
FLOATING LUNGS: FORENSIC SCIENCE IN SELF-INDUCED ABORTION PROSECUTIONS

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ABSTRACT

Pregnancy that ends in stillbirth or late miscarriage—particularly where a person gives birth outside of a hospital—raises the specter of criminal behavior. To successfully prosecute a person for the death of a child, however, requires proving that the child was born alive. Prosecutors mobilize forensic science as an objective way to determine life. This Essay focuses on one such forensic method: the hydrostatic lung test (“HLT”), also known as the floating lung test (“FLT”). Although there are debates about the “correct” way to perform the exam, in essence, the test requires that a forensic scientist take pieces of the lung and place them in water. If the lungs float, indicating a breath has been taken, scientists conclude that the baby was born alive. If the lungs sink, the infant is thought to have died in utero, thereby exculpating the accused.

The evidence that a fetus has taken at least one breath and was therefore born alive has numerous legal consequences. Depending on the jurisdiction, prosecutors can charge the woman with homicide, infanticide, neglect of a dependent, and neglect of a dependent resulting in death. Each charge carries harsh criminal penalties. Despite numerous doubts within the scientific community about the test’s veracity and growing advocacy against it, when examining cases that have used the HLT over the decades, we see that the perceived reliability of the test by adjudicators remains.

Drawing on historical research and a review of cases from the mid-1800s to the present, this Essay engages with a larger literature on forensic science and criminal law to interrogate the relationship between scientific expertise, evidence, and lawmaking in the context of self-induced abortion late in pregnancy. The Essay makes two arguments: First, it argues that adjudication is integral to the validation of forensic science and the legitimation of the HLT. In other words, courts play a key role in sustaining the belief that the HLT is a true test of whether a child was born alive. Second, this Essay argues that given

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the lack of scientific evidence on the HLT, it becomes necessary to turn to broader social and moral rationales for the ongoing reliance on the test. I explore two possibilities: First, as the carceral state has taken hold, forensic science offers a purportedly scientific means of furthering the project of holding individuals responsible for their behavior. Second, courts rely on the HLT as a means to respond to a moral panic about pregnancy and abortion.

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INTRODUCTION

Pregnancy that ends in stillbirth or late miscarriage—particularly where a person gives birth outside of a hospital—raises the specter of criminal behavior.¹ To successfully prosecute a person for the death of a child, however, requires proving that the child was born alive. Prosecutors mobilize forensic science as an objective way to determine life. This Essay focuses on one such forensic method: the hydrostatic lung test (“HLT”), also known as the floating lung test (“FLT”). Although there are debates about the “correct” way to perform the exam, in essence, the test requires that a forensic scientist take pieces of the lung and place them in water. If the lungs float, indicating a breath has been taken, scientists conclude that the baby was born alive. If the lungs sink, the infant is thought to have died in utero, thereby exculpating the accused.

The issue of forensic science in pregnancy- and abortion-related prosecutions, and the HLT in particular, came under increased scrutiny by the public with the prosecution of Purvi Patel in Indiana.² On July 11, 2013, Patel ingested an abortifacient—a drug designed to induce an abortion—that she had ordered online. She then began to miscarry. After delivering the fetus, which she perceived to be dead, she placed it into a plastic bag and put the bag in a dumpster. She then went to the hospital. Once there, two physicians, Dr. Tracy Byrne and Dr. Kelly McGuire³—the latter a member of the Association of Pro-Life Obstetricians and Gynecologists⁴—examined Patel. After some hesitation, Patel described taking the abortifacient and passing the fetus. She explained that she had been ten to twelve weeks pregnant. Through a physical exam, the physicians determined that Patel had been further along in the pregnancy than she claimed. Dr. McGuire called the police and accompanied them to the site where Patel described leaving the fetus. The fetus was retrieved from the dumpster. The autopsy of the fetus by the State’s pathologist determined that it was twenty-five weeks in utero; the pathologist for the defense later argued that the date was likely closer to twenty-three or twenty-four weeks.⁵ McGuire, perhaps influenced by his politics, dated the pregnancy at thirty weeks.

¹ This Essay switches between the more trans-inclusive language of “person” and the more gendered language of “woman.” The choice of language reflects the language of the case or scholarship being described. In the cases discussed in this Essay, no prosecution was found against a person who self-identified as transgender in legal materials.

² *Patel v. State*, 60 N.E.3d 1041 (Ind. Ct. App. 2016).

³ Amy Gastelum, *Miscarriage or Murder?*, GUERNICA MAG. (Apr. 13, 2015), <https://www.guernicamag.com/amy-gastelum-miscarriage-or-murder/> [<https://perma.cc/37AS-TNVA>].

⁴ *Kelly Wayne McGuire, M.D., FACOG*, OBGYN ASSOCS. N. IND., <http://www.obgynni.com/meet-our-doctors/kelly-wayne-mcguire-md/> [<https://perma.cc/4N7K-953C>] (last visited Apr. 6, 2020).

⁵ Appellant’s Brief at 9, *Patel*, 60 N.E.3d 1041 (No. 71A04-1504-CR-166), 2015 WL 9418308, at *9.

Most controversially, the forensics expert for the State utilized the HLT in order to prove that the infant had taken at least one breath. The evidence that a fetus has taken at least one breath and was therefore born alive has many legal consequences. Depending on the jurisdiction, prosecutors can charge the woman with homicide, infanticide, neglect of a dependent, and neglect of a dependent resulting in death. Each charge carries harsh criminal penalties. Despite numerous doubts about the test's veracity within the scientific community and growing advocacy against it, when examining cases that have used the HLT over the decades, we see that the perceived reliability of the test by adjudicators remains.⁶

Drawing on historical research and a review of cases from the mid-1800s to the present, this Essay engages with a larger literature on forensic science and criminal law to interrogate the relationship between scientific expertise, evidence, and lawmaking in the context of self-induced abortion late in pregnancy.⁷ The Essay makes two arguments: First, it argues that adjudication is integral to the validation of forensic science and the legitimation of the HLT. In other words, courts play a key role in sustaining the belief that the HLT is a true test of whether a child was born alive. Second, this Essay argues that given the lack of scientific evidence on the HLT, it becomes necessary to turn to broader social and moral rationales for the ongoing reliance on the test. I explore two possibilities: First, as the carceral state has taken hold, forensic science offers a purportedly scientific means of holding individuals responsible for their behavior.⁸ The use of forensics provides an objective rationale for blaming the accused and confidence in the finality of the decision—two of the central goals of the criminal legal system. The HLT demonstrates the way forensics underpins prosecutions in the context of pregnancy and childbirth and, in turn, how courts legitimate scientific claims. Second, courts rely on the HLT as a means to respond to a moral panic about pregnancy and abortion. This moral panic reflects past and ongoing racialized and gendered social anxieties around pregnancy and abortion. It fits within a long history of cases in which medical and forensic evidence and expertise was mobilized, shaped, and legitimated by courts for the sake of successful prosecutions of pregnant women, mothers, and caretakers in the contexts of the “crack baby” epidemic and Shaken Baby Syndrome.⁹ Today,

⁶ Leon Neyfakh, *False Certainty: Why Did the Pathologist in the Purvi Patel Feticide Case Use the Discredited “Lung Float Test” to Show Her Fetus Was Born Alive?*, SLATE (Feb. 5, 2015, 4:03 PM), <https://slate.com/news-and-politics/2015/02/purvi-patel-feticide-why-did-the-pathologist-use-the-discredited-lung-float-test.html> [<https://perma.cc/WT5J-98VF>].

⁷ Jennifer L. Mnookin, *Expert Evidence, Partisanship, and Epistemic Competence*, 73 BROOK. L. REV. 1009, 1015-19 (2008).

⁸ Cf. MICHAEL LYNCH ET AL., TRUTH MACHINE: THE CONTENTIOUS HISTORY OF DNA FINGERPRINTING 2 (2008).

⁹ See MICHELE GOODWIN, POLICING THE WOMB: INVISIBLE WOMEN AND THE CRIMINALIZATION OF MOTHERHOOD (2020); DOROTHY ROBERTS, KILLING THE BLACK BODY 154-67 (1997); DEBORAH TUERKHEIMER, FLAWED CONVICTIONS: “SHAKEN BABY SYNDROME”

the HLT provides a way to legitimately prosecute women whose pregnancies are stillbirths or miscarriages or who self-abort.

This Essay proceeds in six parts. Part I provides a brief overview of the literature on the rise of the carceral state and its discussion of pregnancy-, caretaking-, and birth-related crimes. Part II turns to the subset of cases of concern here: women who are prosecuted for the purported death of a newborn. These cases frequently rely on the HLT to demonstrate that a mother killed her child. Part III considers the *Patel* case as a contemporary example. Despite its ongoing influence in infanticide trials, there are no comprehensive analyses of the history, application, and impact of the HLT. Part IV begins to fill this void by first examining the test's history and debates in forensic pathology about the test and then by outlining the implications of the "one breath" rule in criminal law and, more broadly, on legal and medical ideas of viability. While engaging with the broader context in which the HLT is used, Part IV also hones in on the use of the HLT in prosecutions of self-induced abortion. As advocates push for greater access to medication abortion and greater abortion restrictions are enacted, and as women increasingly self-induce, more women will be vulnerable to prosecution. The door to prosecution for the range of crimes listed is opened further as viability becomes more likely earlier in pregnancy or as restrictive abortion laws make it so that early-stage fetuses are deemed to be children. Part V explores several rationales for why and how the HLT survives and examines the failure of evidentiary standards in preventing questionable forensic science from entering trials, the legitimization effect of courts on contested science, and the raced and gendered application of the HLT. Part VI considers a way forward.

I. ABORTION, PREGNANCY, AND PARENTING IN THE CARCERAL STATE

Scholars have dedicated increasing attention to the intersection of pregnancy, abortion, and the carceral state in the context of the broader critique of policing and mass incarceration. Unpacking this literature provides a framework for understanding how conceptions of forensic science are wrapped into the expansion of a prosecution-based approach to social issues.

There are several origination accounts about how and why the carceral state came to be and how the criminal justice system so quickly spread into the governance and management of people's daily lives. Sociologists of law, including Malcolm Feeley and Jonathan Simon, describe the emergence of a new penology that marked a deep shift in the 1970s and 1980s in discourses, objectives, and techniques of governance that prioritized criminal law.¹⁰ For Feeley and Simon, the shift in discourse was embraced by a new language of risk and probability, changes in objectives including the efficient control of rehabilitation and crime control, and new techniques that aggregated offenders

AND THE INERTIA OF INJUSTICE, at xi-xiv (2014); Maxine Eichner, *Bad Medicine: Parents, the State, and the Charge of "Medical Child Abuse,"* 50 U.C. DAVIS L. REV. 205, 273 (2016).

¹⁰ Malcolm M. Feeley & Jonathan Simon, *The New Penology: Notes on the Emerging Strategy of Corrections and Its Implications*, 30 CRIMINOLOGY 449, 449 (1992).

rather than individualizing approaches to accomplishing the goals of the criminal justice system.¹¹ In his book *Governing Through Crime*, Simon argues that the rise of the criminal law framework for viewing social problems provided a powerful tool “with which to interpret and frame all forms of social action as a problem of governance.”¹² In his work, sociologist Loïc Wacquant drives home the connection between race and the logic of the criminal justice system. In *From Slavery to Mass Incarceration*, Wacquant describes the remnants of the “dark ghetto” and “carceral apparatus” as the most recent iteration of control exerted over African Americans.¹³ Wacquant argues that slavery and mass incarceration are on a continuum of institutional forms, each operating for the purpose of labor extraction and social ostracization.¹⁴ More recently, legal scholar Michelle Alexander describes how the criminal justice system perpetuates a system of racial hierarchy—a caste system—where Black and Brown men (in particular) have become a new underclass.¹⁵ Alexander connects the rise of mass incarceration to similar social conditions and ideological constructs that supported the rise of neoliberalism and the diminishment of welfarism in the United States.¹⁶ Like those theorists before her, Alexander plays close attention to the War on Drugs wrought by the Reagan Administration in the 1980s in the context of a contracting welfare state.¹⁷

Feminist legal theorists, building on these larger questions of governance, political economy, and race, have approached questions of gender in the carceral

¹¹ *Id.* at 451-52.

