No. 19-1392

In the Supreme Court of the United States

THOMAS E. DOBBS, ET AL., *Petitioners*

v.

JACKSON WOMEN'S HEALTH ORGANIZATION, ET AL.

On Writ of Certiorari to the United States Court of Appeals for the Fifth Circuit

BRIEF OF MAUREEN L. CONDIC, PH.D. AND THE CHARLOTTE LOZIER INSTITUTE AS *AMICI CURIAE* SUPPORTING PETITIONERS

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QUESTION PRESENTED

Whether all pre-viability prohibitions on elective abortions are unconstitutional.

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INTRODUCTION AND INTERESTS OF *AMICI*[1]

Modern scientific methods show that, starting early in the second trimester, the human fetus actively distinguishes between music and noise, exhibits intentional and even social behavior, and shares—with other humans and animals—the neurocircuitry necessary for a conscious experience of pain. And yet this Court's current approach to abortion is hamstrung by 50-year-old precedents based on outdated science. Consequently, the lower courts grossly undervalue the State's compelling interests in protecting any living, conscious human being from cruelty and death.

From the outset, however, this Court's landmark abortion decisions—in 1973 and 1992—stressed that the qualified right to abortion must be balanced against compelling state interests guided by *current* scientific knowledge. And since that time, technological breakthroughs, especially sophisticated brain mapping and 4D ultrasonography, have enabled direct, unprecedented observation of human fetuses and behavior indicating their subjective experiences—confirming that the fetus is living, conscious, and

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[1] All parties have consented to the filing of this brief. No counsel for a party authored any part of it, nor did any person or entity, other than *Amici* and their counsel, make a monetary contribution to fund its preparation or submission. *Amici* are not publicly traded and have no parent corporations. No publicly traded corporation owns 10% or more of either *amicus*. The legal name of *Amicus* Charlotte Lozier Institute is the Susan B. Anthony List Inc. Education Fund, a 501(c)(3) charitable nonprofit that is separate from the Susan B. Anthony List Inc., a 501(c)(4) social-welfare entity.

sensitive to pain shortly after the beginning of the second trimester and months before viability. Given these new findings, freezing the balance of compelling state interests in the amber of obsolete science would not only be a reactionary turn against modern scientific insights, but would contravene the very rationale of this Court's abortion precedents.

Amici are well-qualified to help the Court avoid that mistake. *Amicus* Dr. Maureen Condic, who compiled the scientific material presented in Section II of this brief, is a faculty member in the University of Utah School of Medicine who has taught Human Embryology for over 20 years and has studied fetal consciousness and pain in great depth.[2] *Amicus* Charlotte Lozier Institute (CLI), in which Professor Condic serves as an associate scholar, is a nonprofit research and education organization committed to bringing modern science to bear in life-related policy and legal decision-making. Both *amici* believe the legal precedents and principles governing abortion should be informed by the most current medical and scientific knowledge on human development.

In addition, as an organization devoted to the application of scientific knowledge to policies involving human life, CLI has a strong interest in this case because it believes this Court's abortion precedents—especially *Roe* v. *Wade* and *Planned Parenthood* v. *Casey*—were limited by the scientific

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[2] Dr. Condic appears in her individual capacity; this brief does not represent the views or positions of the university that employs her. Further, as a non-lawyer, Dr. Condic offers no opinions on the legal matters addressed in Sections I and III.

understanding of their eras. Because scientific understanding of human fetal life has expanded exponentially in the decades since those decisions, this Court should revisit its prior precedents to incorporate the compelling state interests implicated by current scientific knowledge about pre-viability fetal life.

SUMMARY OF ARGUMENT

Almost half a century ago, *Roe* v. *Wade* drew a constitutional line separating a compelling state interest in protecting "potential" human life *after* viability from what the Court viewed as a less-than-compelling interest in protecting potential life *before* reaching that biological threshold. Even if that line had any logical justification, it depended on a now-archaic scientific understanding long since overtaken by modern advancements.

I. This Court baked into *Roe*'s and *Casey*'s analyses the express recognition that the State's compelling interests in regulating abortion should be evaluated according to then-current scientific understanding. So guided, *Roe* devalued the State's interests both in maternal health and in protecting the beginnings of human life. See, *e.g.*, *Roe* v. *Wade*, 410 U.S. 113, 159 (1973) ("[T]he judiciary, at this point in the development of man's knowledge, is not in a position to speculate as to the answer" of when life begins.).

Applying principles of *stare decisis*, *Casey* likewise cited the reach and limits of then-current scientific advancements to justify its decision to retain *Roe*'s viability threshold while rejecting other portions of that decision. See, *e.g.*, *Planned Parenthood of Se. Pa.* v. *Casey*, 505 U.S. 833, 860 (1992) (recognizing that

although "advances in neonatal care have advanced viability" to an earlier point, those advances did not undermine "*Roe*'s central holding"). Thus, both precedents acknowledged that the weight afforded to the State's regulatory interests before viability rise or fall based on current scientific knowledge.

II. Scientific and technological advancements since *Roe* and *Casey* have cemented the State's compelling interests in protecting human fetal life long before viability. For example, 4D ultrasonography has revolutionized the study of fetal behavior and neurology, giving direct and convincing proof of fetal discernment, intentionality, and sociality from as early as 12 weeks of life. Such objective evidence of active fetal consciousness dispels any indeterminacy about whether the human fetus is either alive or capable of independent subjective experience. It also requires re-evaluation of the State's compelling interest in protecting that conscious human life.

Further, a mountain of recent scientific evidence shows that, through neural structures developing between 12 and 18 weeks, the fetus can and does experience conscious pain *in utero*. Faced with multiple, new, independent lines of evidence, even past naysayers have now admitted that the fetus is capable of conscious suffering without the later-developing brain structures that experts once considered essential to a conscious apprehension of pain. Perhaps most compellingly, 4D ultrasonography confirms that, even before viability, fetuses react to painful surgical procedures by grimacing and making other facial gestures recognized by science as a universal language of conscious pain experience.

III. Given the wealth of new scientific evidence establishing the human fetus's independent conscious experience and actual suffering, this Court should revise the false balance struck in prior abortion precedents to give full weight to the State's compelling interest in protecting actual, and not merely "potential," human life. Further, such evidence implicates the well-established and compelling state interest in preventing cruelty to living beings irrespective of legal personhood. See, *e.g., United States* v. *Stevens*, 559 U.S. 460, 469 (2010).

Finally, especially given the legal and ethical stakes implicated by these myriad advancements, this Court's abortion framework should be brought into line with its many precedents recognizing that state and federal legislatures are the appropriate arbiters of any lingering scientific uncertainty. This means that *Roe* and *Casey* should either be overruled (as the State and several *amici* compellingly argue) or, at a minimum, that the *Roe*/*Casey* framework should be adjusted to account for the recently established reality of fetal consciousness as early as the beginning of the second trimester.

