

**IN THE
INDIANA COURT OF APPEALS**

Cause No. 71A04-1504-CR-00166

PURVI PATEL,)	
)	Appeal from the St. Joseph Superior Court
<i>Appellant</i>)	
v.)	Cause No. 71D08-1307-FA-000017
)	
STATE OF INDIANA,)	Hon. Elizabeth C. Hurley, Judge
)	
<i>Appellee</i>)	

BRIEF OF AMICUS CURIAE

THE INNOCENCE NETWORK AND DR. GREGORY J. DAVIS

IN SUPPORT OF APPELLANT PURVI PATEL

Julie D. Cantor, MD, JD
Attorney No. 3120-95-TA
506 Santa Monica Blvd, #217
Santa Monica, CA 90401
Phone: (310) 403-8709
Julie.cantor@stanfirdalumni.org

Linda L. Pence
Attorney No: 13198-98
Pence Hensel LLC
135 N. Pennsylvania St., #1600
Indianapolis, IN 46204
Phone: (317) 833-1111
lpence@pencehensel.com

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Pilarczyk, Ian C., “*So Foul A Deed*”: *Infanticide in Montreal, 1825-1850*, 30 LAW & HIST. REV. 575 (2012).....4

Saukko, Pekka, and Knight, Bernard, KNIGHT’S FORENSIC PATHOLOGY, 445-46 (3rd ed. 2004) *passim*

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STATEMENT OF INTEREST

The Innocence Network is an affiliation of organizations from all over the world dedicated to providing pro bono legal and investigative services to individuals seeking to prove innocence of crimes for which they have been convicted and working to redress the causes of wrongful convictions. Most of the Innocence Network's members are based in the United States and are mainly focused on criminal justice reform in the United States, but the Network also includes non-U.S. organizations that meet its membership criteria. The Network maintains an International Committee, and it strongly encourages the development of sister networks across the world, such as Red Inocente, recognizing them as critically important partners in this work.

Dr. Gregory J. Davis is Professor of Pathology and Laboratory Medicine at the University of Kentucky, College of Medicine. He is board certified by the American Board of Pathology in Anatomic and Clinical Pathology as well as Forensic Pathology. Dr. Davis received his medical degree from the University of Tennessee, College of Medicine, in Memphis, Tennessee. He completed his residency at the University of Louisville Affiliated Hospitals and a fellowship at the Office of the Chief Medical Examiner in Louisville, Kentucky. He has an active practice and has published over a dozen articles in peer-reviewed journals. He has also served as president of the Kentucky Society of Pathologists.

ARGUMENT

“A Defendant must not be convicted on suspicion or speculation.”

— Court’s Instruction No. 6, Trial of Purvi Patel

Amici Curiae share a common goal: to ensure that forensic evidence is reliable and that jury verdicts rest on sound scientific evidence. In the case of Purvi Patel, the State argued that the deceased neonate was born alive, and the jury necessarily agreed with this assessment—otherwise, it could not have rendered the verdict of guilt on the feticide and child endangerment charges. *Amici* are concerned that the forensic findings underlying the jury’s decision were unreliable and should not have been admitted as evidence. *Amici* are also concerned that, as a result of the admission of flawed scientific evidence, Ms. Patel is now wrongfully imprisoned. A criminal conviction cannot rest on shaky forensic ground. If we, as a society, are going to condemn an individual to prison for twenty years, the forensic evidence underpinning that decision should at least meet standards of scientific validity. Without that safeguard, we have no assurance that a jury decision is based in anything more than bias, suspicion, and speculation.

I. The Forensic Evidence Admitted In The Case of Purvi Patel Was Unreliable

Indiana Rule of Evidence 702(b) is clear: “Expert scientific testimony is admissible only if the court is satisfied that the expert testimony rests upon reliable scientific principles.” In this case, *Amici* are gravely concerned that the forensic findings were based on unreliable, unproven, and fallible science. The jury should have been shielded from these findings.

A. The lung float test fails to meet any hallmarks of scientific reliability

In *Daubert v. Merrill Pharmaceuticals*, the United States Supreme Court described certain guideposts of evidentiary reliability, including 1) whether a theory or technique can be (and has been) tested; (2) whether the theory or technique has been subjected to peer review and publication; (3) the known or potential rate of error of a particular scientific technique; (4) the existence and maintenance of standards controlling the technique's operation; and (5) a scientific technique's degree of acceptance within a relevant scientific community.¹ The lung float test, which was relied on at least in part to support the State's forensic pathologist's conclusion that a live birth occurred, fails to meet any of those indicia of reliability.

