had retinal hemorrhages); Bruce & Zimmerman, *supra* note 52, at 484 ("The presence of retinal hemorrhages in the absence of a history of severe trauma is diagnostic of some type of shaken impact injury.").

¹⁸¹*See* A.A.P., *supra* note 6, at 873 (emphasis added).

¹⁸²*See supra* notes 142, 172; *see also* *State v. Schneider*, No. L-84-214, 1984 WL 3719, (Ohio App. 6th D. 1984).

¹⁸³*See State v. Traster*, No. 17548, 1996 WL 603850, (Ohio App. 9th D. Oct. 23, 1996); *State v. Weeks*, 582 N.E.2d 614 (Ohio Ct. App. 1989).

v. *Traster*,¹⁸⁴ the court noted both the qualifications of the experts as well as their methodology in making the diagnosis. In that case, the infant was met at the emergency room by a pediatric neurologist and pediatric ophthalmologist who made the diagnosis based on the retinal hemorrhages and other symptoms of the shaken baby syndrome.¹⁸⁵ Dr. Richard Steiner, the director of the child abuse evaluation center of the hospital, provided the two pediatric specialists with a consult to confirm the diagnosis.¹⁸⁶ All three of the physicians testified at trial as expert witnesses. The comprehensive nature of the examination described in the opinion is consistent with the approach recommended by the American Academy of Pediatrics.¹⁸⁷ The trial court apparently took extreme care in rendering a decision as to who shall qualify as an expert.

While the medical community's awareness of the need for a systematic team approach is being observed and implemented in practice, the judiciary has still not required that testimony concerning shaken baby syndrome, or child abuse in general come from individuals involved in such a team approach. Nevertheless, it is incumbent upon the judiciary that it closely scrutinize testimony of any purported experts based on the recognized advantages of a team approach and the need for specialists. Other jurisdictions are beginning to see an increase in cooperative efforts between specialists in diagnosing shaken baby syndrome.¹⁸⁸

2. SBS Diagnosis Requires A Multifaceted Approach

Not only must the expert witness be proficient in the specific field testified about, but the reliability of the test, procedure, or methodology forming the basis of that testimony must be shown.¹⁸⁹ Rule 702(C) of the Ohio Rules of Evidence states that the witness's testimony must have its basis in reliable, scientific, technical, or otherwise specialized knowledge.¹⁹⁰ More importantly, the reliability of the test or procedure must be shown generally *and as to the specific application*.¹⁹¹ The reliability of scientific evidence is based on the satisfying of three factors: (1) the validity of the underlying theory, (2) the validity of the technique applying that theory, and (3) the proper application of the technique on any given occasion.¹⁹² The

¹⁸⁴No. 17548, 1996 WL 603850, at *1 (Ohio App. 9th D. Oct. 23, 1996).

¹⁸⁵*Id.* at *2.

¹⁸⁶*Id.*

¹⁸⁷*See* A.A.P., *supra* note 109, at 874 and accompanying text.

¹⁸⁸*See* *People v. Corrie*, No. 4-97-0050, 1998 WL 21924 (Ill. App. 4th D. 1998); *see also* *Bryant-Bruce v. Vanderbilt University, Inc.*, 974 F.Supp 1127, 1131, 1136 (M.D. Tenn. 1997).

¹⁸⁹OHIO R. EVID. 702(C). Evidence Rule 702(C) codifies *Williams*, *supra* note 121, which stand for the proposition that the underlying theory as well as the implementation of that theory must be reliable.

¹⁹⁰*Id.*

¹⁹¹OHIO R. EVID. 702, staff notes (emphasis added).

¹⁹²1 GIANNELLI & IMWINKELRIED, *SCIENTIFIC EVIDENCE* 1-2 (2d ed. 1993) ("The first two factors— the validity of the underlying theory and validity of the technique— are distinct issues. One could accept, for example, the validity of the premise underlying 'voiceprint'

inquiry as to reliability remains unchanged in the common law and is appropriately directed, not to the correctness of the conclusions reached by any particular method, but to the reliability of the principles and methodology used to reach those conclusions.¹⁹³

For example, the fundamental principle concerning the reliability of a testing procedure for voiceprint analysis is similar to the analysis for proper presentation of expert testimony on a diagnosis for shaken baby syndrome. The underlying scientific theory is that shaken baby syndrome occurs generally where there exists retinal hemorrhage, subdural hematoma, and subarachnoid hemorrhage.¹⁹⁴ These factors in the absence of significant external trauma or genetic abnormalities indicate the infant has suffered from this syndrome.¹⁹⁵ The underlying theory of this syndrome receives its validity through its general acceptance and reliability in the medical community.¹⁹⁶ The problem arises when a physician lacks the necessary qualifications to make the complete diagnosis by himself without the benefit of a comprehensive situation as recommended by the medical community.¹⁹⁷ At this point, the methodology in making the diagnosis should be considered flawed.