The Court should do this by recognizing that where, as here, a State cannot fully protect its interest in preventing the infliction of great pain and even death on a conscious human being under the prevailing undue-burden standard before viability, a different standard should govern—one that gives decisive weight to the State's interest beginning at the point at which fetal consciousness is now known to begin. Such an approach will necessarily uphold Mississippi's ban on abortion after 15 weeks.

ARGUMENT

I. This Court's Prior Abortion Precedents Were Expressly Premised on Then-Current Medical Knowledge.

Taking *Roe* and *Casey* on their own terms, the reach of the right to abortion articulated there was never "unqualified," but from its inception hinged on the judicially determined strength of countervailing state regulatory interests. *Roe* v. *Wade*, 410 U.S. 113, 154 (1973); see also, *e.g.*, *id.* at 155 (agreeing that "at some point the state interests as to protection of health, medical standards, and prenatal life become dominant" in justifying abortion regulation). And there is no question that, in determining which state interests were sufficiently "compelling" to justify regulatory limitations, *Roe* premised its determination on then-available medical and scientific knowledge and the technical "problems of the present day." *Id.* at 165.

1. *Roe* endorsed the State's "definite interest" in promoting "health and medical standards" and gave more epistemologically qualified support for the State's interest in protecting "at least potential life." 410 U.S. at 150. And in determining the point at which those two rationales became compelling, *Roe* relied expressly and overwhelmingly on then-available medical knowledge to weigh the State's interests *at that time*. For example, while noting that States enacted their 19th Century abortion laws when the procedure was "inherently hazardous," *Roe* devalued the State's ongoing interests in protecting maternal health because the development of antisepsis and other "[m]odern medical techniques have altered this

situation." *Id.* at 149. The Court thus acknowledged the State's interests in protecting maternal health, but nevertheless set its second-trimester constitutional threshold "in the light of *present medical knowledge*" and "now-established medical fact." *Id.* at 163 (added emphasis).

On the other hand, as to protecting "potential life," *Roe* drew the constitutional threshold for a compelling state interest at viability—both because it viewed that recognizable line as having "logical and biological justifications,"[3] 410 U.S. at 163, and because the Court saw a relative lack of epistemological clarity as to the earlier and more "difficult question of when life begins," *id*. at 159. Besides cultural disagreement, the Court also identified substantial definitional problems posed by what were then cutting-edge scientific advances, such as "by new embryological data that purport to indicate that conception is a 'process' over time rather than an event, and by new medical techniques such as menstrual extraction, the morning-after pill, implantation of embryos, artificial insemination, and even artificial wombs." *Id.* at 161 (internal quotations omitted).

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[3] But see *Planned Parenthood of Se. Pa.* v. *Casey*, 505 U.S. 833, 989 n.5 (1992) (Scalia, J., dissenting) ("The arbitrariness of the viability line is confirmed by the Court's inability to offer any justification for it beyond [a] conclusory assertion[.]"); see also *City of Akron* v. *Akron Ctr. for Reprod. Health, Inc.*, 462 U.S. 416, 461 (1983) (O'Connor, J., dissenting) ("The choice of viability as the point at which the state interest in *potential* life becomes compelling is no less arbitrary than choosing any point before viability or any point afterward." (original emphasis)).

Hence, while acknowledging that a determination of when human life begins was relevant to the strength of the State's interest, the Court expressly reserved that question for a later day, concluding that resolution was impossible "at this point in the development of man's knowledge."[4] *Roe*, 410 U.S. at 159. Thus, from its inception, *Roe* premised its judicial line-drawing on the medical and scientific knowledge available in 1973.

2. The *Casey* plurality freely acknowledged that *Roe*'s continuing precedential effect turned on the strength of its underlying factual assumptions, guided by then-current scientific advancements. And, though the *Casey* plurality repeatedly emphasized its duty to reaffirm *Roe* on principles of *stare decisis*, it still abandoned *Roe*'s rigid trimester framework and subjected the abortion right to greater qualification by replacing *Roe*'s scrutiny standard with the new undue-burden test. See *Planned Parenthood of Se. Pa.* v. *Casey*, 505 U.S. 833, 872-878 (1992).

In squaring those changes with its decision to retain *Roe*'s viability threshold, the *Casey* plurality stressed that medical advances had altered some, but not all, of the factual assumptions underlying *Roe*. Thus, while "advances in neonatal care have advanced viability to a point somewhat earlier," those changed facts affected only the application of *Roe*'s constitutional threshold rather than its "validity"

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[4] In the intervening decades, human knowledge has advanced considerably, leaving little doubt that life begins at sperm-egg fusion. See, *e.g.*, Maureen L. Condic, *When Does Human Life Begin? The Scientific Evidence and Terminology Revisited*, 8 J. L. & Pub. Pol'y 44 (2013).

under the previously established balance of interests.[5] *Casey*, 505 U.S. at 860.

To the plurality, medical and scientific advancements in the 19 years since *Roe* had affected the timing of safety and viability concerns within the gestational period, but those types of factual changes had not added to or otherwise changed the *nature* of the countervailing state interests against which the abortion right might be qualified. The plurality thus explained that the "soundness or unsoundness" of *Roe*'s viability threshold "in no sense turns on whe[n] viability occurs." *Casey*, 505 U.S. at 860. Instead, its "attainment" may "continue to serve as the critical fact, [because] no change in *Roe*'s factual underpinning has left its central holding obsolete[.]" *Ibid*.

As in *Roe*, fundamental to the *Casey* analysis was the recognition that advancements in medical knowledge could alter the weight of state interests underlying the viability threshold. See *Casey*, 505 U.S. at 855 (asking, in accordance with *stare decisis* principles, "whether *Roe*'s premises of fact have so far changed in the ensuing two decades as to render its central holding *** irrelevant or unjustifiable"); cf. *id.* at 871 (recognizing that the "weight to be given th[e] state interest" in protecting potential life, "not the strength of the woman's interest, was the difficult question faced in *Roe*"). *Casey*, like *Roe*, thus

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[5] Accord *Casey*, 505 U.S. at 955 (Rehnquist, C.J., dissenting) (agreeing with the plurality that, except for the timing of viability, the "basic facts" underlying *Roe*'s viability threshold "have remained the same").

recognized the Court's abortion precedents to reflect, and be limited by, then-available scientific knowledge.

But the plurality made sure to reaffirm that "facts [could] so change[], or come to be seen so differently," as to undermine the justification for those older rules. *Casey*, 505 U.S. at 855. As explained in the next section, significant developments in embryology and neuroscience have done just that.

II. Since *Roe* and *Casey*, Technological and Medical Advances Have Greatly Expanded Scientific Understanding of Fetal Consciousness and Capacity for Suffering.