In terms of its testing, peer review, publication, rate of error, and standardization, our research found one peer-reviewed, published study in the medical literature from within the last 100 years about the lung float test, and this study has been subject to criticism and has not been reproduced.² This brand of forensic evidence concerned the Committee on Forensic Science of the National Academy of Sciences when it cautioned that, with many forensic tests that are routinely introduced as evidence, there is "a notable dearth of peer-reviewed, published studies establishing [their] scientific bases and validity."³

In terms of acceptance within the relevant scientific community, there is no agreement about the usefulness of the test, and, in other countries, its utility was dismissed centuries ago.

¹ 509 U.S. 579, 593-94 (1993).

² In a recent report, the National Academy of Sciences, Committee on Forensic Science, expressed serious concern that some non-DNA forensic tests "do not meet the fundamental requirements of science, in terms of reproducibility, validity, and falsifiability." The lung float test appears to fit squarely into that category. See NATIONAL ACADEMY OF SCIENCES, COMMITTEE ON FORENSIC SCIENCE, STRENGTHENING FORENSIC SCIENCE IN THE UNITED STATES: A PATH FORWARD 43 (2009) [hereinafter STRENGTHENING FORENSIC SCIENCE].

³ *Id.* at 8.

Soon after its inception in the 1660s,⁴ Europeans quickly “concluded that it was impossible to infer live birth from floating lungs.”⁵ Years later, physicians and scientists in Great Britain finally reached the same conclusion.⁶ In England, by the 1780s, as one historian explains, “the lung flotation test was in eclipse. . . . In 1802 in the M’Carthy case an apothecary was moved to declare: ‘no gentleman of the faculty could swear [a child] was born alive’ on the strength of the lung flotation test. The judicial attraction to simple and certain tests was counterbalanced by the reticence of the expert witnesses.”⁷ At that point, “even English physicians were conceding that a conviction for murder should not hinge upon whether lung tissue sank or ‘swam’.”⁸

Today, leading forensic medical texts express concern that the test is not only affirmatively useless, but that its admission into evidence is profoundly dangerous. *Knight’s Forensic Pathology* makes the point:

There are too many recorded instances when control tests have shown that stillborn lungs may float and the lungs from undoubtedly live-born infants have sunk to allow it to be used in testimony in a criminal trial. Even one such failure negates the whole history of the test and the authors are saddened to contemplate the number of innocent women who were sent to the gallows in previous centuries on the testimony of doctors who had an uncritical faith in this crude technique.⁹

⁴ Michelle Oberman, *Mothers Who Kill: Coming to Terms with Modern American Infanticide*, 34 AM. CRIM. L. REV. 1, 90 n.36 (1996).

⁵ George K. Behlmer, *Deadly Motherhood: Infanticide and Medical Opinion in Mid-Victorian England*, 34 J. HIST. MED. & ALLIED SCI. 403, 410 (1979).

⁶ Ian C. Pilarczyk, “So Foul A Deed”: *Infanticide in Montreal, 1825-1850*, 30 LAW & HIST. REV. 575, 598 (2012) (“Seen from the vantage point of modern forensics, the hydrostatic test was highly dubious, and even by the early eighteenth century, English practitioners were doubtful about its efficacy.”).

⁷ Stephan Landsman, *One Hundred Years of Rectitude: Medical Witnesses at the Old Bailey, 1717-1817*, 16 LAW & HIST. REV. 445, 472 (1998).

⁸ Behlmer, *Deadly Motherhood* at 410.

⁹ Pekka Saukko & Bernard Knight, KNIGHT’S FORENSIC PATHOLOGY, 445-46 (3rd ed. 2004) [hereinafter KNIGHT’S FORENSIC PATHOLOGY].

That text also notes, “The test unfortunately tends to mislead more in one direction than the other, in that almost all lungs float irrespective of their appearance.”¹⁰ *Essentials of Forensic Medicine* reinforces the point. As it says, “The test was suspect even in 1900 and requires no detailed discussion because it is now known to have no value. The lungs of the live-born, even those who have been known to live for days, may sink and those which float are not necessarily those of live-born infants. . . . It is therefore pointless to apply the hydrostatic test, which will impair the material for other and more important investigations.”¹¹

Other medical texts similarly conclude that the test is a historic relic—outdated, unreliable, and more mystical than scientific. Busuttil and Keeling’s *Paediatric Forensic Medicine and Pathology* notes, “The use of the property of lungs to float in water (or buffered formalin) as a determinant of live birth is fraught with difficulty. It is unwise to rely on it as the only determinant of live birth even when some or any of the published modifications, which allegedly improve reliability, are introduced.”¹² Regarding those modifications, *Knight’s Forensic Pathology* states, “The complicated instructions offered in many textbooks concerning cutting the lung into lobes and then into pieces, squeezing them with knife blades and even pressing them underfoot on the mortuary floor before floating them, all smatter of black magic and are a complete waste of time. Worse, they can simulate a false sense of scientific validity and even to an eventual miscarriage of justice.”¹³

¹⁰ KNIGHT’S FORENSIC PATHOLOGY at 447.