¹² JONATHAN SIMON, *GOVERNING THROUGH CRIME: HOW THE WAR ON CRIME TRANSFORMED AMERICAN DEMOCRACY AND CREATED A CULTURE OF FEAR* 17 (2007) (“When we govern through crime, we make crime and the forms of knowledge historically associated with it—criminal law, popular crime narrative, and criminology—available outside their limited original subject domains as powerful tools with which to interpret and frame all forms of social action as a problem for governance.”).

¹³ Loïc Wacquant, *From Slavery to Mass Incarceration: Rethinking the ‘Race Question’ in the US*, 13 *NEW LEFT REV.* 41, 41 (2002); see also Devon W. Carbado, *Predatory Policing*, 85 *UMKC L. REV.* 545, 548 (2017).

¹⁴ Wacquant, *supra* note 13, at 41-42.

¹⁵ MICHELLE ALEXANDER, *THE NEW JIM CROW: MASS INCARCERATION IN THE AGE OF COLORBLINDNESS* 21 (2012).

¹⁶ *Id.* at 40-58 (connecting 1960s-1970s racial tensions and competing ideologies of Republicans and Democrats regarding race, poverty, and crime to rise of incarceration and reduction in welfare). For an examination of the relationship between the rise in mass incarceration and neoliberalism, see generally BERNARD E. HARCOURT, *THE ILLUSION OF FREE MARKETS: PUNISHMENT AND THE MYTH OF NATURAL ORDER* 40-44 (2011).

¹⁷ ALEXANDER, *supra* note 15, at 48-49 (highlighting Reagan’s anecdote about “welfare queens” and Reagan’s War on Drugs); see also ELIZABETH HINTON, *FROM THE WAR ON POVERTY TO THE WAR ON CRIME: THE MAKING OF MASS INCARCERATION IN AMERICA* 3 (2016) (challenging the idea of the origin stories that begin in the 1980s and instead arguing that, in the 1960s, during then-President Lyndon Johnson’s War on Poverty, American saw an uptick in federal efforts to control crime, thus channeling resources in its direction).

state from several perspectives. One influential strand of scholarship examines how feminists played a role in aiding the entry of the criminal justice system into the home. In the context of family violence, for example, feminists who specifically advocated for the need to hold individuals (mostly men) accountable for harm done to women provided the political fodder needed to deepen a criminal law approach to social issues. In recent years, the push for increased involvement of criminal justice in the home—particularly in the context of violence against women—has been scrutinized and critiqued by feminists who see a link between feminist reliance on criminal law and the rise of the carceral state. This critique, which names the earlier feminist push for increased involvement of criminal law movement “carceral feminism,”¹⁸ calls into question the reliance of feminists on police and prosecutors to accomplish feminist goals. In doing so, scholars interrogate how the widespread support of the criminal justice system by feminists now backfires and often harms subgroups of women.¹⁹

A second strand of feminist legal theorizing on the carceral state examines the specific impact of laws and policies on gendered crimes, including those pertaining to pregnancy, parenting, and caretaking.²⁰ Within this literature scholars have considered how science and forensics have been mobilized to justify prosecutions.²¹ Two prominent examples are Shaken Baby Syndrome (“SBS”) and the “crack baby” epidemic. In her book *Flawed Convictions:*

¹⁸ Elizabeth Bernstein, *Militarized Humanitarianism Meets Carceral Feminism: The Politics of Sex, Rights, and Freedom in Contemporary Antitrafficking Campaigns*, 36 SIGNS 45, 56 (2010) (“[A] myopic feminist focus on the criminalization of rape and domestic violence during the 1990s contrasted with grassroots and early second-wave feminist concerns about women’s social and economic empowerment.”).

¹⁹ See Donna Coker, *Shifting Power for Battered Women: Law, Material Resources, and Poor Women of Color*, 33 U.C. DAVIS L. REV. 1009, 1012 (2000); Leigh Goodmark, *Autonomy Feminism: An Anti-essentialist Critique of Mandatory Interventions in Domestic Violence Cases*, 37 FLA. ST. U. L. REV. 1, 1 (2009); Aya Gruber, *The Feminist War on Crime*, 92 IOWA L. REV. 741, 748 (2007) (“By embracing harsh criminalization policies, domestic violence reformers actually strayed from the underlying values of the feminist movement. They have also bolstered conservative ideologies and thus reinforced, rather than dismantled, inequality.”).

²⁰ For writing on the criminalization of pregnancy, see GOODWIN, *supra* note 9, at 28; ROBERTS, *supra* note 9, at 153-54; Wendy A. Bach, *Prosecuting Poverty, Criminalizing Care*, 60 WM. & MARY L. REV. 809, 810 (2019); and Priscilla A. Ocen, *Incapacitating Motherhood*, 51 U.C. DAVIS L. REV. 2191, 2191 (2018).

²¹ The few studies that exist provide a view of arrests and prosecutions in the context of pregnancy. The most recent survey is a 2013 study that reports on 413 cases from forty-four states and Washington, D.C., as well as federal jurisdictions from 1973-2005. See Lynn M. Paltrow & Jeanne Flavin, *Arrests of and Forced Interventions on Pregnant Women in the United States, 1973-2005: Implications for Women’s Legal Status and Public Health*, 38 J. HEALTH POL. POL’Y & L. 299, 300 (2013). Women who were prosecuted were largely women of color and African American women. *Id.* at 311. Most faced forms of socioeconomic disadvantage. *Id.* The majority of prosecutions were for drug use during pregnancy. *Id.* at 315.

“Shaken Baby Syndrome” and the Inertia of Justice, Professor Deborah Tuerkheimer argues that SBS emerged as a syndrome constructed through litigation in an effort to find accountability for the death of infants.²² Tuerkheimer shows how three symptoms—bleeding beneath the outer layer of membranes surrounding the brain, bleeding in the retina, and brain swelling—have come to be viewed as evidence of SBS, resulting in the convictions of caretakers for killing children on their watch.²³ The idea of SBS gained legitimacy through court cases and physician buy-in, eventually becoming its own identifiable syndrome.

The purported “crack baby” epidemic, which has now received a public reckoning,²⁴ is another powerful example of how criminal law and science coproduce a reality in which new facts come into play with detrimental consequences.²⁵ In her early work, legal scholar Dorothy Roberts describes how pregnant Black women became victims of an aggressive campaign to punish women for drug use during pregnancy in the 1980s.²⁶ Based on studies that conflated the symptoms of premature birth with drug use in newborns, prosecutors justified targeting pregnant women. Many Black women were treated with suspicion, arrested, and incarcerated as they attempted to get health services during their pregnancies.²⁷ Today the crack baby epidemic is largely understood to be the product of racism substantiated by methodologically poor studies. The most recent evidence suggested that the birth and long-term outcomes predicted for children exposed to crack in utero were instead associated with poverty.²⁸

Both SBS and the crack baby epidemic serve as examples of what sociologist Elizabeth Armstrong describes in her work on fetal alcohol syndrome as “biomedical entrepreneurship,” or the growth of diagnosis and expertise around a new type of illness or disease.²⁹ As we see with both SBS and the crack baby epidemic, this type of biomedical entrepreneurship is legitimated by the legal

²² TUERKHEIMER, *supra* note 9, at 13-14.

²³ *Id.* at xi.

²⁴ Editorial Board, Opinion, *Slandering the Unborn*, N.Y. TIMES (Dec. 28, 2018), <https://www.nytimes.com/interactive/2018/12/28/opinion/crack-babies-racism.html>.

²⁵ Sheila Jasanoff, *The Idiom of Co-production*, in STATES OF KNOWLEDGE: THE CO-PRODUCTION OF SCIENCE AND THE SOCIAL ORDER 9-10 (Sheila Jasanoff ed., 2004).

²⁶ ROBERTS, *supra* note 9, at 153.

²⁷ *Id.* at 157-59.

²⁸ Laura M. Betancourt et al., *Adolescents with and Without Gestational Cocaine Exposure: Longitudinal Analysis of Inhibitory Control, Memory and Receptive Language*, 33 NEUROTOXICOLOGY & TERATOLOGY 36, 44 (2011).

²⁹ Elizabeth M. Armstrong, *Diagnosing Moral Disorder: The Discovery and Evolution of Fetal Alcohol Syndrome*, 47 SOC. SCI. & MED. 2025, 2025 (1998) (“The recognition of a new disease or syndrome is sometimes the result of serendipity, but more often the result of determined investigation and scientific entrepreneurship. In the case of fetal alcohol syndrome, moral fervor powered the discovery as much as medical curiosity.”).

processes associated with the criminal justice system and by the momentum to prosecute.

Two additional features of SBS and crack baby prosecutions are worth noting. First, both offer accounts of how courts legitimate particular medical and forensic narratives of truth despite gaps in the literature and/or contestation in the relevant scientific communities. As Tuerkheimer shows, in SBS a triad of diagnostic factors was pushed by prosecutors and accepted by the courts as a way to demonstrate that the syndrome had occurred.³⁰ Courts played a central role in ensuring the legal legitimacy of the syndrome as the medical profession began its own attempts to name and identify the phenomenon of children dying while with a caretaker. The crack baby epidemic had a similar dynamic. Contested evidence about crack-cocaine's impact on infants was legitimated by the courts as fact, which in turn justified the arrest and prosecution of mothers. With both SBS and the crack baby epidemic, the courts helped solidify a national panic about parents mistreating their children and mothers using crack-cocaine.³¹

Second, both SBS and the "crack baby" epidemic occurred in the 1980s and 1990s, a time in which we see both the retreat of the welfare state and the rigorous application of criminal law to pregnancy, parenting, and caretaking that continues today.³² The crack baby epidemic reflects this most explicitly. Rather than support women with social services and treatment, women lost custody of their children and found themselves in prison. Using Simon's lens, criminal law became the way to address a perceived social problem, precluding the possibility of other solutions—among them a range of public health, harm-reduction, and housing options. This idea to prosecute and drive home ideas of individual responsibility rather than to consider the broader structural forces continues as a theme in the context of prosecutions for abortion-related crimes.

³⁰ See *supra* note 24.

³¹ Questioning the validity of the forensic and medical evidence of perpetrator identification has become central to the overall critique of the criminal justice system. The 2009 National Academy of Sciences Report, *Strengthening Forensic Science in the United States: A Path Forward*, took a hard look at the basis for various types of perpetrator identification. See generally NAT'L RESEARCH COUNCIL OF THE NAT'L ACADS., STRENGTHENING FORENSIC SCIENCE IN THE UNITED STATES (2009), <https://www.ncjrs.gov/pdffiles1/nij/grants/228091.pdf> [<https://perma.cc/K4PX-DK98>]. Despite criticism of the science and practices of DNA, eyewitness, and fingerprint identification, each has its own dynamics. The critique of DNA evidence often links back to basic errors in technology, mistakes made by forensic scientists, and issues in labs including cross-contamination. *Id.* at 132. Eyewitness testimony has been subject to intense scrutiny for biases in the minds of the witness, which may lead to incorrect identification. *Id.* at 122-23. And fingerprints have been revealed to be faulty by DNA evidence, which has served to exonerate many. *Id.* at 37.

³² For more on the carceral response to welfare and parenting, see generally Tonya L. Brito, *Fathers Behind Bars: Rethinking Child Support Policy Toward Low-Income Noncustodial Fathers and Their Families*, 15 J. GENDER RACE & JUST. 617 (2012).

Forensic evidence has received a hard look over the past few decades with scholars, advocates, and policymakers interrogating the authoritative role of purportedly objective science to provide a rationalization for findings of guilt or innocence in criminal trials.³³ This has also been true in debates surrounding SBS and crack-cocaine use during pregnancy. This Essay next turns to yet another forensic method that is deserving of scrutiny—the HLT—and its application to a carefully curated political issue: self-induced abortion as infanticide.

II. SELF-INDUCED ABORTION

Prosecutions of self-induced abortion represent a small slice of the broader pie of abortion- and pregnancy-related prosecutions.³⁴ The term “self-induced abortion” refers to the act of a woman ending her own pregnancy. The prosecution of self-induced abortion is yet another instance in which forensic science, no matter how contested, continues to provide a seemingly objective basis for prosecutions.

This Part begins with a survey of the literature on pregnancy-related complications today. This is followed by an overview of the laws governing self-induced abortion. Finally, we turn to the HLT and its role in successful prosecutions of pregnant women.