Although researchers have been interested in the cognitive and social behaviors of the fetus since the late 1800s, the nature of pregnancy obscured direct observation. More rigorous investigations of fetal behavior only became possible at the end of the 20th century "with the development of fetal physiological monitoring technology and innovations in ultrasound technology."[6] In particular, 4D ultrasonography—not widely available until more than a decade after *Casey*[7]—created an unprecedented new tool for studying fetal behavior and opened entirely new fields of research including "fetal neurology," "fetal psychology," and "fetal neurobehavior."[8] These tools

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[6] Gabriella A. Ferrari et al., *Ultrasonographic Investigation of Human Fetus Responses to Maternal Communicative and Non-communicative Stimuli*, 7 Frontiers Psych., at 1-2 (2016).

[7] Susan Raatz Stephenson, *3D and 4D Sonography: History and Theory*, 21 J. Diagnostic Med. Sonography 392 (2005).

[8] Mihaela Grigore et al., *The Role of 4D US in Evaluation of Fetal Movements and Facial Expressions and Their Relationship*

have given us a far better understanding of fetal consciousness and pain than was available at the times of *Roe* and *Casey*.

A. Recent Scientific Advances Demonstrate Fetal Consciousness From Early In The Second Trimester.

These modern technological advancements have allowed researchers to confirm fetal consciousness by directly observing fetal behavior, including reactions to external stimuli, and then comparing that objective behavior to comparable behavior exhibited in human infants, adults, and animals having a conscious experience.[9] Thus, although fetuses cannot verbally communicate their internal experiences, the technological developments of the last three decades now allow scientists to compare early fetal behavior with behaviors known to exhibit consciousness in other sentient beings.

Based on those scientific developments, there is now clear evidence based on ultrasonographic observations of facial expressions that fetuses as early as 12 weeks[10] exhibit conscious, intentional behavior,

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with Fetal Neurobehaviour, 20 Med. Ultrasonography 88, 88 (2018).

[9] See, *e.g.*, Marisa López-Teijón et al., *Fetal Facial Expression in Response to Intravaginal Music Emission*, 23 Ultrasound 216, 217 (2015) (noting the "great potential [of] modern 3D/4D ultrasound" to "identify[] specific movements that might be more reliably associated with fetal response").

[10] Throughout, references to the developmental age of the fetus are given in weeks since sperm-egg fusion (post-fertilization

and that they actively discriminate among similar sensory experiences:

- For example, as early as 14 weeks, after fetal auditory structures have formed, fetuses distinguish between music and mere vibroacoustic noise that stimulates the same auditory pathways, exhibiting a spike in activity and mouth movements only for music.[11]
- Fetuses at 23 weeks of life distinguish nursery rhymes with the syllable "LA" from rhymes with the syllable "LU."[12]
- Similarly, fetuses as young as 19-23 weeks selectively respond to and distinguish between different types of external stimulation, displaying more intentional—and perhaps communicative—movement in reaction to maternal abdominal touch versus maternal speaking.[13]

Besides facial expressions, hand and arm movements also provide evidence for conscious and active planning by the pre-viability fetus:

- At least as early as 20 weeks, fetal hand movements towards the mouth and eye are straighter and less jerky, and through acceleration

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age). For gestational age based on the last menstrual period (LMP), add two weeks.

[11] López-Teijón, *supra* note 9, at 216-223.

[12] Ferrari, *supra* note 6, at 3-8.

[13] Viola Marx & Emese Nagy, *Fetal Behavioural Reponses to Maternal Voice and Touch*, PLoS ONE (June 8, 2015), https://doi.org/10.1371/journal.pone.0129118.

and deceleration reveal planned hand movement responsive to the relative size and delicacy of the target. Thus, by that age, fetuses "show the recognizable form of intentional actions, with kinematic patterns that depend on the goal of the action, suggesting a surprisingly advanced level of motor planning."[14]

- Use of ultrasonography on fetal twins not only buttresses the evidence of intentional fetal movements, but also shows a social dimension to that capacity at an even earlier stage of gestation. Such analysis shows that fetuses as young as 12 weeks consistently demonstrate longer movement duration and deceleration time for movements directed at their twin compared to those directed at either themselves or at the uterine wall. Further, these other-directed movements increase with gestational age even as self-directed movements decrease. Thus, fetal movements "specifically aimed at the co-twin" evince fetal capacity for "social actions" as early as 12 weeks and confirm that such movements are intentional rather than random.[15]

These studies suggest that early fetal behavior—as early as 12 weeks—is neither accidental nor merely reflexive. Instead, it demonstrates a pre-viability

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[14] Stefania Zoia et al., *Evidence of Early Development of Action Planning in the Human Foetus: A Kinematic Study*, 176 Experimental Brain Rsch. 217, 217 (2007).

[15] Umberto Castiello et al., *Wired to Be Social: The Ontogeny of Human Interaction*, PLoS ONE (Oct. 7, 2010), https://doi.org/10.1371/journal.pone.0013199.

fetus's conscious awareness of its environment, active discrimination among similar sensory experiences, and intentional—even social—planning of physical actions. These studies thus show that, from early in the second trimester, fetal consciousness is an active, subjective experience comparable to that exhibited in other forms of sentient human life.

B. More Recent Scientific Evidence Demonstrates That Fetal Capacity For Suffering Also Arises Early In The Second Trimester.

Besides the proliferating evidence of fetal consciousness, scientific advances since *Roe* and *Casey* show that the fetus can and does experience pain from early in the second trimester. Brain mapping and other new methods have generated overwhelming evidence that neurocircuitry present from early in the second trimester is sufficient for both consciousness and suffering, while direct observations of fetal behavior confirm that young fetuses consciously react to painful stimuli.

1. There is longstanding, effectively universal scientific agreement that connections between the fetus's spinal cord and the subcortical nuclei in the thalamus region of the brain begin to form between 12 and 18 weeks.[16] In the past, however, many espoused the unproven theory that conscious fetal suffering was impossible before the development of thalamocortical

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[16] See, *e.g.*, Ivica Kostovic & Patricia S. Goldman-Rakic, *Transient Cholinesterase Staining in the Mediodorsal Nucleus of the Thalamus and its Connections in the Developing Human and Monkey Brain*, 219 J. of Compar. Neurology 431, (1983).

and intracortical circuitry beginning at about 22 weeks. For example, Dr. Stuart Derbyshire, a brain mapping researcher and pro-choice consultant who has written extensively on fetal pain since 1994,[17] was until recently considered "a leading voice against the likelihood of fetal pain,"[18] based chiefly on the assumption that the cortex was necessary for such pain.[19] In fact, Dr. Derbyshire was one of only two neuroscientists on the panel that produced the 2010 Royal College of Obstetricians and Gynaecologists (RCOG) report[20] rejecting the possibility of fetal pain before 22 weeks—not as a tested conclusion but merely as an inference flowing from the unproven "belie[f] that the cortex is necessary for pain perception."[21]

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[17] See Stuart W.G. Derbyshire & John C. Bockmann, *Fetal Pain and Abortion*, J. Med. Ethics: Blog (Jan. 15, 2020), https://blogs.bmj.com/medical-ethics/2020/01/15/fetal-pain-and-abortion/.