¹¹ *Id.* at 446 quoting CYRIL J. POLSON, D.J. GEE & BERNARD KNIGHT, *ESSENTIALS OF FORENSIC MEDICINE* (3rd ed. 1985) (internal citations omitted).

¹² Anthony Butsuttil & Jean W. Keeling, *PAEDIATRIC FORENSIC MEDICINE AND PATHOLOGY* 185 (2009).

¹³ KNIGHT’S FORENSIC PATHOLOGY at 446.

To be sure, at least one author has suggested that the use of the lung float test has some use—in “carefully controlled” circumstances.¹⁴ Even if that is so, the Patel case did not meet that mark. The deceased neonate was found on a hot summer night,¹⁵ at least six hours after birth, inside a plastic bag that was in a garbage container. These are not “carefully controlled” conditions. Decomposition and autolysis of cells begins immediately following death, and “the slightest degree of post-mortem decomposition immediately negates any interpretation of the flotation test.”¹⁶ Busuttil and Keeling’s *Paediatric Forensic Medicine and Pathology* notes, “It [the lung float test] may be falsely positive because of putrefaction, even to a minor degree.”¹⁷ Janssen’s *Forensic Histopathology* concurs that “[t]he influence of autolysis and putrefaction can lead to the disappearance of air or regeneration of gas within the pulmonary tissue.”¹⁸ Even Jack J. Moar, the author who proposed that the lung float test may be moderately useful in “carefully controlled” circumstances, concedes that in his experience, “the majority of newborn infants seen at autopsy show signs of varying degrees of decomposition, having been found usually among garbage, wrapped in newspaper or plastic bags, or lying in an open field. Even microscopic putrefaction can cause unexpanded lungs to float, when gas formation may not be

¹⁴ Jack J. Moar, *The Hydrostatic Test—a Valid Method of Determining Live Birth?*, 18 AM. J. FORENSIC MED. & PATHOLOGY 109, 110 (1997) (noting that “while the hydrostatic test should not be used alone, it nevertheless may be of value when used under carefully controlled conditions”).

¹⁵ According to information available at <http://www.usclimatedata.com>, the high on July 13, 2013 was 78.1 F.

¹⁶ KNIGHT’S FORENSIC PATHOLOGY at 446.

¹⁷ Anthony Busuttil & Jean W. Keeling, PAEDIATRIC FORENSIC MEDICINE AND PATHOLOGY 185 (2009).

¹⁸ W. Janssen, FORENSIC HISTOPATHOLOGY 203 (1984).

macroscopically apparent.”¹⁹ In the case of Purvi Patel, it is just not possible to determine whether a positive lung float test is a true positive or a false positive.

Overall, if a forensic test that has been in existence for well over 300 years still lacks valid scientific literature to support it, and if, to this day, the weight of the relevant scientific community is against it,²⁰ should it really be foisted upon juries of lay people and used, in any way, to send people to prison? When forensic evidence does not meet the hallmarks of reliable science, its admission undermines the integrity of the scientific and medical communities as well as the legal system itself.

B. Other purported indicia of air in the lungs are not indicative of live birth

The State’s testifying pathologist purported to rely on other means—a visual inspection of the lungs, the extent to which the lung cavity was filled, certain histological findings—to determine that there was air in the lungs and that, *therefore*, a live birth occurred. But forensic science does not support that conclusion. As Dr. Lester Adelson, the renowned forensic pathologist,²¹ has explained, “But for almost every finding described as indicative of live birth, there is usually a caveat that this finding per se is not invariably pathognomonic of successful extra-uterine existence. The entire situation is beset with anatomic ambiguities and pathologic

¹⁹ Jack J. Moar, *The Hydrostatic Test—a Valid Method of Determining Live Birth?*, 18 AM. J. FORENSIC MED. & PATHOLOGY 109, 110 (1997).

²⁰ See Chris Milroy, *Neonatal Deaths, Infanticide, and the Hydrostatic (Floatation) Test: Historical Perspectives*, 2 ACAD. FORENSIC PATHOLOGY 338 (2012) (noting that the lung float test has been “subject to significant criticism for at least 250 years”).