A. *Legal, Policy, and Ethical Frameworks for Self-Induced Abortion*

The advent of self-administrable medication to induce abortion revolutionized the possibilities of how abortion care could be delivered.³⁵ The Food and Drug Administration (“FDA”) approved the drugs for medication abortion in 2000, and by 2014 medication abortion made up approximately 31% of all nonhospital abortions.³⁶ The current FDA-approved medication regimen for self-induced abortion is as follows: for up to seventy days since the patient’s last menstrual period a patient takes two medications—mifepristone and

³³ For critical examinations of forensic evidence, see generally DAVID A. HARRIS, *FAILED EVIDENCE: WHY LAW ENFORCEMENT RESISTS SCIENCE* (2012); LYNCH ET AL., *supra* note 8; ERIN E. MURPHY, *INSIDE THE CELL: THE DARK SIDE OF FORENSIC DNA* (2015); and *WRONGFUL CONVICTIONS AND THE DNA REVOLUTION: TWENTY-FIVE YEARS OF FREEING THE INNOCENT* (Daniel S. Medwed ed., 2017).

³⁴ Most notably, the political imperative for pushing these prosecutions came from conservatives who made the prosecution of infanticide a part of the Republican Party platform. *2016 Republican Party Platform*, AM. PRESIDENCY PROJECT (July 18, 2016), <https://www.presidency.ucsb.edu/documents/2016-republican-party-platform> [<https://perma.cc/6NSL-8B5Q>].

³⁵ This is not to suggest that women were not already attempting to end their pregnancies at home before the advent of self-administrable abortion medication, or to suggest that women had not already begun to self-medicate.

³⁶ Rachel K. Jones & Jenna Jerman, *Abortion Incidence and Service Availability in the United States, 2014*, 49 *PERSP. ON SEXUAL & REPROD. HEALTH* 17, 21 (2017).

misoprostol. The former blocks progesterone necessary for pregnancy; the latter induces contractions and ends the pregnancy. While the FDA limits the distribution of mifepristone to clinics, hospitals, and medical offices, misoprostol is more widely available.³⁷

The data on self-induced abortion is difficult to gather, but studies show that the practice is widespread. A study by Jenna Jerman, Rachel Jones, and Tsuyoshi Onda concluded that 1.3% of abortion patients reported that they had taken misoprostol to “bring back their period or end a pregnancy.”³⁸ The study was consistent with earlier research that demonstrated that in 2008, 1.2% of patients accessing clinical abortions attempted to use misoprostol to end pregnancy and an additional 1.4% attempted to use other substances in order to self-induce abortion.³⁹ A 2010 study of over 1400 women found that 4.6% of women attempted to self-induce an abortion using misoprostol and other substances.⁴⁰ A 2015 study found that in states with extensive restrictions on abortion, such as Texas, more than 100,000 women had attempted self-induced abortion.⁴¹ And, in 2015, there were 700,000 Google searches for information regarding self-induced abortion.⁴²

Advocates for self-induced abortions describe the ideal care scenario as one in which women are able to have access to self-induced abortions, the

³⁷ *Approved Risk Evaluation and Mitigation Strategies (REMS)*, U.S. FOOD & DRUG ADMIN., <https://www.accessdata.fda.gov/scripts/cder/remis/index.cfm> [<https://perma.cc/YY3S-5VUZ>] (last visited Apr. 6, 2020).

³⁸ JENNA JERMAN, RACHEL K. JONES & TSUYOSHI ONDA, CHARACTERISTICS OF U.S. ABORTION PATIENTS IN 2014 AND CHANGES SINCE 2008, at 8 (2016), https://www.guttmacher.org/sites/default/files/report_pdf/characteristics-us-abortion-patients-2014.pdf [<https://perma.cc/7P8J-WWB2>].

³⁹ Rachel K. Jones, *How Commonly Do US Abortion Patients Report Attempts to Self-Induce?*, 204 AM. J. OBSTETRICS & GYNECOLOGY 23.e1, 23.e1-e3 (2011).

⁴⁰ Daniel Grossman et al., *Self-Induction of Abortion Among Women in the United States*, 18 REPROD. HEALTH MATTERS 136, 137 (2010); see also Heather D. Boonstra & Elizabeth Nash, *A Surge of State Abortion Restrictions Puts Providers—and the Women They Serve—in the Crosshairs*, 17 GUTTMACHER POL’Y REV. 9, 9 (2014).

⁴¹ Jenna Jerman, Tsuyoshi Onda & Rachel K. Jones, *What are People Looking for When They Google “Self-Abortion”?*, 97 CONTRACEPTION 510, 510 (2018). See generally D. Grossman et al., *Knowledge, Opinion and Experience Related to Abortion Self-Induction in Texas*, 92 CONTRACEPTION 360 (2015). While recent data suggests that overall abortions are decreasing, these numbers do not include the number of women who self-abort. See Claire Cain Miller & Margot Sanger-Katz, *Researchers on Abortion Find Blind Spot in Data*, N.Y. TIMES, Sept. 20, 2019, at A21 (“The number of abortions performed in American clinics was lower in 2017 than in any year since abortion became legal nationwide in 1973, new data showed this week. But that does not count a growing number of women who are managing their abortions themselves, without going to a medical office — often by buying pills illicitly.”).

⁴² Jerman, Onda & Jones, *supra* note 41, at 510.

information they need, and a provider of their choice when they need one.⁴³ A medication abortion is safe and legal—according to advocates and health professionals—when the abortion is done within legal⁴⁴ and medical time limits,⁴⁵ provided by the legally required health professional,⁴⁶ and done with medication received from a pharmacy.⁴⁷ If unable to meet these requirements, women may resort to ordering abortion medication online. This comes with the risk that medications ordered online may be fake or contaminated, and women may not be within the recommended time period for inducing the abortion. Alongside the medical harm that may accompany taking an abortifacient outside of the medically proscribed timeframe, a self-induced abortion outside the legally permitted time also opens up a woman to prosecution.

Criminal laws used to prosecute self-induced abortion vary widely. They include feticide,⁴⁸ solicitation of murder,⁴⁹ direct bans on self-induced abortions,⁵⁰ and fetal assault.⁵¹ Where fetuses are deemed to have been “born alive,” charges of homicide and neglect of a dependent become possible.⁵² Because of laws that consider a fetus viable after twenty weeks or, in some cases, after twenty-three weeks, women are most vulnerable to prosecution after week twenty of their pregnancy.⁵³

As the Supreme Court has noted,⁵⁴ fetal viability is a shifting line based on medical developments. Yet a medical definition of viability is not clear. The

⁴³ See, e.g., Megan K. Donovan, *Self-Managed Medication Abortion: Expanding the Available Options for U.S. Abortion Care*, 21 GUTTMACHER POL’Y REV. 41, 41-42 (2018).

⁴⁴ These vary by state. See *State Bans on Abortion Throughout Pregnancy*, GUTTMACHER INST., <https://www.guttmacher.org/state-policy/explore/state-policies-later-abortions> [<https://perma.cc/R2HM-7S3V>] (last updated Apr. 1, 2020).

⁴⁵ *Abortion Pill*, AM. PREGNANCY ASS’N, <https://americanpregnancy.org/unplanned-pregnancy/abortion-pill/> [<https://perma.cc/5DTV-G4ZM>] (last visited Apr. 5, 2020).

⁴⁶ This requirement is dictated by state regulation. See *Medication Abortion*, GUTTMACHER INST., <https://www.guttmacher.org/state-policy/explore/medication-abortion> [<https://perma.cc/A8TC-Q6NJ>] (last updated Apr. 1, 2020).

⁴⁷ See, e.g., Donovan, *supra* note 43, at 41-43.

⁴⁸ See, e.g., Kevin Hayes, *Did Christine Taylor Take Abortion into Her Own Hands?*, CBS NEWS (Mar. 2, 2010, 6:55 AM), <https://www.cbsnews.com/news/did-christine-taylor-take-abortion-into-her-own-hands/> [<https://perma.cc/2M8Q-7TW7>].

⁴⁹ Nina Liss-Schultz, *Women Who Face Prosecution for Home Abortions Finally Have a Number to Call*, MOTHER JONES (Oct. 30, 2018), <https://www.motherjones.com/crime-justice/2018/10/self-induced-abortion-diy-home-prosecution-legal-help-1/> [<https://perma.cc/GTD6-6UH9>].

⁵⁰ SIA LEGAL TEAM, *ROE’S UNFINISHED PROMISE: DECRIMINALIZING ABORTION ONCE AND FOR ALL 6* (2018), https://docs.wixstatic.com/ugd/8f83e4_dd27a51ce72e42db8b09eb6aab381358.pdf [<https://perma.cc/9YBP-P6EL>].

⁵¹ *Id.* at 14.

⁵² See, e.g., *infra* note 60 and accompanying text.

⁵³ For examples of such laws, see SIA LEGAL TEAM, *supra* note 50, at 10-12.

⁵⁴ *Planned Parenthood of Se. Pa. v. Casey*, 505 U.S. 833, 871 (1992) (plurality opinion).

availability of medical technology, the opinions of qualified physicians, and a malleable sense of what “life” means produce divergent and subjective ideas that a life has or has not begun. Medical guidance offers surprisingly little clarity. Neonatologists, for example, who work to ensure the survival of preterm infants are guided by the Neonatal Resuscitation Program (“NRP”) of the American Heart Association and the American Academy of Pediatrics. Their guidelines suggest that the twenty-three-week to twenty-five-week period is a gray area for resuscitation.⁵⁵ The resuscitation guidelines of the AMA Code of Medical Ethics—followed by the NRP—state that

the primary consideration for decisions regarding life-sustaining treatment for seriously ill newborns should be what is best for the newborn. Factors that should be weighed are (1) the chance that therapy will succeed, (2) the risks involved with treatment and nontreatment, (3) the degree to which the therapy, if successful, will extend life, (4) the pain and discomfort associated with the therapy, and (5) the anticipated quality of life for the newborn with and without treatment.⁵⁶

In other words, the AMA guidelines give broad discretion to physicians for resuscitation of “seriously ill” newborns—a decision typically made hand-in-hand with parents.

These ethical guidelines and physicians’ broad discretion have been subject to political pressure from antichoice groups seeking to narrow the range of time in which a physician or parent can choose not to resuscitate. The 2002 Born Alive Infants Protection Act (“BAIPA”), for example, defines born alive as

the complete expulsion or extraction from his or her mother of that member, at any stage of development, who after such expulsion or extraction breathes or has a beating heart, pulsation of the umbilical cord, or definite movement of voluntary muscles, regardless of whether the umbilical cord has been cut.⁵⁷

⁵⁵ J. Colin Partridge et al., *Resuscitation of Likely Nonviable Newborns: Would Neonatology Practices in California Change if the Born-Alive Infants Protection Act Were Enforced?*, 123 PEDIATRICS 1088, 1088 (2009) [hereinafter Partridge, *Neonatology Practices*] (“The Born-Alive Infants Protection Act clarified the legal status of ‘born alive’ infants, but enforcement guidelines fail to clarify what measures are appropriate when survival is unlikely.”). Over “50% of infants born of <24 weeks’ gestation die despite aggressive resuscitation and intensive care.” *Id.* One study suggested that the selective nonintervention regiment yielded greater quality-of-life years and lower costs compared with “universal resuscitation of all infants who are delivered spontaneously between 20-23 weeks 6 days’ gestation [which] would increase costs by \$313.1 million.” John Colin Partridge et al., *Resuscitation of Likely Nonviable Infants: A Cost-Utility Analysis After the Born-Alive Infant Protection Act*, 206 AM. J. OBSTETRICS & GYNECOLOGY 49.e1, 49.e6 (2012).

⁵⁶ AMA, *The AMA Code of Medical Ethics Opinions on Seriously Ill Newborns and Do-Not-Resuscitate Orders*, 12 AMA J. ETHICS 554, 554 (2010).

⁵⁷ Born-Alive Infants Protection Act of 2002, Pub. L. No. 107-207, § 8(b), 116 Stat. 926, 926 (codified at 1 U.S.C. § 8 (2018)).

The goal of the Act was to “protect infants who are born alive.”⁵⁸ The inclusion of the language “at any stage of development” suggests that physicians are responsible for the care of the fetus even when born prior to legal or medically determined viability.