[18] Pam Belluck, *Complex Science at Issue in Politics of Fetal Pain*, N.Y. Times (Sept. 17, 2013), https://www.nytimes.com/2013/09/17/health/complex-science-at-issue-in-politics-of-fetal-pain.html.

[19] See, *e.g.*, Stuart W.G. Derbyshire, *Can Fetuses Feel Pain?*, 332 British Med. J. 909, 909-912 (2006).

[20] Royal College of Obstetricians & Gynaecologists, *Fetal Awareness: Review of Research and Recommendations for Practice*, at ix (2010).

[21] *Id.* at viii; cf. Susan J. Lee et al., *Fetal Pain: A Systematic Multidisciplinary Review of the Evidence*, 294 J. Am. Med. Ass'n 947, 949 (2005) (asserting, without citation to any evidence or authority, that "the psychological nature of pain presupposes the presence of functional thalamocortical circuitry required for conscious perception").

And yet, faced with mounting scientific evidence to the contrary, Derbyshire abandoned his position on the cortex's necessity just last year. He noted that even without a fully formed cortex, the mere projection of the thalamus into the cortical subplate area of the brain—which occurs at an early stage of neurological development—could be sufficient for pain perception and that such projections begin to emerge at 12 weeks post-fertilization. On the strength of that and other evidence, Dr. Derbyshire publicly reversed his position on fetal pain capacity. He now concludes that "the evidence, and a balanced reading of that evidence, points toward an immediate and unreflective pain experience mediated by the developing function of the nervous system from as early as 12 weeks."[22]

2. Indeed, a fair view of the current evidence readily shows that claims denying fetal pain without the cortex rest on mere *ipse dixit*,[23] while an enormous body of data—representing multiple, independent lines of scientific evidence—all point to the pre-viability fetus's developmental capacity for, and actual experience of, conscious suffering.

First, five separate lines of evidence show that both animals and humans exhibit consciousness and

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[22] Stuart W.G. Derbyshire & John C. Bockmann, *Reconsidering Fetal Pain*, 46 J. Med. Ethics 3, 6 (2020) (added emphasis); see also *id.* at 4 ("current neuroscientific evidence undermines the necessity of the cortex for pain experience"); *ibid.* ("it is now clear that the [position rejecting fetal pain before 22 weeks post-fertilization] is no longer tenable").

[23] See, *e.g.*, Lee, *supra* note 21, at 949 (asserting, without citation to any evidence or authority, that "pain perception requires cortical recognition of the stimulus as unpleasant").

suffering even when the cortex is impaired, immature, or absent, and that deletions of *sub*cortical circuitry (circuitry below the cortex region) are sufficient to cause disorders of consciousness:

- While the neocortex (the largest region of the cortex) is unique to mammals, animals that entirely lack that region of the brain (fish, amphibians, reptiles, and birds) are both conscious and capable of suffering.[24]
- Mammals (including rodents, cats, and primates) that have had the cortex partially or fully removed remain conscious and continue to show a vigorous response to painful stimuli.[25]

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[24] Extensive studies have determined that the neural structures underlying the most primitive form of consciousness in both humans and animals are found in subcortical regions of the brain. See, *e.g.*, Jaak Panksepp, *Cross-species Affective Neuroscience Decoding of the Primal Affective Experiences of Humans and Related Animals*, PLoS ONE (Sept. 7, 2011), https://doi.org/10.1371/journal.pone.0021236. As one expert has stated categorically, "it is now eminently clear that affective consciousness is a property of subcortical circuits we share with the other animals." Franco Fabbro et al., *Evolutionary Aspects of Self- and World Consciousness in Vertebrates*, 9 Frontiers Hum. Neuroscience, at 8 (2015). These "subcortical circuits" would include brain structures well developed in a human fetus at or before 18 weeks.

[25] Brigitte K. Matthies & K.B.J. Franklin, *Effects of Partial Decortication on Opioid Analgesia in the Formalin Test*, 67 Behav. Brain Rsch. 59 (1995); Brigitte K. Matthies & Keith B.J. Franklin, *Formalin Pain is Expressed in Decerebrate Rats but not Attenuated by Morphine*, 51 Pain 199 (1992); Duke Tanaka, Jr., *Effects of Selective Prefrontal Decortication on Escape Behavior in the Monkey*, 53 Brain Rsch. 161 (1973); Karen J. Berkley & Ronald Parmer, *Somatosensory Cortical Involvement in*

- Similarly, human children born without the cortex ("decorticate" or hydraencephalic patients) are conscious, indicating that long-range cortical connections developing only after 22 weeks in the human fetus, and completely absent in these patients, are not necessary for consciousness or for a psychological perception of suffering.[26]
- Multiple studies indicate that, while human processing of pain and the associations it elicits may become more complex over time, perception of pain remains relatively constant from childhood into adulthood,[27] demonstrating that late-

Responses to Noxious Stimulation in the Cat, 20 Experimental Brain Rsch. 363 (1974).

[26] Among other things, these studies of show that decorticate or hydraencephalic patients are capable of conscious behaviors, including smiling, distinguishing between familiar/unfamiliar people and situations, having preferences for particular kinds of music and having adverse reactions to pain. Majid Beshkar, *The Presence of Consciousness in the Absence of the Cerebral Cortex*, 62 Synapse 553 (2008); D. Alan Shewmon et al., *Consciousness in Congenitally Decorticate Children: Developmental Vegetative State as Self-Fulfilling Prophecy*, 41 Dev. Med. & Child Neurology 364 (1999); Bjorn Merker, *Consciousness Without a Cerebral Cortex: A Challenge for Neuroscience and Medicine*, 30 Behav. & Brain Sci. 63 (2007).

[27] Lynda L. Lamontagne et al., *Children's Ratings of Postoperative Pain Compared to Ratings by Nurses and Physicians*, 14 Issues in Comprehensive Pediatric Nursing 241 (1991); J. Emily Harrop, *Management of Pain in Childhood*, 92 Archives of Disease in Childhood – Educ. & Prac. 101 (2007).

developing cortical circuitry is unnecessary for a conscious experience of suffering.[28]

- In 2015, the largest study to date of human patients with consciousness disorders unambiguously concluded that the loss of consciousness is associated not with the loss of cortical, but rather of subcortical circuitry.[29] And experts in the study of consciousness have elsewhere concluded that consciousness clearly persists even without "vast regions of the cortex."[30]

Second, four separate lines of evidence show that consciousness and emotions do not arise in the cortex, but rather depend on subcortical circuitry, including the thalamus. These studies strongly establish that

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[28] That consistency in pain perception undercuts the necessity of the cortex because the cortical regions associated with painful experiences (dorsal-lateral prefrontal cortex and dorsal-anterior cingulate cortex), see, *e.g.*, Ulrike Bingel & Irene Tracey, *Imaging CNS Modulation of Pain in Humans*, 23 Physiology 371 (2008), are among the last to achieve maturity and continue to develop for decades after birth, see, *e.g.*, Nitin Gogtay et al., *Dynamic Mapping of Human Cortical Development During Childhood Through Early Adulthood*, 101 Proc. Nat'l Acad. Sci. U.S. 8174 (2004); Elizabeth R. Sowell et al., *Mapping Cortical Change Across the Human Life Span*, 6 Nature Neuroscience 309 (2003).