²¹ After his death, Dr. Adelson was remembered as a “preeminent, renowned forensic pathologist who was instrumental in the development and refinement of forensic pathology.” David Dolinak & Elizabeth K. Balraj, *In Memoriam: Lester Adelson, MD (1914-2006)*, 27 AM. J. FORENSIC MED. & PATHOLOGY 283, 283 (2006). Further, his work was said to have “benefited society in many ways” and “no doubt [to have] left a permanent and profound imprint on forensic pathology.” *Id.*

perplexities.”²² He continued: “The presence of partially expanded pulmonary alveoli is not an ironclad guarantee of postpartum respiration.”²³

Other authorities agree that a finding of “ventilation of the lungs alone cannot be taken as a certain indication of a live birth. Under various circumstances, lungs originally aerated can become devoid of air: conversely, the lungs of stillborn neonates can appear aerated. It is not possible to be certain in all cases.”²⁴ Lungs can fill with air during the descent through the vaginal canal.²⁵ Air can be introduced during ordinary handling of the body, and “[a]pparently respired alveoli have been found in lung sections from a dead infant taken from the uterus of a dead mother [and attributed to post-mortem handling of the body].”²⁶ *Knight’s Forensic Pathology* cautions that it is “unsafe to be dogmatic over a histological opinion”—“an undoubted stillbirth may reveal quite extensive alveolar expansion, whilst a baby that unequivocally lived for some time may show totally collapsed air sacs.”²⁷ Because of this reality, leaders in pathology have, for decades, urged practitioners to respect the limits of science and to proceed with extreme caution: “Any doubts must be resolved in the direction of no breathing and, even in

²² Lester Adelson, *THE PATHOLOGY OF HOMICIDE: A VADE MECUM FOR PATHOLOGIST, PROSECUTOR AND DEFENSE COUNSEL* 628 (1974).

²³ *Id.*

²⁴ W. JANSSEN, *FORENSIC HISTOPATHOLOGY* 202 (1984).

²⁵ *See, e.g.*, Anthony Busuttill & Jean W. Keeling, *PAEDIATRIC FORENSIC MEDICINE AND PATHOLOGY* 185 (2009). (explaining that the birth process can introduce air into the lungs).

²⁶ KNIGHT’S *FORENSIC PATHOLOGY* at 447-48. *See also* W. JANSSEN, *FORENSIC HISTOPATHOLOGY* 201 (1984) (explaining that in that instance, “[t]he cause of this partial aeration was explained by postmortem entry of air into the lungs as a result of manipulations to the corpse of the child during autopsy”).

²⁷ KNIGHT’S *FORENSIC PATHOLOGY* at 448.

doubtful instances when the pathologist decides—on balance—that respiration has occurred, he should convey his uncertainty in the body of his report.”²⁸

Although there was no such equivocation in the prosecution witness’s autopsy report, forensic science simply cannot determine whether the fetus in the case of Ms. Patel was born alive. We just do not know, and there is no way for us to know. The lung float test is not reliable science, and it does not suddenly become reliable when lined up with other investigations. (A coin flip is random, and it remains random, even when someone correctly predicts heads or tails.) It lacks peer-reviewed, verifiable, reproducible, published data, and it has been widely rejected within the relevant scientific community. The real-world conditions in which the body in this case was found make it impossible to rule out lung floatation due to microscopic decomposition and gas formation. And even forensic findings of air in the lungs cannot rule out stillbirth.

This reality—that science cannot tell us whether this particular neonate was born alive—is both frustrating and perplexing. We all want answers to questions, and we expect science to yield those answers—just as it does on television. But sometimes science does not have the capability or the certainty to be a panacea. The Patel case is one of those cases in which scientific certainty is impossible, and the introduction of fallible forensic “evidence” against the backdrop of red-flags for bias—a self-induced abortion, a baby’s body found in a Dumpster, a mother portrayed as a monster, disturbing photos—create a perfect storm of conditions that lead to wrongful conviction.²⁹ The forensic findings in the Patel case fall in line with those warned of

²⁸ *Id.* at 446.