BAIPA has had little effect on medical practice largely because neonatologists report not knowing about the law.⁵⁹ In part to remedy this, in 2015 the House passed the Born Alive Abortion Survivors Act.⁶⁰ The Act, which failed a roll-call vote of the Senate in 2019, stated that

any health care practitioner present at the time the child is born alive shall—(A) exercise the same degree of professional skill, care, and diligence to preserve the life and health of the child as a reasonably diligent and conscientious health care practitioner would render to any other child born alive at the same gestational age; and (B) . . . ensure that the child born alive is immediately transported and admitted to a hospital.⁶¹

A health care practitioner who violates this law faces imprisonment for not more than five years, a fine, or both.⁶²

Each of these efforts at regulating self-induced abortion bears on the questions of when life begins and who bears responsibility for that life. However, the reliance on punitive approaches coupled with the individual responsibility borne out of a declaration of life begs the question: How do we know life has *objectively* begun?⁶³

III. TESTING FOR LIFE? A CONTEMPORARY EXAMPLE

Although its veracity continues to be debated, the hydrostatic lung test (“HLT”), also known as the floating lung test (“FLT”), is the primary available test to determine whether or not an infant should be deemed to have been born alive.⁶⁴ The test is based on whether or not an infant has taken a breath. The

⁵⁸ *Id.* A 2009 study found that more than half of 156 interviewed neonatologists had not heard of this law. Partridge, *Neonatology Practices*, *supra* note 55, at 1088. Nearly all critiqued the legislation, and only 6% felt it should be enforced. *Id.*

⁵⁹ *See* Partridge, *Neonatology Practices*, *supra* note 55, at 1088.

⁶⁰ Born-Alive Abortion Survivors Act, H.R. 3504, 114th Cong. § 1532(e)(1) (2015) (defining abortion as “the use or prescription of any instrument, medicine, drug, or any other substance or device—(A) to intentionally kill the unborn child of a woman known to be pregnant; or (B) to intentionally terminate the pregnancy of a woman known to be pregnant, with an intention other than—(i) after viability, to produce a live birth and preserve the life and health of the child born alive; or (ii) to remove a dead unborn child”).

⁶¹ *Id.* § 1532(a)(1).

⁶² *Id.* § 1532(b)(1)(a).

⁶³ *See* Partridge, *Neonatology Practices*, *supra* note 55, at 1089.

⁶⁴ VINCENT J. DiMAIO & DOMINICK DiMAIO, *FORENSIC PATHOLOGY* 353 (Vernon J. Geberth ed., 2d ed. 2001) (“At the present time, the authors place most reliance on the hydrostatic test.”); *see also* SPITZ & FISHER’S *MEDICOLEGAL INVESTIGATION OF DEATH: GUIDELINES FOR THE APPLICATION OF PATHOLOGY TO CRIME INVESTIGATION* 347 (Werner U.

2006 version of *Spitz and Fisher's Medicolegal Investigation of Death: Guidelines for the Application of Pathology to Crime Investigation*, for example, describes the HLT as the "best test" for assessing whether there is air in the lung⁶⁵:

This test involves placing the lung tissue in a water bath and observing whether the tissue floats or sinks. The float test should be initially performed by placing the entire chest block (heart, lungs and trachea) in the water. Each lung should then be evaluated separately in addition to small sections from each lobe. When immersed in water, the airless lung tissue will sink. Lungs that sink are consistent with a child that did not breathe. Lung tissue containing air will float, indicating that the child took one or more breaths.⁶⁶

The Spitz and Fisher textbook acknowledges that the test is imperfect.⁶⁷ Other textbooks, however, go beyond merely acknowledging the test's imperfection and condemn it. In Pekka Saukko and Bernard Knight's *Forensic Pathology*, the authors note that they "are saddened to contemplate the number of innocent mothers who were sent to the gallows in previous centuries on the testimony of doctors who had an uncritical faith in this crude technique."⁶⁸ The authors refer to the HLT as "black magic" and assert that its repeated false results make it unreliable and a poor candidate for evidence.⁶⁹ They suggest that the use of the test can produce a "false sense of scientific validity and even . . . an eventual miscarriage of justice."⁷⁰ Similarly, the authors of *Paediatric Forensic Medicine and Pathology* argue that without other tests it is "unwise" to rely solely on the HLT as the determinant of live birth.⁷¹

Experts that raise doubts about the test itself do so on several grounds, the primary one being that oxygen can be introduced into the lung tissue by means other than the infant having taken a breath. In such a situation, the test would

Spitz & Daniel J. Spitz eds., 4th ed. 2006) (1972) [hereinafter MEDICOLEGAL INVESTIGATION OF DEATH]; Jack Moar, *The Hydrostatic Test - A Valid Method of Determining Live Birth?*, 18 AM. J. FORENSIC MED. & PATHOLOGY 109, 109 (1997) ("In a survey conducted among our colleagues, it was found that most still made use of the hydrostatic test for lack of another more reliable alternative.").

⁶⁵ MEDICOLEGAL INVESTIGATION OF DEATH, *supra* note 64, at 347.

⁶⁶ *Id.*

⁶⁷ *Id.*

⁶⁸ PEKKA SAUKKO & BERNARD KNIGHT, KNIGHT'S FORENSIC PATHOLOGY 455 (4th ed. 2004) (1991) (emphasis added); see also Brief of Amicus Curiae The Innocence Network & Dr. Gregory J. Davis in Support of Appellant Purvi Patel at 3-7, *Patel v. State*, 60 N.E.3d 1041 (Ind. Ct. App. 2016) (No. 71A04-1504-CR-00166) [hereinafter Innocence Network Amicus Brief] (offering overview of critiques from forensic scientists of HLT).

⁶⁹ SAUKKO & KNIGHT, *supra* note 68, at 456; see also PAEDIATRIC FORENSIC MEDICINE AND PATHOLOGY 185 (Anthony Busuttill & Jean W. Keeling eds. 2009).

⁷⁰ SAUKKO & KNIGHT, *supra* note 68, at 456.

⁷¹ PAEDIATRIC FORENSIC MEDICINE AND PATHOLOGY, *supra* note 69, at 185.

produce a false positive; the lungs float not due to the fetus having taken a breath but instead, for example, due to the decomposition process. Ironically, the FLT can also result in a false positive if a woman attempts resuscitation of the fetus, putting oxygen in the lungs herself.⁷²

Purvi Patel's case sheds light on how this science is utilized and contested in courts. The events that led to Patel's eventual prosecution began in the summer of 2013. Patel had been having a relationship with a man at the fast-food chain where she worked.⁷³ She lived with her parents.⁷⁴ When Patel suspected that she was pregnant, she became nervous about her family's reaction to this news.⁷⁵ In a series of text messages described in court documents, Patel expressed her confusion about pregnancy, her fear of being pregnant, and concerns about her family to her friend Felicia Turnbo⁷⁶:

[O]n June 4, Patel told Turnbo that she had not had an appetite "for a while now" and indicated that she thought that she might be pregnant, but she "hope[d] not!!!!!!!!!!" Turnbo asked, "Have u missed?" Patel replied, "I been cramping like crazy tho for weeks now so I'm hoping its cuz of stress[.]" Turnbo responded, "Take a test!!!!!!!!" Patel stated, "Hoping it all just goes away lol[.]"

On June 10, Patel took a pregnancy test. She informed Turnbo that it "didn't even take a min[ute] for it to show" that she was pregnant and that "[m]y Fam would kill me n him[.]" Patel stated, "U already know I can't have it[.]" Turnbo stated, "Now first we gotta get u to a dr. This may b[e] something that ur body is deciding on its own[. . .] U can go to the urgent care place even and tell them that u took a test and it shows positive but u r cramping bad and spotting. They will do an ultrasound and let u know then we will go from there[.] Patel stated, "I rather not even go to a doc . . . just wanna get it over with[.]" . . .

On June 16, Patel told Turnbo, "Btw I just realized today I've missed 2." Turnbo replied, "You need to go to Dr. first[.]" Patel stated, "Yeah I think we need to go this week[.]"⁷⁷

There is no record of Patel ever going to a physician. Instead, she ordered abortifacients from an online pharmacy in Hong Kong.⁷⁸

On July 11, 2014, Patel ingested the abortifacients. Shortly after, she went into her bathroom at home and delivered a fetus.⁷⁹ Patel may have been in

⁷² DiMAIO & DiMAIO, *supra* note 64, at 352-53.

⁷³ *Patel*, 60 N.E.3d at 1044.

⁷⁴ *Id.*

⁷⁵ *Id.* at 1045.

⁷⁶ *Id.* at 1044-46.

⁷⁷ *Id.* at 1045 (alterations and omissions in original).

⁷⁸ *Id.*

⁷⁹ *Id.* at 1046.

shock.⁸⁰ According to her testimony, she sat quietly in the bathroom for about fifteen minutes before realizing she had to do something.⁸¹ Believing the fetus to be dead, she put the fetus into a plastic bag and drove to a Target near her work, leaving the bag in the dumpster.⁸² She then drove to the hospital, where she arrived in bad physical condition, bleeding with her umbilical cord protruding from her body.⁸³ She was examined by two physicians. Although Patel told them that she had been ten to twelve weeks pregnant, the physicians—Dr. Tracy Byrne and Dr. Kelly McGuire—examined Patel and found that, based on her umbilical cord, the size of her placenta, and the state of her uterus, her pregnancy was much further along.⁸⁴ As Byrne prepared Patel for surgery to remove placenta stuck to her uterine wall, McGuire—a member of the Association of Pro-Life Obstetricians and Gynecologists—contacted the police.⁸⁵ Upon the police’s arrival and in response to the doctors’ concern that “there had to have been a baby,” Purvi disclosed the location of the fetus.⁸⁶ McGuire left with the police and found the body in the dumpster of the parking lot.⁸⁷ A police officer came into the room and stood next to Patel’s bed, presumably to ensure that she did not flee despite having recently given birth. Patel was charged with feticide—“knowingly or intentionally terminat[ing] a human pregnancy with an intention other than to produce a live birth or to remove a dead fetus”⁸⁸—and with neglect of a dependent resulting in death. Neglecting a dependent requires a dependent that is alive. In turn, central to the prosecution’s case was whether or not the child had been born alive or showed evidence of life.⁸⁹ In Indiana, a live birth is one in which there is a “birth of a child who shows evidence of life after the child is entirely outside of the mother.”⁹⁰

Despite what appears to be clear legal guidance, the *Patel* case reveals an enormous amount of confusion around making a determination of life. Prosecutors exploit this confusion to introduce moral and ethical arguments. During the trial, prosecutors painted Patel as a cold-blooded murderer:

⁸⁰ *Id.* at 1050 n.9.

⁸¹ *Id.* at 1046.

⁸² *Id.* at 1046-47 (noting that Patel stated that infant was not moving or crying and that “it was just a small little limple body”).

⁸³ *Id.* at 1046.

⁸⁴ *Id.*

⁸⁵ *Id.*

⁸⁶ *Id.*

⁸⁷ *Id.*

⁸⁸ IND. CODE § 35-42-1-6 (2017).

⁸⁹ Transcript of Record at A7, *State v. Patel*, No. 71D08-1307-FA-00017 (St. Joseph Super. Ct. Mar. 30, 2015) [hereinafter *Patel* Transcript].

⁹⁰ IND. CODE § 16-18-2-205 (defining “live birth” and “birth”).

Today as we stand here we're not here just for laws of the defendant. We're here for a little boy. This whole production is about the little boy. A baby. . . .

On July 13 the little boy was born on a cold, hard bathroom floor. The only touch he got from his mother was to move him from that bathroom floor into a garbage can. In that garbage can he was lying on and surrounded by waste that no one wanted. From there he went to the bottom of a cold, metal dumpster. He was born and died without being cared about, without experiencing anything good. Not one second of comfort, not one second of warmth. We're here for a little boy that we can't call by name because he never got one.⁹¹

The State closed with an even stronger description of Patel's purported depravity:

She became a mother. And you know she did based on what we saw. She saw her baby boy. We know she did. She was the only one in the bathroom. She is the one that put him in the garbage. She chose to do nothing. . . . She placed him in a dangerous situation. . . . She put him in the garbage and he died. Those are the facts.⁹²

Because it is not possible to kill a dead fetus, the prosecution had to prove that there was a live child to secure a homicide conviction. This required an autopsy and examination of the fetus. The forensic scientists turned to the HLT. Two forensic pathologists testified at trial: Dr. Prahlow for the State⁹³ and Dr. Teas for the defense.⁹⁴

The State's forensic scientist explained his procedure:

PRAHLOW: The typical way that I do it and explained in multiple text books, et cetera, is that you—you float the lungs—or you attempt to float the lungs, you put those in water and you put the liver in water as a comparison. And then you can even cut the lungs up into smaller pieces to see if all of them float or just some of them. But the—the floating of the entire thoracic block or just the heart attached to the lungs while described by some pathologists is not universally practiced.