[29] Evan S. Lutkenhoff et al., *Thalamic and Extrathalamic Mechanisms of Consciousness After Severe Brain Injury*, 78 Annals of Neurology 68, 68 (2015) ("[C]linical measures of awareness and wakefulness *** were systematically associated with tissue atrophy within thalamic and basal ganglia nuclei.").

[30] Ezequiel Morsella et al., *Minimal Neuroanatomy for a Conscious Brain: Homing in on the Networks Constituting Consciousness*, 23 Neural Networks 14, 14 (2010).

consciousness, although later contextualized in the cortex, originates in the thalamus rather than the cortex:

- An authoritative review of the neural basis for human consciousness and emotion concludes that "the available evidence indicates that" later-developing "sectors of the nervous system, such as the cerebral cortex, contribute to but are not essential for the emergence of feelings, which are likely to arise instead from older regions such as the brainstem" and that the "neural substrates [of consciousness] can be found at all levels of the nervous system."[31]
- In the last decade, studies using high resolution brain imaging in both animals[32] and humans[33] have strongly indicated that anesthesia-induced loss of consciousness, and therefore conscious pain perception, is associated with a reduction in the activity of the thalamus, that is only later followed

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[31] Antonio Damasio & Gil B. Carvalho, *The Nature of Feelings: Evolutionary and Neurobiological Origins*, 14 Nature Rev. Neuroscience 143, 143 (2013).

[32] Rowan Baker et al., *Altered Activity in the Central Medial Thalamus Precedes Changes in the Neocortex During Transitions into Both Sleep and Propofol Anesthesia*, 34 J. Neuroscience 13326 (2014).

[33] Xiao-xing Song & Bu-wei Yu, *Anesthetic Effects of Propofol in the Healthy Human Brain: Functional Imaging Evidence*, 29 J. Anesthesia 279 (2015); Tommaso Gili et al., *The Thalamus and Brainstem Act as Key Hubs in Alterations of Human Brain Network Connectivity Induced by Mild Propofol Sedation*, 33 J. Neuroscience 4024 (2013).

by suppression of cortical activity in response to reduced thalamic function.

- Rigorous brain stimulation studies demonstrate that pain can rarely if ever be elicited by activating cortical circuitry. This indicates that, while the cortex may build upon painful experiences generated by other brain regions, it is largely *not* involved in producing a conscious experience of pain; *i.e.*, in humans, the conscious experience of suffering depends almost entirely on subcortical brain regions that develop very early in the life of the fetus.[34]
- Finally, a large body of direct experimental and medical evidence contradicts the assertion that suffering requires cortical circuitry. Interventions such as ablation[35] or stimulation[36] of the cortex do not affect pain perception, while altering the

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[34] The most scientifically accurate way of determining the neural structures *sufficient* for a conscious experience of suffering (or any other conscious experience), is to directly stimulate a specific brain region in an alert patient and observe whether a pain response is elicited. In agreement with decades of prior research, a recent study of over 4000 stimulations of the cortex determined that pain responses were surprisingly rare (approximately 1.4%). Laure Mazzola et al., *Stimulation of the Human Cortex and the Experience of Pain: Wilder Penfield's Observations Revisited*, 135 Brain: J. Neurology 631, 631 (2012). Such findings strongly disassociate the cortex from the production of conscious suffering.

[35] See sources cited *supra* note 25.

[36] Chikashi Fukaya et al., *Motor Cortex Stimulation in Patients With Post-Stroke Pain: Conscious Somatosensory Response and Pain Control*, 25 Neurological Rsch. 153 (2003); Mazzola, *supra* note 34.

function of subcortical structures[37] does, and is a highly effective treatment for patients with chronic pain[38]

Taken together, these nine lines of evidence—representing an extensive and diverse body of data generated almost entirely in the last two decades—indicate that consciousness and feeling, including conscious suffering, do not depend on cortical circuitry and are instead mediated by sub-cortical brain networks.[39] And, as noted above, there is overwhelming scientific agreement that, besides thalamic projections into the cortical subplate at 12 weeks, the subcortical, spinothalamic circuits capable of pain perception are established in a human fetus between 12 to 18 weeks.

Third and finally, observations of fetal and newborn responses to stimuli, including 4D ultrasonographic studies of fetal behavior, provide

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[37] Dipankar Nandi et al., *Thalamic Field Potentials in Chronic Central Pain Treated by Periventricular Gray Stimulation – A Series of Eight Cases*, 101 Pain 97 (2003); Sandra G.J. Boccard et al., *Long-term Outcomes of Deep Brain Stimulation for Neuropathic Pain*, 72 Neurosurgery 221 (2013).

[38] For example, so-called "Deep Brain Stimulation" of the thalamus, periaqueductal grey matter, and internal capsule—all early-developing, subcortical brain structures—is a widely used pain therapy. See Steven M. Falowski, *Deep Brain Stimulation for Chronic Pain*, 19 Current Pain & Headache Rep. 27, 27 (2015); Richard G. Bittar et al., *Deep Brain Stimulation for Pain Relief: A Meta-Analysis*, 12 J. Clinical Neuroscience 515 (2015).

[39] See also Derbyshire & Bockmann, *supra* note 22, at 4 nn. 23, 26-32 (reviewing numerous recent studies undermining the necessity of the cortex for pain experience).

direct, compelling evidence of the fetus's awareness of, and sensitivity to, painful stimuli:

- In considering use of anesthesia for invasive medical procedures performed on the fetus, a recent review of the evidence concluded that from the 13th week onward, "the fetus is extremely sensitive to painful stimuli," making it "necessary to apply adequate analgesia to prevent [fetal] suffering."[40]

  Moreover, while some had previously argued that the fetus is maintained in a constant state of sleep due to the presence of endocrine neuroinhibitors (ENIs) in the uterine environment, recent reviews of the literature indicate that the level of ENIs actually present in utero does not provide adequate anesthetic effect, and that the fetus can therefore be awakened by painful stimuli.[41]

- Fetuses delivered prematurely (as early as 21 weeks) show clear pain-related behaviors.[42] But even more tellingly, the earlier the infants are

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[40] Slobodan Sekulic et al., *Appearance of Fetal Pain Could be Associated With Maturation of the Mesodiencephalic Structures*, 9 J. Pain Rsch. 1031, 1036 (2016).

[41] Carlo V. Bellieni et al., *Is Fetal Analgesia Necessary During Prenatal Surgery?*, 31 J. Maternal-Fetal & Neonatal Med. 1241 (2018); Carlo V. Bellieni, *Analgesia for Fetal Pain During Prenatal Surgery: 10 Years of Progress*, 89 Pediatric Rsch. 1612 (2020).