²⁹ Because the Patel case involves abortion, it raises ire in many quarters. But beyond that, other biases are concerning, including but not limited to the following: “common desire to please others (or avoid conflict); willingness to ignore base rate information in assessing the probative value of information; framing of the question; common bias toward researching closure; urgency

by the National Academy of Sciences' Committee on Forensic Science: "The bottom line is simple: In a number of forensic science disciplines, forensic science professionals have yet to establish either the validity of their approach or the accuracy of their conclusions, and the courts have been utterly ineffective in addressing the problem."³⁰

This Court has the opportunity to address the problem. Ms. Patel's guilt or innocence should not turn on subjective, untested, and unverifiable forensic findings. And because the science was presented by a physician, it "carries a false sense of significance" by which, as the National Academy of Sciences' Committee on Forensic Science said, "the jury or court can be misled, and this could lead to wrongful conviction[.]"³¹ Therefore, *Amici* urge this Court to heed the words of Dr. Adelson, "whose experience and clarity of expression makes his voice one of the most respected in forensic pathology,"³² when he stated, "Unless the pathologist has incontrovertible criteria of post-natal survival, e.g. *well* expanded lungs, food in the stomach or vital reaction in the stump of the umbilical cord, he is legally bound *not* to diagnose live birth."³³

to reach a conclusion; tendency to avoid cognitive dissonance; anchoring — tendency to rely too heavily on one piece of information when making decisions; tendency to see patterns that do not actually exist." STRENGTHENING FORENSIC SCIENCE at 123-24.

³⁰ *Id.* at 53.

³¹ STRENGTHENING FORENSIC SCIENCE at 37.

³² KNIGHT'S FORENSIC PATHOLOGY at 446.

³³ Lester Adelson, THE PATHOLOGY OF HOMICIDE: A VADE MECUM FOR PATHOLOGIST, PROSECUTOR AND DEFENSE COUNSEL 632 (1974) (*italics in original*).

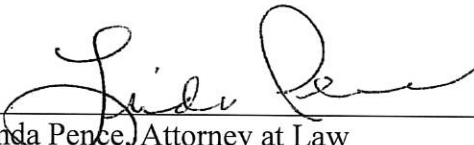
CONCLUSION

If we, as a society, are going to put a woman in jail for twenty years, we should be confident that the science used to condemn her was reliable. Anything less undermines confidence in the American system of justice. The imprimatur of science and of medicine makes forensic findings appear true and certain even when those findings, in reality, have little to no scientific support for their truth or certitude. And although doubt may not be a pleasant condition, in the context of this case, certainty, as Voltaire wrote, “is an absurd one.”³⁴ Here, there is no reasonable argument that the science used in the Patel case was reliable or that a live birth occurred. Which means the jury’s finding of guilt rests on passion, not reason, and heat, not light. It is an injustice that *Amici* ask this Court to correct.

³⁴ *Letter to Frederick William, Prince of Prussia* (November 28, 1770) (“Doubt is not a pleasant condition, but certainty is an absurd one.”) as printed in VOLTAIRE IN HIS LETTERS: BEING A SELECTION FROM HIS CORRESPONDENCE 232 (1919) (S. G. Tallentyre, translator).

CERTIFICATE OF WORD COUNT

Pursuant to Rule 44(E) & (F) of the Indiana Rules of Appellate Procedure, I verify that this brief contains no more than 7,000 words.



Linda Pence, Attorney at Law

CERTIFICATE OF SERVICE

I hereby certify that a copy of the foregoing was served on the below persons on this 2nd day of October 2015 by first class U.S. postage, pre-paid:

Joel M. Schumm
530 W. New York Street, #229
Indianapolis, IN 46202

Lawrence C. Marshall
559 Nathan Abbott Way
Stanford, CA 94305

Gregory F. Zoeller
Ellen H. Meilaender
302 West Washington Street
Indiana Government Center South, 5th Floor
Indianapolis, IN 46204

Lynn Paltrow
Sara Ainsworth
National Advocates for Pregnant Women
875 6th Avenue, Suite 1807
New York, NY 10001

Cynthia Soohoo
Director International Women's
Human Rights Clinic
City University of New York Law School
2 Court Square , Room 5-319
Long Island City, NY 11101-4356

Barry Levanstam
Reena Bajowala
Devi M. Rao
Jenner & Block, LLP
353 N. Clark
Chicago, IL 60654-2735

Katherine D. Jack
Law Office of Katherine D. Jack
One Courthouse Plaza
PO Box 813
Greenfield, IN 46140


Grace Atwater
KAMMEN & MOUDY
135 N. Pennsylvania St., Suite 1775
Indianapolis, IN 46204

Jill E. Adams
Melissa A. Mikesell
Wendy Fu
Center on Reproductive Rights and Justice
University of California
Berkeley School of Law
2850 Telegraph Avenue, Suite 500
Berkeley, CA 94705-7220

Shivana Jorawar
Reproductive Justice Program Director
National Asian Pacific American
Women's Forum
1730 Rhode Island Avenue, NW, Suite 210
Washington, DC 20036

Sandra Blevins
BETZ & BLEVINS
One Indiana Square, Suite 1660
Indianapolis, IN 46204

Laura Paul
407 Fulton Street
Indianapolis, IN 46202



Linda Pence, Attorney at Law