. . . .

QUESTION: . . . When you performed the test, the lung floated, correct?

PRAHLOW: Yes, the lungs both floated and the liver sank, which indicates that there is air in the lungs. And then I sectioned the lungs . . . and portions of each lung floated while other portions sank.⁹⁵

⁹¹ *Patel* Transcript, *supra* note 89, at D448-49.

⁹² *Id.* at D493.

⁹³ *See generally id.* at 885-1030, 378-414.

⁹⁴ *See generally id.* at 246-357.

⁹⁵ *Id.* at B37-38.

Based on this test, Prahlow concluded that the infant was born alive.⁹⁶ At the same time, he acknowledged common problems with the test, including the possibilities of human error, false positives, and false negatives.⁹⁷ Prahlow also entertained the possibility that the fetus may have taken his one or more breaths inside the birth canal.⁹⁸ Where the infant may have taken a breath could determine Patel's culpability. Evidence that the child's breath was inside the birth canal would exculpate the mother. Based on the appearance of the fetus, Prahlow found that it was likely to have been approximately twenty-five weeks old.⁹⁹

The forensic expert for the defense, Teas, arrived at competing conclusions. First, Teas asserted that "there is actually a much greater chance of the baby being 23 weeks gestation" than twenty-five weeks, as argued by Prahlow.¹⁰⁰ The dating of the fetus has important legal implications: the earlier the gestational age, the less likely the child could have been born alive or could have been sustained in a medical setting. Second, relying on Prahlow's statement and study, Teas also stated that there was no evidence of a live birth or a "separate existence."¹⁰¹ In fact, Teas argued that the HLT is "worthless" given the frequency with which a stillborn child delivered in a hospital setting will test positive for having taken a breath.¹⁰² Teas noted that even if one were to take the test seriously, at the age and stage of lung development that Teas had placed the fetus it would not be possible for lungs to show evidence of breathing.¹⁰³ Finally, Teas explained how lungs could contain oxygen and yet fail to prove life. First, she argued, decomposition creates a "false positive" by producing oxygen in the lungs.¹⁰⁴ Decomposition may have begun given the time that lapsed between when Patel delivered the fetus and when the fetus was found. Second, Teas testified that because Patel stated that she opened the mouth of the fetus she may have inadvertently let oxygen into the lungs, thus producing a false positive.¹⁰⁵

⁹⁶ *Id.* at 1024 ("I believe that this baby was born alive, meaning that it breathed.").

⁹⁷ *Id.* at 947, 986 (acknowledging that "lung flotation test is necessarily unreliable all by itself" given other possible explanations for oxygen in lung).

⁹⁸ *Id.* at 939-40.

⁹⁹ *Id.* at 381-82.

¹⁰⁰ *Id.* at D330. Defense argued that counting the weeks from Patel's last period as indicated in a text message to a friend would place gestation at twenty-three weeks. *See id.* at D481-82.

¹⁰¹ *Id.* at D255.

¹⁰² *Id.* at D256. Teas also discusses three other tests made unreliable by any sort of resuscitation attempt or, as in Patel's case, by moving the mouth, including conducting an x-ray to determine how far air entered into the lungs, testing the umbilical cord for a reaction, and looking for water in the stomach, especially when the birth occurs in water. *Id.* at D257-59. She also said that you can check for air in the middle ear. *Id.* at D259.

¹⁰³ *Id.* at D284.

¹⁰⁴ *Id.* at D300-01.

¹⁰⁵ *Id.* at D300, D318.

The jury found in favor of the prosecution.¹⁰⁶ Patel was found guilty of feticide and neglect of a dependent resulting in death. She was sentenced to thirty years of imprisonment for neglect of a dependent, with twenty years executed, and a concurrent executed term of six years for feticide.¹⁰⁷

Patel appealed the conviction but not the sentence. Finding that the feticide law was unconstitutional in its application against a pregnant woman, the appeals court acquitted Patel of the crime.¹⁰⁸ On the charge of felony neglect of a dependent, the findings were more complex. The court did not question the general validity of the HLT or its specific findings in this case—that the infant had been born alive. Instead, the court asked whether or not Patel had “knowingly placed her dependent in a dangerous situation” and whether doing so had resulted in the dependent’s death.¹⁰⁹ If her actions had not caused the death, the charge could be reduced to a Class D felony of neglect of a dependent, which carries a lesser sentence.¹¹⁰ The appeals court found that there was not enough evidence to prove beyond a reasonable doubt that Patel caused the death of the child.¹¹¹ Thus, the court held that although an infant had been born alive, Patel’s negligence had not been the cause of the child’s death.¹¹²

Pro-choice organizations celebrated Patel’s release from prison on time served.¹¹³ Yet it is important to note that when all was said and done, the HLT went on the record as a legitimate test to demonstrate life. Further, the HLT’s finding—in this case that Patel had given birth to a live child—was established as fact.

IV. A BRIEF HISTORY OF THE HLT

The *Patel* case struck a nerve. In *The New York Times Magazine*, Emily Bazelon warned that the prosecution of Patel was just the beginning of miscarriage-related prosecutions and argued that the HLT was akin to “witchcraft.”¹¹⁴ Advocates and members of the forensic science community

¹⁰⁶ *Patel v. State*, 60 N.E.3d 1041, 1048 (Ind. Ct. App. 2016).

¹⁰⁷ *Id.*

¹⁰⁸ *Id.* at 1062.

¹⁰⁹ *Id.* at 1049.

¹¹⁰ *Id.* at 1048-49, 1052.

¹¹¹ *Id.* at 1052.

¹¹² *Id.* at 1055.

¹¹³ *See, e.g.*, Press Release, Planned Parenthood, Statement from Planned Parenthood Federation of America President Cecile Richards on Indiana Court Overturning Feticide Conviction of Purvi Patel (July 25, 2016), <https://www.plannedparenthood.org/about-us/newsroom/press-releases/statement-from-planned-parenthood-federation-of-america-president-cecile-richards-on-indiana-court-overturning-feticide-convicti> [<https://perma.cc/DAE2-LU6X>].

¹¹⁴ Emily Bazelon, *Purvi Patel Could Be Just the Beginning*, N.Y. TIMES MAG. (Apr. 1, 2015), <https://www.nytimes.com/2015/04/01/magazine/purvi-patel-could-be-just-the-beginning.html>.

lamented the use of a “discredited” test.¹¹⁵ These accusations beg the question of the history of the HLT.

Although histories contradict each other, several suggest that the idea that oxygenated lungs float first originated with Galen, a physician and surgeon in the Roman Empire around approximately 140 A.D.¹¹⁶ An actual forensic test utilized for the purposes of criminal trials did not emerge until the seventeenth century when the test became a tool for gathering evidence in infanticide cases.¹¹⁷ As described by physician and medical ethicist Michael Ryan in the 1836 treatise *A Manual of Medical Jurisprudence and State Medicine*, the procedure for the test included placing the lungs and heart in water the “temperature of the atmosphere” and containing no salt.¹¹⁸ The description is almost identical to the contemporary practice:

The lungs are to be taken out of the water, the large vessels tied, the heart separated, and the organs then weighed to ascertain the proportion they bear to the weight of the body. They are to be immersed again, then the lobes separately, and lastly, each to be cut into small pieces. . . . Should the fragments float, they are to be firmly squeezed in the hand, and again placed in the water. . . . [A]nd if the segments float after firm pressure, then the evidence is irresistible that the infant was born alive, and enjoyed perfect respiration. If only the right lung, or its pieces float, the respiration has been less perfect. If some pieces only float, while the greater number sink, respiration has been still less complete. If neither the entire lungs nor any section of them float in water, the evidence is decisive that the child never respired.¹¹⁹

Despite the detailed description, Ryan highlights that the test should be questioned for its capacity to tell whether or not a child was born alive.¹²⁰ His concern is that the test will provide false positives because of the ability of a

¹¹⁵ Neyfakh, *supra* note 6.

¹¹⁶ See, e.g., Sir Sydney Smith, *The History and Development of Forensic Medicine*, BRIT. MED. J., Mar. 24, 1951, at 602-03 (noting that Galen remarked on “difference between the lungs of a foetus and those of an infant who had breathed”).

¹¹⁷ ANNE-MARIE KILDAY, *A HISTORY OF INFANTICIDE IN BRITAIN C. 1600 TO THE PRESENT* 105 (2013).

¹¹⁸ MICHAEL RYAN, *A MANUAL OF MEDICAL JURISPRUDENCE AND STATE MEDICINE* 306 (2d ed. 1836).

¹¹⁹ *Id.* at 306-07.

In the 1828 Offences against the Person Act, disposing of the body of a dead child in order to conceal its birth, even if the child was still-born, became a separate offence for which both unmarried and married women could be imprisoned for two years, with or without hard labour.

Mark Jackson, *The Trial of Harriet Vooght: Continuity and Change in the History of Infanticide*, in *INFANTICIDE: HISTORICAL PERSPECTIVES ON CHILD MURDER AND CONCEALMENT, 1550-2000*, at 1, 7 (Mark Jackson ed., 2002).

¹²⁰ See RYAN, *supra* note 118, at 302 (“[T]he hydrostatic test can never prove positively that the child was still-born, but only that it had not breathed.”).

child to take a breath prior to being expelled from the woman and the ability of lungs to float despite the absence of air.¹²¹ Ryan also highlights that the test has fallen out of favor in Europe due to these issues but that “[s]ome of our best jurists cling to it with a degree of tenacity which, to speak in the mildest terms, is exceedingly remarkable.”¹²² Here, Ryan is sympathetic to the accused, writing, “Suppose the accused do not allege uterine, vaginal, or extra-uterine respiration before complete birth, are not the judges warranted to temper justice with mercy, and to give the prisoner the benefit of the reasonable doubt in such a case? Most decidedly.”¹²³

Although Ryan’s book certainly suggests that cases of infanticide were actively prosecuted in the early 1800s¹²⁴ and that the FLT was actively utilized (and discounted), the earliest case found in Westlaw documenting a court grappling with questions of life and respiration in the United States was published in 1876. In *State v. Winthrop*,¹²⁵ a physician was charged with producing the death of a child for whom he was caring during labor.¹²⁶ The defense in *Winthrop* asked the court to give a jury instruction suggesting that a child must be “fully born, and born alive, having an independent circulation and existence separate from the mother” regardless of “whether the umbilical cord which connects it with its mother be severed” to constitute a human being in the eyes of the law.¹²⁷ Instead, the court’s jury instructions stated:

If the child is fully delivered from the body of the mother, while the after birth is not, and the two are connected by the umbilical cord, and the child has independent life, no matter whether it has breathed or not, or an independent circulation has been established or not, it is a human being, on which the crime of murder may be perpetrated.¹²⁸

The Iowa Supreme Court held that the jury instructions were incorrect.¹²⁹ Citing to English case law, *Rex v. Enoch*,¹³⁰ and the *Casper Book of Medical Jurisprudence*, the court held that a life cannot be established without

¹²¹ See *id.* at 300.

¹²² *Id.* at 299 (discussing validity of contention that “hydrostatic test is no longer considered conclusive”). Ryan also writes, “If the death of a non-viable infant is less criminal than abortion, the punishment of infanticide ought not to be inflicted, for this is inflicting the greatest punishment for the lesser crime.” *Id.* at 280.

¹²³ *Id.* at 301.

¹²⁴ See D. Seaborne Davies, *Child-Killing in English Law*, 1 MOD. L. REV. 203, 208-11 (1937); Jeffrey A. Meldman, *Legal Concepts of Human Life: The Infanticide Doctrines*, 52 MARQ. L. REV. 105, 105-08 (1968).

¹²⁵ 43 Iowa 519 (1876).

¹²⁶ *Id.* at 519.

¹²⁷ *Id.* at 523, 520.

¹²⁸ *Id.* at 520 (emphasis omitted).

¹²⁹ *Id.* at 523 (reversing lower court based on jury instructions).

¹³⁰ (1833) 172 Eng. Rep. 1089; 5 Car. & P. 539.

independent respiration and circulation.¹³¹ Rather than providing clarity, the *Winthrop* case became the first in a long line of cases that seem to arbitrarily apply factors, including independent respiration, independent circulation, and amount of fetal expulsion from the mother, to determine life.