[42] Sharyn Gibbins et al., *Pain Behaviours in Extremely Low Gestational Age Infants*, 84 Early Hum. Dev. 451 (2008).

delivered, the stronger their response to pain,[43] suggesting that later-developing cortical circuits, rather than enabling pain perception, moderate or even inhibit conscious suffering.[44]

- Last and most powerfully, cutting-edge 4D ultrasound studies confirm that the fetus, when subjected to painful stimuli, reacts with recognizable facial expressions consistently linked to a conscious experience of pain. For example, a well-controlled study published in January 2021[45] demonstrated that fetuses undergoing injection of anesthetic into the thigh prior to a painful surgical procedure at approximately 29 weeks make facial gestures (grimacing, etc.)[46] that are specifically associated with a conscious pain experience from the injection, with such gestures not occurring either at rest or after a "startling" stimulus.

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[43] Lina Kurdahi Badr et al., *Determinants of Premature Infant Pain Responses to Heel Sticks*, 36 Pediatric Nursing 129 (2010).

[44] Michael H. Ossipov et al., *Descending Pain Modulation and Chronification of Pain*, 8 Current Op. Supportive & Palliative Care 143 (2014); Mikwang Kwon et al., *The Role of Descending Inhibitory Pathways on Chronic Pain Modulation and Clinical Implications*, 14 Pain Prac. 656 (2014).

[45] Lisandra S. Bernardes et al., *Sorting Pain Out of Salience: Assessment of Pain Facial Expressions in the Human Fetus*, 6 Pain Rep., at 1-9 (2021).

[46] *Id.* at 5 (Figure 4, showing ultrasound images of pain expressions), 8 (links to ultrasound videos showing: (a) reaction to painful stimulus (http://links.lww.com/PR9/A91), (b) control group at rest (http://links.lww.com/PR9/A920), and (c) control group reacting to acoustic startle (http://links.lww.com/PR9/A93)).

> Because of the small size of the fetus before the third trimester, *in utero* surgery at earlier ages was rare until fairly recently.[47] However, a June 2021 case study[48] has confirmed previous results and extended them into pre-viability, observing that a fetus undergoing heart surgery at 21 weeks post-fertilization also reacted with facial expressions showing a conscious experience of pain upon injection of anesthetic into the thigh.[49]

This final category of studies—those involving fetal facial expressions—are especially compelling on the question of fetal consciousness. Facial-action coding systems have been widely used to assess pain in adult humans, infants, and even in diverse animal species (including mice, rats, rabbits, horses, and cats), based on strong evidence that, "facial expression can be used to quantify pain in individuals who are unable to express themselves verbally," such as "infants, young children, [or] those with verbal or cognitive impairments."[50] Specific behavioral measures have

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[47] See, *e.g.*, Colleen Malloy et al., *The Perinatal Revolution*, 34 Issues in L. & Med. 15, 19-20 (2019).

[48] See, *e.g.*, Lisandra S. Bernardes et al., *Acute Pain Facial Expressions in 23-Week Fetus*, Ultrasound in Obstetrics & Gynecology (forthcoming 2021), https://obgyn.onlinelibrary.wiley.com/doi/10.1002/uog.23709?af=R.

[49] *Ibid.* (ultrasound video available at https://obgyn.onlinelibrary.wiley.com/action/downloadSupplement?doi=10.1002%2Fuog.23709&file=uog23709-sup-0001-VideoS1.mp4).

[50] Christine T. Chambers & Jeffrey S. Mogil, *Ontogeny and Phylogeny of Facial Expression of Pain*, 156 Pain 798, 798 (2015).

been developed for neonates, infants, patients with dementia and comatose patients with minimal levels of consciousness.[51] In contrast, facial expression of pain does not consistently occur in unconscious individuals,[52] although pain is routinely assessed in such patients by other physiologic and neurologic criteria.

These studies provide even more conclusive proof that, at or before 21 weeks of life (well before the elaboration of connections between the thalamus and the cortex), the fetus is not merely reacting to pain in an unconscious, reflexive manner, but can communicate a conscious experience of suffering through a universal pain language unused by unconscious or anesthetized individuals.

In short, all 12 lines of evidence presented here support the conclusions that (a) contrary to the critical assumption made by RCOG and other physician trade associations, a connection between the thalamus and the cortex is *not* necessary for a fetus to be conscious and to experience suffering; and (b) a fetus is likely conscious and capable of apprehending pain at or before 18 weeks—and perhaps as early as 12 weeks.

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[51] Caroline Schnakers et al., *Assessment and Detection of Pain in Noncommunicative Severely Brain-Injured Patients*, 10 Expert Rev. Neurotherapeutics 1725, 1725-1731 (2010).

[52] Céline Gélinas et al., *Behaviors Indicative of Pain in Brain-Injured Adult Patients with Different Levels of Consciousness in the Intensive Care Unit*, 57 J. Pain & Symptom Mgmt. 761, 761-773 (2019).

III. These Advances Compel the Adjustment of *Roe* and *Casey*'s Balance to Reflect the State's Compelling Interest in Preventing Cruelty to Conscious Humans and Other Living Beings.

This large and growing body of evidence of fetal consciousness and suffering, developing in the decades since *Roe* and *Casey*, puts to rest any empirical question of whether the fetus is alive before viability: Any active, growing organism is clearly "alive" as that term is overwhelmingly understood.[53] And, as an organism of human origin, showing multiple signs of consciousness and emotion, a fetus is not merely "alive" but also capable at an early age of planning, discriminating, learning and emotional feeling. For this reason, this Court should revise the false balance struck by its abortion precedents to give full weight to the State's compelling interest in protecting that actual, not merely "potential," human life.

But aside from that recognized state interest, the mounting evidence of fetal consciousness and capacity for pain implicates another state interest that, though well-established, was not factored into prior abortion decisions—the compelling interest in preventing cruelty to conscious living beings, including but not limited to humans. The *Roe*/*Casey* framework must also be adjusted (at a minimum) in light of that interest.

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[53] See, *e.g.*, Bernd Rosslenbroich, *Properties of Life: Toward a Coherent Understanding of the Organism*, 64 Acta Biotheoretica 277 (2016).

A. The State's Interest in Preventing Cruelty to Conscious Humans and Other Living Beings is Broad and Compelling.

The powerful state interest in preventing cruelty is so widely recognized as to be ubiquitous. Most obviously, the Constitution itself prohibits state-sponsored "cruel and unusual punishments." U.S. Const. amend. VIII. And every state and federal code—not to mention the common law—contains laws proscribing violence, torture, and cruelty to others. But even putting aside protections tied directly to legal personhood, there can be no question that the State's interest runs deeper, extending over the past four centuries to protect an ever-expanding range of conscious, living beings.

