



Health & Family

INFANCY

The Shaky Science of Shaken Baby Syndrome

Prosecutors have charged parents and caretakers with shaking infants to death. But how valid is that diagnosis, and how reliable is the evidence behind it?

By [Maia Szalavitz](#) @maiasz | Jan. 17, 2012 | [1 Comment](#)

On New York's Rikers Island, the parents of baby Annie await trial for shaking their infant girl to death. Her mother and father deny harming their child in any way, but prosecutors claim the 70 day old baby died with a severely fractured skull and brain damage consistent with being shaken violently.

Shaken baby syndrome presents a terrifying dilemma to the criminal justice system: a false conviction leaves a grieving parent or other innocent in prison for years while an undeserved exoneration could allow a dangerous child abuser to kill again. Unfortunately, the medical science used to determine the cause of death in infants suspected of being shaken to death is far from precise, and certainly not conducive to the simple "guilty" or "not guilty" decisions that courts require.

In a highly contested [case](#) heard by the Supreme Court last fall, the original guilty verdict against grandmother Shirley Ree Smith for having shaken her grandson to death was overturned by the Ninth Circuit Court of Appeals, which said there was "no physical evidence" and "no demonstrable support" for the conviction. Ree Smith had been visiting her grandchildren and had no prior history of abuse.

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Shaken baby Syndrome (SBS) is typically diagnosed by a "triad" of symptoms: bleeding in the retinas of the eyes, bleeding under the dural matter of the brain (subdural hematoma) and brain swelling— all occurring in the absence of a recent car accident or other clear explanation for the injuries. In Smith's case, her seven-week old grandson had no retinal bleeding at all. Although he did have a subdural hematoma, his brain was not swollen: he didn't even meet two of the three triad criteria. Moreover, most cases of SBS occur among highly isolated new parents or caregivers who are overwhelmed by the baby's incessant crying. But Smith was a grandmother with no history of abuse who spent the the night in her grandson's room along with two other children— and no one even heard the baby cry after he went to bed.

The Supreme Court did not address Smith's innocence but upheld her conviction on procedural grounds, saying that the Appeals Court had overstepped its bounds by overruling the jury's view of the evidence. The ruling leaves open the question of whether Smith did or did



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not cause any harm to her grandson, and consequently, Smith, who had been released, may have to return to prison even though her conviction rests on what her attorneys are arguing is unsound scientific evidence.

In the current case, reported by the *The New York Times*, the suspects are still awaiting trial. Chinese immigrants Li Hangbin and Li Ying became parents of a baby girl they named Annie in August 2007. In October of that year, they were charged with violently murdering her: the father accused of brutally shaking the two month old and the mother of failing to call 911 immediately afterwards. Prosecutors have painted a picture of harsh, uncaring parents who were so unconcerned about their baby that they waited hours after she was clearly severely injured to call for help. They claim that Annie had a massive skull fracture from two non-accidental blows to the head, hemorrhaging in the brain, two broken legs and a fractured rib.

But activists in the Chinese community have discovered that the Li's may have a family history of osteogenesis imperfecta, a disease that can cause bones to break easily, which has previously been mistaken for shaken baby syndrome in some infant deaths. The Li's supporters say that six family members died prematurely of the disorder, two of them at age two months, as in Annie's case.

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Both cases highlight why incidents involving alleged shaken baby syndrome are so challenging for the courts. Any time a loved one's care of an infant is questioned, emotions run high — and the courts, by definition, are forced to put aside passions in favor of evidence that only tells half the story. Physical evidence is only the end result, or the final outcome of what may have been a criminal act, but the cause behind that evidence isn't always obvious. Parents may not be aware that their child is vulnerable to fractures, and child abusers don't typically admit what they have done. The final outcome of a harmed child however, may look the same. For scientists studying shaken baby syndrome to better glean patterns of symptoms more typical of innocence or guilt, this raises the level of uncertainty to a degree that many would be comfortable calling "reasonable doubt."

Take, for example, the diagnosis of SBS itself. SBS, fortunately, affects only a small number of babies— around 1,200 to 1,400 annually. In at least 30% of cases, the diagnosis is relatively clear, because there is prior evidence of abuse. But for the remaining majority of cases, the cause is far more confusing, partly because other possible explanations are equally controversial and ambiguous, making their study more difficult. First is SIDS, or sudden infant death syndrome, which is the leading cause of death of babies aged one month to one year, claiming 2000 to 3000 babies annually in the U.S. No one knows what causes it, which makes diagnosis challenging, although some deaths may be due to accidental smothering from bedding either in a crib or when a child sleeps in its parents' bed.

Second, there are numerous rare genetic disorders—like osteogenesis imperfecta— that can kill infants in ways that can lead to a mistaken SBS diagnosis. Osteogenesis imperfecta affects just 1 in 20,000 births; there are thousands of similarly rare disorders that can cause infant death, many of which have not been studied significantly.

Finally, there's the curious case of Munchausen Disease by Proxy (MPB), a psychiatric disorder in which mothers deliberately injure and sometimes kill their children in a quest for medical attention and praise for their devoted "caring" for injured or sick kids. While the cause of death in both SBS and in murdered children of parents with MPB is abuse, the dangerousness of the Munchausen parent who deliberately produces injury is far greater than that seen in typical SBS. In SBS, momentary anger and frustration typically produces an overreaction and injury— but there is generally no consistent intent to inflict severe or fatal harm as in MBP.

As a result, because SBS is basically a diagnosis of exclusion and involves ruling out rare diseases that physicians may have never even seen, reasonable doubt may be unavoidable. And that's especially true in the 50-75% of cases where the triad of head injuries is the only evidence of SBS.

To address the confusion, experts are attempting to clarify criteria that distinguish SBS from these other conditions. Previously, for example, doctors believed that shaking alone—without banging the child's head against something— was a common cause of SBS death. Now most think that impact is usually needed for serious injury or death. In 2009, the American Academy of Pediatrics decided that the condition should be called "abusive head trauma" to reflect the new understanding of the condition.

But that doesn't mean that diagnosing SBS will necessarily get easier. One recent study of babies and fetuses who died from birth injuries or disease (and could not have been shaken because they never left the hospital) found that many had subdural hematomas, or

bleeding in the brain, that could later have been mistaken for signs of abuse if they'd lived. Other studies find that babies can be injured by abusive head trauma but remain lucid for hours or possibly days before collapsing— meaning that the time frame of the crime may be expanded, which in turn widens the pool of suspects based on their contact with the victim.

Given all this, it seems unjust to sentence people—most of whom have suffered the most grievous loss a parent can face— to years of prison in cases where the “triad” is the only evidence that the baby died from abuse. Perhaps in cases where abuse is suspected but cannot be proven, suspects might be monitored by child welfare authorities or precluded from working with children. But when the science is this shaky, it isn't yet ready for the courtroom, where lives hang in the balance. In the Li's case, that includes not only their own but that of their other daughter— named Nianni, or “remember Annie” in Chinese— who was born while her mother was in shackles and knows her only from jail visits.

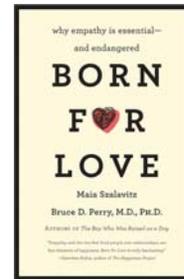
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