The most recent reports by professionals in the medical community who are familiar with this syndrome indicate that diagnoses made by the cooperative efforts of death review teams is becoming the only reliable method for determination of abuse.¹⁹⁸ Many of the statistics show that due to the significant increase in cases of detected child abuse using the team approach, the previous method of individual detection allowed many cases of abuse to slip through the cracks.¹⁹⁹ In keeping with the wording of Rule 702, the particular procedure, test or experiment needs to be conducted in a way that will yield an accurate result.²⁰⁰

Under Ohio law it is clear that unreliability of the principles and methods cannot be shown without evidence that the procedures employed were "somehow deficient."²⁰¹ It may be reasonably argued that since the implementation of these child death review teams in many other jurisdictions,²⁰² the methodology of

identification— voice uniqueness— but still question whether the voiceprint technique can identify that uniqueness. Similarly, the underlying psychological and physiological principles of polygraph testing could be acknowledged without endorsing the proposition that a polygraph examiner can detect deception by means of the polygraph technique. The validity of a scientific principle and the validity of the technique applying that principle may be established through judicial notice, legislative recognition, stipulation, or the presentation of evidence, typically expert testimony.").

¹⁹³OHIO R. EVID. 702, staff notes.

¹⁹⁴See A.A.P., *supra* note 6, at 872.

¹⁹⁵*Id.*

¹⁹⁶*Id.* at 874 ("The shaken baby syndrome is a clearly definable medical condition.").

¹⁹⁷Zylke, *supra* note 9, at 2934.

¹⁹⁸See *supra* note 11.

¹⁹⁹A NATION'S SHAME, *supra* note 13, at 86.

²⁰⁰OHIO R. EVID. 702(C)(3).

²⁰¹State v. Pierce, 597 N.E.2d 107, 113 (Ohio 1992).

²⁰²See *supra* note 11.

diagnosing child abuse and specifically shaken baby syndrome has taken a dramatic turn towards modification.²⁰³ Although one may only predict the enactment of child death review legislation by Ohio's General Assembly,²⁰⁴ the future passage of that bill will make incumbent upon the judiciary reconsideration of its viewpoint regarding the approach used by purported experts in detection of shaken baby syndrome.

Recognition of the team approach by the medical community could provide evidence that the past individualized approach for diagnosis was "somehow deficient" and a new team concept must be implemented to remedy that deficiency. This interpretation of the medical community's findings along with the mandatory implementation of county child death review teams could provide Ohio's judiciary with the ammunition to reevaluate the basis for expert testimony concerning shaken baby syndrome.

V. CONCLUSION

Interagency child death review is a concept that has been endorsed and encouraged by the medical community for nearly ten years.²⁰⁵ The idea has produced significant results in detection and possibly prevention of many child abuse cases.²⁰⁶ Shaken baby syndrome is a serious form of infant maltreatment which is diverse and often elusive in its presentation.²⁰⁷ The need for trained professionals to effectively deal with this serious form of abuse has never been greater than it is today.

In recognition of this accelerating problem, Ohio's legislature is currently considering a bill under which these review teams will become mandatory throughout each county.²⁰⁸ If this bill passes, the judiciary should feel compelled to keep pace with this innovative idea. According to the Ohio Rules of Evidence, the judiciary has many available tools by which they may consider the admissibility of expert testimony.²⁰⁹ The judiciary must use this opportunity to become the gatekeepers of justice. This idea holds that judges should scrutinize evidence and its presentation by a purported expert. Ohio's judges should weigh the probative value of the expert's opinion, keeping in mind what methodology was used in forming that opinion and what the basis for the opinion is, with the danger of unfair prejudice, of confusion of the issues, or of misleading the jury.²¹⁰ The goal of the judiciary is always the same: the search for truth.²¹¹

²⁰³A.A.P., *supra* note 6, at 874. ("[Shaken baby syndrome as a clearly definable medical condition] requires integration of specific clinical management and community intervention in an interdisciplinary fashion").

²⁰⁴H.R. 287, 122nd Leg., 1997-1998 Regular Session (Ohio 1997).

²⁰⁵A.A.P., *supra* note 6, at 874.

²⁰⁶A NATION'S SHAME, *supra* note 13, at 86-90.

²⁰⁷Cox, *supra* note 55, at 513.

²⁰⁸H.R. 287, 122nd Leg., 1997-1998 Regular Session (Ohio 1997).

²⁰⁹*See supra* notes 129, 130, 140 and accompanying text.

²¹⁰*See supra* text accompanying note 130.

²¹¹*See* Barker, 553 F.2d at 1024 and accompanying text.

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