1. As this Court noted in *United States* v. *Stevens*, the prohibition against cruelty to living creatures even without the protections of legal personhood "has a long history in American law, starting with the early settlement of the Colonies." 559 U.S. 460, 469 (2010) (citing The Body of Liberties § 92 (Mass. Bay Colony 1641), reprinted in American Historical Documents 1000-1904, 43 Harvard Classics 66, 79 (C. Eliot ed. 1910)) ("No man shall exercise any Tirranny or Crueltie towards any bruite Creature which are usuallie kept for man's use.").

And, as the entire Court and then-Solicitor General Kagan all agreed in *Stevens*, since the Founding there has emerged a "broad societal consensus against cruelty to animals." 559 U.S. at 476 (quotations omitted) (agreeing with the brief for the United States). That consensus is reflected in the fact that "[a]ll 50 states and the District of Columbia" have

enacted "statutes prohibiting animal cruelty." *Id.* at 491 (Alito, J., dissenting). As this Court has repeatedly acknowledged, that "national consensus" is "proof that [the] particular government interest"—in this case the interest in preventing cruelty to conscious living beings even without legal personhood—is "compelling." *Id.* at 496 n.6 (citing *Simon & Schuster, Inc.* v. *Members of N.Y. State Crime Victims Bd.*, 502 U.S. 105, 118 (1991); and *Roberts* v. *U.S. Jaycees*, 468 U.S. 609, 624-625 (1984)).

2. Given the ubiquitous condemnation of cruelty to other species, it would pervert both logic and compassion to think that the state interest in preventing cruelty would be any less compelling for a human fetus capable of both consciousness and suffering. It cannot be said that such an interest in preventing pain depends on the more sophisticated mental processes of the cortex, as virtually none of the animal cruelty laws currently in effect exclude non-mammals (which do not have advanced cortexes) from protection or otherwise condition their protection on higher cortical function.[54]

In the American legal tradition, moreover, however compelling the State's interest in protecting other species, its interest in "protecting children is unquestionably *more* important." *Stevens*, 559 U.S. at 495 (Alito, J., dissenting) (original emphasis). To condemn unjustified cruelty against snakes, rats, and pigeons while constitutionally elevating the right to inflict unnecessary violence on a demonstrably

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[54] See Appendix A (Definition of "Animal" In State Statutes Preventing Cruelty To Animals).

conscious human fetus would evince an unconscionable callousness to human suffering.[55]

Mounting scientific proof of the fetus's capacity for consciousness, feeling, and suffering from as early as 12 weeks thus compels a rebalancing of the *Roe/Casey* framework to bring those precedents into line with the centuries-old, undeniably compelling state interest in preventing the infliction of unjustified violence on conscious humans and other living beings.

B. Given the Stakes and This Court's Precedents, Any Scientific Uncertainty Warrants Deference to Legislative Judgment.

Because of the growing body of cutting-edge studies demonstrating fetal consciousness and suffering—the most recent approved for publication mere weeks ago—the State's compelling interests continue to grow. Given the astonishing rate of scientific advancement, it would be difficult to predict what human knowledge will reveal and make possible in the next 10, 20, or 30 years. But because the fetus is pre-verbal, certain scientific methodologies for evaluating consciousness in adult human subjects may never be available with the fetus. Perhaps most obviously, researchers cannot query the fetus, ask fetuses to describe their conscious experience of pain, or compare such responses to those of other subjects.

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[55] The need to prevent such callousness, in turn, implicates the State's interest in "protecting the integrity and ethics of the medical profession." *Gonzales* v. *Carhart*, 550 U.S. 124, 157 (2007) (quotations omitted).

But more broadly, no truly subjective experience—even those verbalized by another human adult—can be "known" to the observer in the sense of absolute scientific certainty. No human endeavor could credibly claim to be premised on such a degree of proof, nor could such an impossible standard supply the foundation for any legal doctrine, constitutional or otherwise. It is sufficient that a growing number of independent, rigorous, technically sophisticated methodologies each corroborate the fetus's biological capacity for, and measurable demonstration of, consciousness and suffering long before *Roe*'s arbitrary viability threshold—and early in the second trimester.

In any event, in cases of lingering uncertainty, this Court, under its own precedents, cannot and ought not serve as the ultimate arbiter of scientific proof. Instead, "[t]his Court has given state and federal legislatures wide discretion to pass legislation in areas where there is medical and scientific uncertainty." *Gonzales* v. *Carhart*, 550 U.S. 124, 163 (2007) (collecting cases); see also *June Med. Servs. LLC* v. *Russo*, 140 S. Ct. 2103, 2136 (2020) (Roberts, C.J., concurring in judgment). Because many scientific advances highlight the stark omissions in *Roe*'s and *Casey*'s factual premises—and given the disquieting and wholly credible possibility that, under *Roe*, pre-viability abortion has subjected thousands if not millions of human fetuses to conscious suffering and death—any lingering uncertainty about how to interpret that ever-expanding mountain of data must be resolved in favor of a constitutional framework that gives "especially broad" deference to state and federal legislatures as the appropriate factfinders. *Marshall*

v. *United States*, 414 U.S. 417, 427 (1974). Given the modern evidence, the factual assumptions fossilized in prior precedents like *Roe* and *Casey* must give way to greater knowledge and restored deference.[56]

For these reasons, this Court should overrule *Roe* and *Casey*. But even if it does not, the Court should treat abortion as it treats other rights—by adopting a "much more nuanced" approach to abortion than the undue-burden standard that currently governs pre-viability. See *Fulton* v. *Philadelphia*, 141 S. Ct. 1868, 1883 (2021) (Barrett, J., concurring).

Under such an approach, when, as here, the "difference between pre- and post-viability does not change the purpose, legitimacy, or weight" of the State's interest, viability should no longer be the first point at which that interest can be fully protected. *Preterm-Cleveland* v. *McCloud*, 994 F.3d 512, 521 (6th Cir. 2021). Instead, given the evidence presented above, states should be allowed to fully enforce their powerful interests in protecting conscious fetal life from pain and even extinction beginning at the point at which consciousness is now reasonably believed to begin—near the beginning of the second trimester. Given that the Mississippi law at issue here bans abortion well after the beginning of the second trimester, that law necessarily satisfies constitutional requirements.

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[56] Cf. Derbyshire & Bockmann, *supra* note 22, at 5 (condemning positions dismissive to the possibility of fetal pain as "moral recklessness").

CONCLUSION

This Court's prior abortion precedents, based on data and methodologies long since proven obsolete, do not adequately account for new and growing insights into early fetal life. Nor, considering overwhelming proof of the fetus's capacity for consciousness and suffering, can constitutional law continue to shrug at the independent ethical significance of human life before the arbitrary threshold of viability. Because *Roe* and *Casey* do just that, they should be overruled or, at a minimum, adjusted so as to uphold laws, like the Gestational Age Act, that account for the reality of fetal consciousness and pain near the beginning of the second trimester.