The earliest case documenting the use of the HLT, *Wallace v. State*,¹³² took place in 1881. There, an African American infant was found dead in the woods.¹³³ The State charged Sallie Wallace with homicide by strangulation.¹³⁴ Ruling that the child was likely strangled but that it was difficult to tell due to race—"Witness observed no signs of strangulation, which are swelling of the face and protrusion of the tongue and eyes, but these signs would be less observable in a negro than a white . . ."¹³⁵—the investigators set out to determine if the child had been born alive prior to the strangulation. The examiner applied the HLT.¹³⁶ In this case, the test was described as follows: "[The medical examiner] cut into the body and took out a piece of the lung about as large as two of his fingers, threw it into a pan of water, and it floated. This being sufficient to satisfy the jury, he made no further examination."¹³⁷ While acknowledging its limitations, the court noted that the test is the "best known to medical science in determining whether air has entered the lungs."¹³⁸ Wallace's defense lawyers seized on the test's uncertainty—presenting evidence by an expert who testified that while the test is the best-known way of assessing whether oxygen entered in the lungs, it cannot show that the infant did not take a breath prior to expulsion from the mother.¹³⁹ The court agreed, holding that "[t]he child must be expelled completely from the mother, alive, before being the subject of homicide."¹⁴⁰

¹³¹ *Winthrop*, 43 Iowa at 522-23 ("Beck says, however: 'It must be evident that when a child is born alive, but has not yet respired, its condition is precisely like that of the *fœtus in utero*. It lives merely because the *fœtal* circulation is still going on. In this case none of the organs undergo any changes.' Casper says: 'In *foro* the term "life" must be regarded as perfectly synonymous with the term "respiration." Life means respiration. Not to have breathed is not to have lived.'" (first quoting THEODRIC ROMEYN BECK & JOHN B. BECK, 1 ELEMENTS OF MEDICAL JURISPRUDENCE 498 (12th ed. 1863) (1823); and then quoting 3 JOHANN LUDWIG CASPER, A HANDBOOK OF THE PRACTICE OF FORENSIC MEDICINE, BASED UPON PERSONAL EXPERIENCE 33 (George William Balfour trans., 1864))).

¹³² 10 Tex. Ct. App. 255 (1881).

¹³³ *Id.* at 255-58.

¹³⁴ *Id.* at 256.

¹³⁵ *Id.* at 259.

¹³⁶ *Id.*

¹³⁷ *Id.*

¹³⁸ *Id.* at 259-60.

¹³⁹ *Id.* at 272-73 (citing *State v. Winthrop*, 43 Iowa 519, 519 (1876)).

¹⁴⁰ *Id.* at 273 (quoting 3 SIMON GREENLEAF, A TREATISE ON THE LAW OF EVIDENCE § 136 (1860)); see also *Nobles v. State*, 68 S.W. 989, 991 (Tex. Crim. App. 1902) (citing *Wallace*, 10 Tex. Ct. App. at 272).

In the 1891 case *Harris v. State*,¹⁴¹ an infant was found dead on the edge of a stream. The mother, Harris, claimed that the bruise on the head may have come during delivery when the child's head hit the floor due to the position in which she had given birth.¹⁴² A medical examiner testified that although he utilized the HLT in the forensic exam and therefore could say that the child had likely taken a breath, he could not be positive.¹⁴³ Harris won her appeal and was found innocent of manslaughter.¹⁴⁴

As time goes on, courts take their own approach to the HLT.¹⁴⁵ Some courts find that the test cannot be held reliable given the critique of some forensic scientists, while other courts reinforce the idea that when performed properly the HLT is the most reliable means to prove or disprove life.¹⁴⁶ The twentieth-century cases continue this trend, with some courts acknowledging that the capacity to determine when a fetus becomes a true human being borders on being an arbitrary decision. In the 1947 case of *People v. Chavez*,¹⁴⁷ for example, the defendant, an unmarried twenty-one-year-old woman, was charged with homicide for killing her newborn.¹⁴⁸ The charge required that the child had been born alive.¹⁴⁹ The forensic scientist for the State found that there was air in the lungs.¹⁵⁰ In the back and forth about whether or not the child was alive, the court states that "it is a difficult thing to draw a line and lay down a fixed general rule as to the precise time at which an unborn infant, or one in the process of being born, becomes a human being in the technical sense."¹⁵¹ Despite this uncertainty, the court agreed with the opinion of the autopsy physician: the infant was born alive.¹⁵²

Several cases demonstrate the way in which the HLT continues to animate claims of objective determinations of life in contemporary cases with divergent outcomes. Most deal with the issue of infanticide. In the 2006 case *People v.*

¹⁴¹ 17 S.W. 1110 (Tex. Ct. App. 1891).

¹⁴² *Id.* at 1111.

¹⁴³ *Id.*

¹⁴⁴ *Id.*

¹⁴⁵ From the late 1800s to the mid-1900s, courts in Ireland raised a similar series of concerns about the HLT. See Elaine Farrell, 'A MOST DIABOLICAL DEED': INFANTICIDE AND IRISH SOCIETY, 1850-1900, at 59-60 (2013).

¹⁴⁶ See, e.g., *Bennett v. State*, 377 P.2d 634, 639 (Wyo. 1963) (finding no error in trial court's rejection of jury instructions, which cast doubt on test purporting to show infant breathed).

¹⁴⁷ 176 P.2d 92 (Cal. Dist. Ct. App. 1947).

¹⁴⁸ *Id.*

¹⁴⁹ *Id.* at 94 (noting that most jurisdictions still require proof that child existed "entirely independent" of mother "before considering the infant as a human being").

¹⁵⁰ *Id.* at 93 (noting air in lungs but acknowledging that child could have breathed before birth). It is unclear in this case whether the HLT was utilized to determine the presence of oxygen in the lungs. No forensic test is specified.

¹⁵¹ *Id.* at 94.

¹⁵² *Id.* at 95.

Scott,¹⁵³ the finding of air in the lung contributed to the conviction of a woman for a Class 2 felony,¹⁵⁴ despite acknowledgements at the time that oxygen could have entered the lungs in ways unrelated to the child breathing. In another 2006 case, *In re M.F.*,¹⁵⁵ a child was found abandoned on the steps of a church. In the case brought against the mother for second-degree murder, the court focused in on the lack of ability to determine life based on the HLT:

Dr. McDonough opined that there are several ways to determine if a baby was born alive. Food in the belly and post-natal activity are some indicators, however there is no “good science” to resolve this question with certainty. . . . While Dr. McDonough is familiar with the hydrostatic test . . . other factors such as bacteria, gas, resuscitation, and the birth process may contribute to the result of the lungs actually floating.¹⁵⁶

In the 2012 case *State v. Robot*,¹⁵⁷ in which a mother was accused of drowning her newborn, questions existed as to whether the infant was a stillborn or born alive.¹⁵⁸ The forensic scientists offered the floating lung test among others as a demonstration that the child had taken several breaths. *Robot* was convicted of second-degree murder.¹⁵⁹ As we see in the *Patel* case and the cases that come before it, the dependence on the HLT for a determination of life—no matter the court’s treatment of the science—implicitly validates the correctness of the test.¹⁶⁰

V. WHY DOES THE HLT PERSIST?

How does a test that is questioned by judges, forensic experts, and the public survive? Given courts’ uneven treatment of the HLT, how do we explain its persistence?

Drawing upon questions core to the studies of the sociology of science, forensic science, and critical legal theory, this Part explores the challenges that exist with regard to how courts admit scientific evidence and how court processes legitimate even highly questionable forensic science. In this case, through grappling with the validity of the HLT within the established rules of the court—particularly through cross-examination, which gives the perception that a scientific tool is defensible—the forensic science itself is reinforced as a means to arrive at whether a life has begun.

¹⁵³ 844 N.E.2d 429 (Ill. App. Ct. 2006).

¹⁵⁴ *Id.* at 434.

¹⁵⁵ 831 N.Y.S.2d 360, 2006 WL 3626760 (N.Y. Fam. Ct. Dec. 11, 2006) (unpublished table decision).

¹⁵⁶ *Id.* at *5.

¹⁵⁷ 49 A.3d 58 (R.I. 2012).

¹⁵⁸ *Id.* at 66.

¹⁵⁹ *Id.* at 70.

¹⁶⁰ *Patel v. State*, 60 N.E.3d 1041, 1048 (Ind. Ct. App. 2016).

These questions cannot be examined out of social context. The *Patel* case offers an opportunity to interrogate the broader social and cultural frames that allow for these prosecutions to move forward. In other words, it is necessary to examine the racialized and gendered assumptions that shape decision-making in the court in finding that a woman ought to be punished for her behavior during or after pregnancy.

A. *The Failure of Evidentiary Standards*

A key question in the *Patel* case and in other cases in which the HLT is utilized is the admissibility of the test. This question raises the longer history of when and how scientific evidence becomes admissible in criminal trials and whether the existing standards mediate the introduction of rigorous and accepted evidence.¹⁶¹

In 1923, *Frye v. United States*¹⁶² was the first attempt by the courts to standardize the acceptance of scientific evidence into the courtroom. In *Frye*, the court held that in order for scientific evidence to be admissible, expert testimony must be generally accepted as relevant in the scientific community.¹⁶³ The *Frye* test has two steps: First, the court must determine who the relevant scientific community is. Second, the court must determine whether the proposed test is generally accepted in this community.¹⁶⁴

In 1975, nearly fifty years later, Rule 702 on expert testimony was adopted into the Federal Rules of Evidence. The Rule states in part that if “scientific, technical, or other specialized knowledge will help the trier of fact to understand the evidence or to determine a fact in issue” then “a witness who is qualified as an expert by knowledge, skill, experience, training, or education may testify in the form of an opinion or otherwise.”¹⁶⁵ Unlike *Frye*, which speaks to the issue of general acceptance, Rule 702 does not mention the scientific community, thus producing confusion as to what constitutes admissible scientific expert testimony. In 1993, in *Daubert v. Merrell Dow Pharmaceuticals, Inc.*,¹⁶⁶ the Supreme Court once again altered the rule on expert scientific testimony. *Daubert* established that the judge has the task of ensuring that the testimony of experts rests on a “reliable foundation” and is relevant to the case.¹⁶⁷ Thus, the

¹⁶¹ See Lynn M. Paltrow & Kathrine D. Jack, *Pregnant Women, Junk Science, and Zealous Defense*, CHAMPION, May 2010, at 30, 30 (describing scientific and expert testimony in context of pregnancy and drug-use cases).

¹⁶² 293 F. 1013 (1923), *superseded by rule*, FED. R. EVID. 702, *as recognized in* *Daubert v. Merrell Dow Pharms., Inc.*, 509 U.S. 579, 587 (1993).

¹⁶³ *Id.* at 1014.

¹⁶⁴ *Id.*

¹⁶⁵ FED. R. EVID. 702.

¹⁶⁶ 509 U.S. 579 (1993).

¹⁶⁷ *Id.* at 580.

trial judge must make an assessment on whether scientific testimony is “scientifically valid . . . [and] can be applied to the facts in issue.”¹⁶⁸

In effect, the *Daubert* standard boils down to a set of five factors that a trial court can consider to determine whether the methodology or underlying reasoning of the expert is admissible and can be presented to a jury. The test asks:

whether the theory or technique in question can be (and has been) tested, whether it has been subjected to peer review and publication, its known or potential error rate and the existence and maintenance of standards controlling its operation, and whether it has attracted widespread acceptance within a relevant scientific community.¹⁶⁹

The inquiry is meant to be flexible while focusing on the principles and methodology stated in the five factors. Yet as science and technology studies scholar Michael Lynch and his coauthors argue, after *Daubert* the ideas of expert and expertise remained open-ended, creating confusion in lower courts.¹⁷⁰ The *Daubert* decision also left out an interpretation for nonscientific evidence referenced in Rule 702. This was remedied in *Kumho Tire Co. v. Carmichael*,¹⁷¹ in which the Court extended the *Daubert* rules to all forms of expert testimony offered in courts—not just scientific testimony.¹⁷²

Congress amended Rule 702 of the Federal Rules of Evidence in 2000 (and then again slightly in 2007). In its current form, Rule 702 states:

A witness who is qualified as an expert by knowledge, skill, experience, training, or education may testify in the form of an opinion or otherwise if:

- (a) the expert’s scientific, technical, or other specialized knowledge will help the trier of fact to understand the evidence or to determine a fact in issue;
- (b) the testimony is based on sufficient facts or data;
- (c) the testimony is the product of reliable principles and methods; and
- (d) the expert has reliably applied the principles and methods to the facts of the case.¹⁷³

The Indiana Rules of Evidence, relevant to the Indiana courts in which the *Patel* case was heard, have adopted their own version of Rule 702, which states that:

- (a) A witness who is qualified as an expert by knowledge, skill, experience, training, or education may testify in the form of an opinion or otherwise if the expert’s scientific, technical, or other

¹⁶⁸ *Id.* at 593.