Respectfully submitted,

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APPENDIX

APPENDIX A

DEFINITION OF "ANIMAL" IN STATE STATUTES PREVENTING CRUELTY TO ANIMALS

State	Definition
Alabama	Animal not defined. *See* Ala. Code § 13A-11-14.
Alaska	"'[A]nimal' means a vertebrate living creature not a human being, but does not include fish." Alaska Stat. Ann. § 11.81.900(b)(3).
Arizona	"'Animal' means a mammal, bird, reptile or amphibian." Ariz. Rev. Stat. Ann. § 13-2910(H)(1).
Arkansas	"'Animal' means any living vertebrate creature, except human beings and fish[.]" Ark. Code Ann. § 5-62-102(2).
California	"[T]he word 'animal' includes every dumb creature[.]" Cal. Penal Code § 599b.

Colorado	"'Animal' means any living dumb creature[.]" Colo. Rev. Stat. Ann. § 18-9-201(2).
Connecticut	"The terms 'animals' and 'animal', as used in this chapter and in sections 53-247, 53-252 and 53-253, shall include all brute creatures and birds." Conn. Gen. Stat. Ann. § 29-108a.
Delaware	"'Animal' shall not include fish, crustacea or molluska." Del. Code Ann. tit. 11, § 1325(a)(2).
District of Columbia	Animal not defined. *See* D.C. Code Ann. § 22-1001.
Florida	"[T]he word 'animal' shall be held to include every living dumb creature[.]" Fla. Stat. Ann. § 828.02.
Georgia	"'Animal' shall not include any fish nor shall such term include any pest that might be exterminated or removed from a business, residence, or other structure." Ga. Code Ann. § 16-12-4.

Hawaii	"'Animal' includes every living creature, except a human being." Haw. Rev. Stat. Ann. § 711-1100.
Idaho	"'Animal' means any vertebrate member of the animal kingdom, except man." Idaho Code Ann. § 25-3502(2).
Illinois	"'Animal' means every living creature, domestic or wild, but does not include man." 510 Ill. Comp. Stat. Ann. 70/2.01.
Indiana	"As used in this chapter, 'animal' does not include a human being." Ind. Code Ann. § 35-46-3-3.
Iowa	"'Animal' means a nonhuman vertebrate." Iowa Code Ann. § 717B.1(1).
Kansas	"'Animal' means every living vertebrate except a human being." Kan. Stat. Ann. § 21-6411(a).
Kentucky	"'Animal' includes every warm-blooded living creature except a human being." Ky. Rev. Stat. Ann. § 446.010(1).
Louisiana	No definition of animal other than livestock. *See* La. Stat. Ann. § 14:102.
Maine	"'Animal' means every living, sentient creature not a human being." Me. Rev. Stat. tit. 7, § 3907(2).

Maryland	"'Animal' means a living creature except a human being." Md. Code Ann., Crim. Law § 10-601(b).
Massachusetts	No definition of animals. *See* Mass. Gen. Laws Ann. ch. 272, § 77.
Michigan	"'Animal' means a vertebrate other than a human being." Mich. Comp. Laws Ann. § 750.50(b).
Minnesota	"'Animal' means every living creature except members of the human race." Minn. Stat. Ann. § 343.20(2).
Mississippi	Animal not defined. *See* Miss. Code. Ann. § 97-41-1.
Missouri	"'Animal', every living vertebrate except a human being." Mo. Ann. Stat. § 578.005(3).
Montana	Animal not defined. *See* Mont. Code Ann. § 45-8-211(1)(a).
Nebraska	"Animal means any vertebrate member of the animal kingdom. Animal does not include an uncaptured wild creature or a livestock animal as defined in section 54-902." Neb. Rev. Stat. Ann. § 28-1008(2).

Nevada	"'Animal' does not include the human race, but includes every other living creature." Nev. Rev. Stat. Ann. § 574.050(1).
New Hampshire	"'[A]nimal' means a domestic animal, a household pet or a wild animal in captivity." N.H. Rev. Stat. Ann. § 644:8(2).
New Jersey	"'Animal' or 'creature' includes the whole brute creation." N.J. Stat. Ann. § 4:22-15.
New Mexico	"'[A]nimal' does not include insects or reptiles." N.M. Stat. Ann. § 30-18-1(A).
New York	"'Animal,' as used in this article, includes every living creature except a human being." N.Y. Agric. & Mkts. Law § 350(1).
N. Carolina	"[T]he term 'animal' includes every living vertebrate in the classes Amphibia, Reptilia, Aves, and Mammalia except human beings." N.C. Gen. Stat. Ann. § 14-360(c).
N. Dakota	Animal not defined. *See* N.D. Cent. Code Ann. § 36-21.2-03.
Ohio	"'Animal' includes every living dumb creature." Ohio Rev. Code Ann. § 1717.01(A).

Oklahoma	"'Animal' means any mammal, bird, fish, reptile or invertebrate, including wild and domesticated species, other than a human being." Okla. Stat. Ann. tit. 21, § 1680.1(1).
Oregon	"'Animal' means any nonhuman mammal, bird, reptile, amphibian or fish." Or. Rev. Stat. Ann. § 167.310(3).
Pennsylvania	Animal not defined. *See* 18 Pa. Stat. and Cons. Stat. Ann. § 5531.
Rhode Island	"'Animal' and 'animals' means every living creature except a human being." 4 R.I. Gen. Laws Ann. § 4-1-1(1).
S. Carolina	"'Animal' means a living vertebrate creature except a homo sapien." S.C. Code Ann. § 47-1-10(1).
S. Dakota	"'Animal,' any mammal, bird, reptile, amphibian, or fish, except humans." S.D. Codified Laws § 40-1-1(2).

Tennessee	"'Animal' means a domesticated living creature or a wild creature previously captured." Tenn. Code Ann. § 39-14-201(1).
Texas	"'Animal' means a domesticated living creature, including any stray or feral cat or dog, and a wild living creature previously captured." Tex. Penal Code Ann. § 42.092(2).
Utah	"'Animal' means *** a live, nonhuman vertebrate creature." Utah Code Ann. § 76-9-301(b)(1).
Vermont	"'Animal' means all living sentient creatures, not human beings." Vt. Stat. Ann. tit. 13, § 351(1).
Virginia	"[A]nimal means any nonhuman vertebrate species including fish except those fish captured and killed or disposed of in a reasonable and customary manner." Va. Code Ann. § 3.2-6500.
Washington	"'Animal' means any nonhuman mammal, bird, reptile, or amphibian." Wash. Rev. Code Ann. § 16.52.011(2)(b).
W. Virginia	Animal not defined. *See* W. Va. Code Ann. § 61-8-19.

Wisconsin	"'Animal' includes every living: (a) [w]arm-blooded creature, except a human being; (b) [r]eptile; or (c) [a]mphibian." Wis. Stat. Ann. § 951.01(1).
Wyoming	"'Household pet' means any privately owned dog, cat, rabbit, guinea pig, hamster, mouse, gerbil, ferret, bird, fish, reptile, amphibian, invertebrate or any other species of domesticated animal sold, transferred or retained for the purpose of being kept as a pet in or near a house." Wyo. Stat. Ann. § 6-3-1001(a)(ii).