¹⁶⁹ *Id.* at 580 (syllabus).

¹⁷⁰ LYNCH ET AL., *supra* note 8, at 47-48.

¹⁷¹ 526 U.S. 137 (1999).

¹⁷² *Id.* at 149.

¹⁷³ FED. R. EVID. 702.

specialized knowledge will help the trier of fact to understand the evidence or to determine a fact in issue.

- (b) Expert scientific testimony is admissible only if the court is satisfied that the expert testimony rests upon reliable scientific principles.¹⁷⁴

These rules for admissibility of scientific evidence raise a core question about the capacity of courts to judge scientific principles or understand the product of scientific consensus. This is what legal scholar Jennifer Mnookin has called “epistemic competence”—the ability of juries to assess expertise.¹⁷⁵ *Daubert*, according to Mnookin, represents an attempt to address this issue. *Daubert*’s goal was to allow the judge to become the gatekeeper of evidence, thereby removing some of the burden from juries and leveling the bias built into the oppositional expert process.¹⁷⁶ Although it sets out to address the issue, Mnookin argues that the *Daubert* standard does little to address some of the underlying tensions and challenges generated by expert evidence in the court and often cannot effectively address the concerns of partisanship and epistemic competence.¹⁷⁷ Importantly, as we see in the reproductive-rights context, *Daubert* provides little headway in ensuring that the court is critically interrogating scientific claims in order to ground decisions on current scientific evidence. For juries, which eventually must adjudicate the expert evidence before them, *Daubert* does little to mitigate the lack of prior knowledge or ideas about what to do when there is no scientific consensus.

As has been acknowledged by many academics and advisory groups on forensic science, *Daubert* and its legacy have had little effect on ensuring rigor in the science presented in the criminal law setting. In the 2016 National Academy of Sciences Report to the President, *Forensic Science in Criminal Courts: Ensuring Scientific Validity of Feature-Comparison Methods*, the authors noted that there is a troubling lack of interrogation by courts of the type and quality of evidence before the court.¹⁷⁸ Other critics of forensic evidence attack the idea that the courtroom and the competing testimony of experts provide enough exposure to juries and judges with regard to the challenges of a given forensic test. In some instances, this is due to the fact that cross-examination may be ineffective if a defense attorney lacks knowledge or that it is not possible to galvanize the necessary experts, materials, or understanding to challenge evidence and expertise put forward by the prosecution. This is particularly true of underresourced and understaffed public defenders’ offices.

¹⁷⁴ IND. R. EVID. 702.

¹⁷⁵ Mnookin, *supra* note 7, at 1009.

¹⁷⁶ *Id.* at 1018.

¹⁷⁷ *Id.* at 1019.

¹⁷⁸ EXEC. OFFICE OF THE PRESIDENT, PRESIDENT’S COUNCIL OF ADVISORS ON SCIENCE & TECHNOLOGY, FORENSIC SCIENCE IN CRIMINAL COURTS: ENSURING SCIENTIFIC VALIDITY OF FEATURE-COMPARISON METHODS 67 (2016), https://obamawhitehouse.archives.gov/sites/default/files/microsites/ostp/PCAST/pcast_forensic_science_report_final.pdf [<https://perma.cc/R24U-WDGD>].

Some scholars have gone so far to assert that *Frye* and *Daubert* have essentially been irrelevant to criminal trials given that nearly all scientific evidence makes its way into the trials despite the widespread acknowledgement that the forensic science underpinning much expert testimony has come under scrutiny for its production of false positives.¹⁷⁹

It shouldn't be surprising, then, that Purvi Patel's attorney brought an unsuccessful challenge against the HLT's admissibility.¹⁸⁰ As documented in the pretrial transcript, Patel's attorney Sanford argued that they were not attempting to exclude Prahlow, the State's forensic expert, based on his expert status or knowledge but rather based on the process he used to make his final determinations of fact with regard to the infant having been born alive.¹⁸¹ It is worth reading through the language of the transcript, which demonstrates Prahlow's own doubt about the HLT:

SANFORD: Isn't the correct way of doing [the FLT] to keep the heart and the lungs together when you do the float test?

PRAHLOW: There are those that advocate for that but I was never taught that method, and I would venture to say most forensic pathologists don't use that description of the method.

The typical way that I do it and explained in multiple text books, et cetera, is that you—you float the lungs—or you attempt to float the lungs, you put those in water and you put the liver in water as a comparison. And then you can even cut the lungs up into smaller pieces to see if all of them float or just some of them. But the—the floating of the entire thoracic block or just the heart attached to the lungs while described by some pathologists is not universally practiced.

SANFORD: Okay. So that wouldn't be—the way you did the test would be acceptable, is that what you're saying?

PRAHLOW: Yes.

....

SANFORD: If somebody advocated that, would that be an acceptable way of performing the test?

PRAHLOW: So long as they went on to continue with the entire process and then separated the lungs and floated those separately comparing to another organ such as a liver, yes.

....

SANFORD: Okay. When you performed the test, the lung floated, correct?

¹⁷⁹ Jennifer L. Mnookin, *The Uncertain Future of Forensic Science*, DAEDALUS, Fall 2018, at 99, 112.

¹⁸⁰ IND. R. EVID. 702(b) ("Expert scientific testimony is admissible only if the court is satisfied that the expert testimony rests upon reliable scientific principles.").

¹⁸¹ *Patel* Transcript, *supra* note 89, at B30-50.

PRAHLOW: Yes, the lungs both floated and the liver sank, which indicates that there is air in the lungs. And then I sectioned the lungs . . . and portions of each lung floated while other portions sank.

SANFORD: Okay. And would you agree, Doctor, that the float test in and of itself isn't a reliable determine—test to determine whether or not there was a breath taken?

PRAHLOW: Yes.

SANFORD: Okay.

THE COURT I'm sorry, was your question that the float test —

SANFORD: In and of itself —

THE COURT: In and of itself is not reliable —

SANFORD: Right.

THE COURT: — (*continuing*) to determine whether a breath was taken?

SANFORD: Right.

THE COURT: And you agreed with that statement.

PRAHLOW: I agree with that.¹⁸²

During cross examination, Prahlow reiterated the potential unreliability of the HLT if conducted outside of context by stating:

And as I testified earlier, the flotation test in and of in itself is—should be considered unreliable. You have to take it—take the results of that in the context of the overall circumstances of the case as well as other findings, and the other—that other observation was upon removal of the chest plate of the baby at autopsy, the lungs, which appeared pink, spongy and were essentially filling the pleural cavities or the chest cavities. And that is distinctly consistent with having air in the lungs.¹⁸³

Later, Prahlow again clarifies that forensic science is different from other types of science:

[F]orensic pathology and actually in medicine in general, the science that we deal with is not necessarily what a lot of people think about as science meaning, you know, there's a—the scientific method is employed and we have an experiment and we make observations and then make determinations based on those experiments. We just can't do that with— with people so a lot of it is experiential, if you will, just making observations about things over the years, things that we've seen.

. . . .

So, for example, now some—some folks have done studies such as . . . including adding the flotation test in there and show that it's relatively reliable, the flotation test as well as seeing the air within the lungs

¹⁸² *Id.* at B36-39.

¹⁸³ *Id.* at B60.

with the caveats that we've described as far as the false positives and false negatives. Not every baby that is born alive will have lungs that float and not every lung that floats occurs in a baby that was alive, but those are typically—accounted for by decomposition or attempts at resuscitation, breathing air into the lungs.

So there is . . . science out there as far as some reports and series that confirm that, yes, although this test in and of itself is unreliable, the flotation test, in combination with seeing the air in the lungs and then ruling out the other causes of it, it is—it is reliable.¹⁸⁴

As the hearing came to a close, Sanford stated:

I mean there's no disputing that Dr. Prahlow is an expert in his field. Nobody is disputing that. But there ought to be some sort of scientific support for his conclusions, and I don't think that that—I'm not saying that he doesn't have scientific support for some of his conclusions but I doubt—I don't think he does for all of them.¹⁸⁵

The State clarified:

And in closing I guess the only thing that we're disputing here is whether there is enough reliability upon scientific principles here.

The State concedes essentially that Dr. Prahlow's testimony does not satisfy all of the standards laid out in *Daubert* but lucky for us *Daubert* isn't controlling. That is something the Court can look to for a guideline essentially only. The Court need only be satisfied that the sufficient foundation has been made showing that the relevant signs of the principles are reliable.¹⁸⁶

The State argued that it satisfied the requirement of Rule 702(a) of the Indiana Rules of Evidence that is reserved to a consideration of the fact that Prahlow is an expert and has "sufficient qualifications" to testify in court.¹⁸⁷ The defense, as is apparent from the transcript, focused on the process by which Prahlow reached his conclusion.

There are several aspects about this exchange and the Indiana Rule 702 challenge that are worth noting, primarily because the pretrial discussion mirrors many *Daubert* critiques and evidentiary standards as a means of addressing core issues of scientific expertise and validity of evidence in a court. First, as has been raised by many critics of *Daubert*, it is apparent here that expert knowledge was required of the lawyers in order to effectively question a forensic scientist.¹⁸⁸ The need for expert knowledge becomes clear in the *Patel* case when Prahlow argues that it is common knowledge in the field is that the HLT is considered

¹⁸⁴ *Id.* at B62-64.

¹⁸⁵ *Id.* at B81.

¹⁸⁶ *Id.* at B82-83.

¹⁸⁷ *Id.* at B82.

¹⁸⁸ *See id.* at B37.

valid when paired with another test.¹⁸⁹ To adequately respond to a claim like this requires a defense attorney to know and understand the debates about forensic methods.¹⁹⁰ Second, Indiana Rule 702 is interpreted by the State and the court as largely speaking to Prahlow's capacity as an expert and not to either his method or the test itself.¹⁹¹ This divests the court of the ability to make a judgment about the testimony itself as advised by *Daubert*. Patel's defense notes that what is at issue is not Prahlow's expert status but instead the content of his testimony.¹⁹²

Finally, the defense highlights that the allure of expertise itself might blind the lay juror to their own ability to critique:

[T]here is a risk that the jury would make an irrational finding of causation based on the siren-like allure of opinions stated by highly qualified experts. Thus, an expert's opinion must have some basis other than the hypothesis before the opinion may have the privilege of being assailed by cross-examination.¹⁹³

The defense introduces the idea that jurors lack the capacity to make findings of fact when they are not themselves experts.¹⁹⁴ In fact, in Patel's case, it was the jury that was finally tasked with determining whether or not the child was born alive.¹⁹⁵ As many scholars have highlighted, this raises the particular issue that even when permitted to do so, neither a jury nor a judge might be capable of distilling competing expert testimony given that they may have only a lay understanding of the science.

The narrow reading of Indiana Rule 702 resulted in the admissibility of Prahlow's testimony and the eventual finding of life.¹⁹⁶ As we see in the *Patel* case, the judge acknowledged that while the evidence offered by the State did not meet the *Daubert* standard, the less rigorous Rule 702 was applied instead.¹⁹⁷ By filtering the HLT through evidentiary processes, the court legitimated the test as an accurate and objective measure of life. This legitimation in turn enabled the prosecution of Patel and enables the prosecution of others in her circumstances.

¹⁸⁹ *Id.* at B64.

¹⁹⁰ Innocence Network Amicus Brief, *supra* note 68, at 3-7 (offering an overview of critiques from forensic scientists on the use of HLT).

¹⁹¹ *Patel* Transcript, *supra* note 89, at B82 ("The defense has essentially conceded the fact that the witness has sufficient qualifications to testify under 702(A).").

¹⁹² *Id.* at B83.

¹⁹³ *Id.* at B85.

¹⁹⁴ *Id.*

¹⁹⁵ *Id.* at B96.

¹⁹⁶ *Id.* at B91 (showing court's acknowledgement of admissibility).

¹⁹⁷ *Id.* at B84.

B. *Social and Political Context*

Most discussions of the interaction between forensic science and law (or between science and law more broadly) suggest that the two are independent systems of authority operating in unique domains. In these accounts, interaction between law and science is mitigated in courts through formal and neutral processes.

Understanding the HLT in its social and political context requires us to challenge this understanding of how science and law interact. As sociology-of-science scholars argue, science, evidence, and expertise emerge from and are shaped by societal norms. The law is core to shaping societal norms. Courts are not simply recipients of scientific knowledge. Instead, judicial processes play an integral role in shaping and legitimating scientific authority and fact. In other words, we can understand the science and law as constitutive of one another—rather than seeing them as independent authoritative forces—both in terms of substance and the way each constitutes the other as independent and objective.¹⁹⁸

The *Patel* case and the forensic science of the HLT offer an opportunity to question the purported bifurcation between law and science. The use of the HLT and its treatment as a legitimate test forces us to ask how and why courts have—over time and despite the procedural protections to guard against faulty forensic evidence—consistently legitimated the test as capable of determining the truth of whether a child was born alive. To be sure, courts have not always taken the HLT as truth. As seen in the history of cases that utilize the test, courts were often skeptical of early claims that the test could verify life.¹⁹⁹ Yet today, nearly 100 years after the earliest published cases discussing the HLT, despite skepticism about the test and growing disagreement about its capacity to accurately speak to a person's culpability, it continues to be used to validate life.

In allowing the HLT to serve as the standard for judging when life begins, courts repeatedly legitimate the purported correctness of the test itself. But why do they do so? This Section offers two possible explanations: first, the desire to blame and the need for finality, and second, as a response to racialized and gendered anxieties around pregnancy, childbirth, and caretaking.

i. *Blame and Finality*

Finality is the idea that all cases must reach a conclusion. This powerful idea in law prevents further appeal because a case has been fully resolved. In its most extreme form, the death penalty offers a “grand finality.”²⁰⁰ Finality represents

¹⁹⁸ Jasanoff, *supra* note 25, at 123. This distinction is replicated in most guidance on forensic science and expertise, including the most recent National Academy of Sciences guidelines, which emphasize that forensic science and the law of forensic science operate in unique domains.

¹⁹⁹ See *supra* Part IV.

²⁰⁰ Daniel S. Medwed, *Grand Finality: Post-conviction Prosecutors and Capital Punishment*, in *FINAL JUDGMENTS: THE DEATH PENALTY IN AMERICAN LAW AND CULTURE* 90, 94 (Austin Sarat ed., 2017).

the desire of participants in the legal system to arrive at an answer and animates the systemic response that drives prosecutions. Finality is also deeply related to society's need to blame and to find accountability.

Concerns over finality, blame, and responsibility drive the treatment of crimes during pregnancy and in the course of caretaking. In her book *Flawed Convictions*, Professor Tuerkheimer explores why and how three neurological symptoms came to be called "shaken baby syndrome" and equated with homicide.²⁰¹ In her account, the desire to blame aided in legitimating the medical diagnosis of SBS. Tuerkheimer describes this phenomenon, which she argues is heightened when an infant dies:

The death of a baby is one of life's most devastating tragedies, as is the severe neurological impairment of a once-healthy child. In the face of such misfortune, finding fault can be irresistible. The impulse to blame is powerful, not only for parents, but also for doctors, police, prosecutors, judges, and jurors (many of whom are also parents themselves). Rather than confront the absence of a wrongdoer, we identify a perpetrator who can be held responsible for awful circumstances.²⁰²

As more women use medication abortion—with many accessing the medication online and without medical supervision—more women may be vulnerable to prosecution. Several factors contribute to women's vulnerability to being prosecuted: First, states increasingly attempt to define life as beginning earlier. The earlier in pregnancy life begins the more possible it is to prosecute a woman for infanticide for having or attempting to have an abortion. Second, if abortion restrictions continue to increase, more women will seek to self-induce abortion, and the unmonitored use of abortifacients can result in abortions when the pregnancies are outside of the legal or medically proscribed period for an abortion to take place.²⁰³ The *Patel* case exemplifies how this plays out in the context of an increasingly conservative legal abortion regime. There is no sign that the conflation of abortion and infanticide or conservative lawmaking in this arena will slow. To the contrary, the antichoice groups continue to prioritize infanticide as a rallying cry.²⁰⁴

The push for finality and blame will continue to animate the response to the HLT despite the uncomfortable reality that we may not be able to determine whether a child is born alive or not. Abandoning this uncertain test becomes the only option, yet it is a difficult one to bear for those who seek finality through the law.

²⁰¹ TUERKHEIMER, *supra* note 9, at 5.

²⁰² *Id.* at 13.

²⁰³ Laura Bassett, *Republicans Are Pushing Another False Claim About Abortion to Rile Up Voters*, WASH. POST (Apr. 10, 2019, 12:56 PM), <https://www.washingtonpost.com/outlook/2019/04/10/republicans-are-pushing-another-false-claim-about-abortion-rile-up-voters/>.

²⁰⁴ *Id.*

ii. The Science of Moral Panics

The concept of a “moral panic” was first identified in 1972 by scholar Stanley Cohen.²⁰⁵ Cohen defines moral panic as:

A condition, episode, person or group of persons emerges to become defined as a threat to societal values and interests; its nature is presented in a stylized and stereotypical fashion by the mass media; the moral barricades are manned by editors, bishops, politicians and other right-thinking people; socially accredited experts pronounce their diagnoses and solutions; ways of coping are evolved or (more often) resorted to; the condition then disappears, submerges or deteriorates and becomes more visible.²⁰⁶

As described by Cohen, the work of making a moral panic is done by experts and leaders who make something hidden real.²⁰⁷ In her work on fetal alcohol syndrome, Armstrong describes how “moral entrepreneurs,” self-driven individuals who see evil and decide to act upon it, took it upon themselves to end what they began to see as a diagnosable condition.²⁰⁸ This requires what Armstrong describes as “medical moral entrepreneurs”—physicians and researchers who set about to characterize and diagnose fetal alcohol syndrome.²⁰⁹ These medical moral entrepreneurs had legitimacy due to their expertise as physicians.²¹⁰ They were able to ground their moral claim not only in cultural and social terms but also in science itself.²¹¹

Following Cohen and Armstrong, I posit here that the prosecution of women for self-inducing abortion or abandoning a stillbirth represents a moral panic rooted in the idea that women who are pregnant must behave in line with a true maternal instinct.²¹² This maternal instinct guides a pregnant woman against abortion—and certainly late-term abortion. It also drives an instinct to seek help

²⁰⁵ STANLEY COHEN, *FOLK DEVILS AND MORAL PANICS* 1 (1972).

²⁰⁶ *Id.* Cohen also described the elements of a moral panic:

They are *new* (lying dormant perhaps, but hard to recognize; deceptively ordinary and routine, but invisibly creeping up the moral horizon)—but also *old* (camouflaged versions of traditional and well-known evils). They are damaging *in themselves*—but also merely *warning signs* of the real, much deeper and more prevalent condition. They are *transparent* (anyone can see what’s happening)—but also *opaque*: accredited experts must explain the perils hidden behind the superficially harmless (decode a rock song’s lyrics to see how they led to a school massacre).

Id. at vii-viii.

²⁰⁷ *Id.* at viii (discussing how “experts must explain the perils hidden behind the superficially harmless”).

²⁰⁸ Armstrong, *supra* note 29, at 2025.

²⁰⁹ *Id.* at 2036.

²¹⁰ *Id.* at 2039.

²¹¹ *Id.*

²¹² See Reva Siegel, *Reasoning from the Body: A Historical Perspective on Abortion Regulation and Questions of Equal Protection*, 44 STAN. L. REV. 261, 264 (1992) (discussing assumptions about sex roles in abortion lawmaking).

for the products of birth no matter when in the pregnancy an abortion takes place. Patel did not act as a mother should. As the prosecution described, Patel gave birth to her son and killed him. Her picture in handcuffs in *The New York Times* and Indiana papers, with her hair falling before her face as she walked, head down in shame, reinforced the idea that she had done something wrong.²¹³

However, as with the HLT, the courts can reclaim a neutral perspective on infanticide, with forensic science providing the purportedly evenhanded method of ascertaining life. In turn, the reliance on the HLT by the courts reinforces the test as capable of producing fact.

VI. A WAY FORWARD

In this Part, I offer a solution for addressing the concerns raised by the HLT: we must discount the forensic science entirely and end its use as a way of substantiating life.²¹⁴

Ending the use of the HLT would result in a shift from finding false positives (i.e., finding women guilty who have not intentionally killed an infant) to potentially finding more false negatives (i.e., finding more women innocent who may have intentionally killed a child). This shift challenges our moral sensibility around the death of infants immediately following birth, given the idea that we as a society must immediately and urgently respond to infanticide.²¹⁵

While this solution is radical with regard to the discomfort associated with a decrease in false positives (i.e., the possibility that some people who give birth will kill their newborn and get away with it), it comports with the critique offered of the test. Time and time again, courts have caved to the use of the HLT because it is the best test offered rather than the most reliable test for determinations of life.²¹⁶ And although courts acknowledge the moral and scientific complexity of determining whether or not there was a life, they lose sight of it in a world in which guilt or innocence rides on a truth claim. This is not to say that the critiques of the test are not considered by courts in the context of individual cases. Courts and juries are often presented with the many weaknesses of the test: a lack of reliability, the impossibility of proving where a newborn took a breath (inside or outside the birth canal), or that oxygenation was due solely to breathing. The *Patel* case is a stunning example of how the critiques are both heard and discounted.²¹⁷ It serves as a reminder of the pull to find culpability.

The HLT begs more existential questions as well, far outside the scope of this Essay but nevertheless necessary to ask: How do we determine when life begins? And what constitutes a life?

²¹³ Bazelon, *supra* note 114.

²¹⁴ This recommendation is in line with critics of the test in the forensic science community. See Innocence Network Amicus Brief, *supra* note 68, at 11.

²¹⁵ Sheila Jasanoff, *Science, Common Sense & Judicial Power in U.S. Courts*, DAEDALUS, Fall 2018, at 15, 15.

²¹⁶ See *Patel v. State*, 60 N.E.3d 1041, 1047 n.6 (Ind. Ct. App. 2016).

²¹⁷ *Id.*

The question of where a breath is taken exemplifies the uncertainty embedded in this question. In the *Patel* case, the trial court questioned whether the breath that made the lungs float was taken inside or outside the birth canal.²¹⁸ The answer remained unresolved as the court found for life based on the HLT, implicitly validating the idea that life could begin inside the birth canal—despite the legal rule stating that complete expulsion from the mother is required for a determination of life.²¹⁹ These questions have haunted the court for over a hundred years. Take the 1881 case *Wallace v. State*, in which the court remarkably posed the same question: Does a breath count if taken in the birth canal?²²⁰ To this the court answered that the child must be fully expelled from the mother:

Such creatures are in being when wholly born alive. The extent of birth is defined by our Code to be actual birth. The court below, recognizing the necessity of explaining to the jury what actual means, our Code being silent, very properly goes to common law authority and draws therefrom the accurate idea of complete expulsion of the child from the body of the mother.²²¹

Has a mother killed her child? The answer is not based on scientific truth as the HLT suggests but rather on the combination of a set of legal and regulatory arrangements that seek to define life based on political compromise, medical knowledge, and subjective ideas of when life begins. This lack of clarity over the years has allowed for a nearly ad hoc process in determining whether or not a child was born.

CONCLUSION

This Essay historicizes and questions the forensics of the hydrostatic lung test used to prove that a mother has killed her child. The urgency of this assessment is clear in a political moment in which more women will self-induce abortion due to a lack of access to legal abortion. As in the Purvi Patel case, in which she did not know how far along in her pregnancy she was, others who mistakenly or intentionally self-induce abortion after twenty weeks of pregnancy risk being prosecuted for murder, negligence resulting in death, infanticide, or other related crimes. These crimes require a child to have been born alive, and the HLT is one of the few tests available to prove life.

This Essay argues that ongoing legitimation of the HLT can be explained by our moral sensibilities around pregnancy and parenting as well as to strong desires for legal finality and blame in the context of a supposed infant death. Yet the HLT is incapable of demonstrating culpability. Given the many questions that the HLT is unable to answer and the many more it produces, this Essay

²¹⁸ Innocence Network Amicus Brief, *supra* note 68, at 7.

²¹⁹ *Id.* at 11.

²²⁰ *Wallace v. State*, 10 Tex. Ct. App. 255, 263 (1881).

²²¹ *Id.* at 263-64 (emphases omitted).

concludes that the HLT should not be relied upon for determining life and, in turn, for determining the guilt or innocence of a mother.