ARIZONA SUPREME COURT

PLANNED PARENTHOOD ARIZONA, INC., et al., Plaintiffs/Appellants, v. KRISTIN MAYES, Attorney General of the State of Arizona, et al., Defendants/Appellees, and ERIC HAZELRIGG, M.D., as guardian ad litem of all Arizona unborn infants, Intervenor/Appellee.	Supreme Court Case No. CV-23-0005-PR Court of Appeals Division Two No. 2 CA-CV 2022-0116 Pima County Superior Court No. C127867

AMICI CURIAE BRIEF OF THE CHARLOTTE LOZIER INSTITUTE & AMERICAN CENTER FOR LAW AND JUSTICE IN SUPPORT OF INTERVENOR/APPELLEE ERIC HAZELRIGG, M.D. (UNOPPOSED)

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INTEREST OF AMICI CURIAE

The Charlotte Lozier Institute[1] (CLI) and American Center for Law & Justice (ALCJ) file this *amici curiae* brief in support of Intervenor/Appellee, Eric Hazelrigg, M.D.

Amicus CLI is a nonprofit research and education organization committed to bringing modern science to bear in life-related policy and legal decision-making. CLI believes the legal precedents and principles governing abortion should be informed by the most current medical and scientific knowledge on human development. As such, CLI has a strong interest in this case because the injunction against A.R.S. § 13-3603 (previously § 13-211) exists solely because of the United States Supreme Court's erroneous decision in *Roe v. Wade*, 410 U.S. 113 (1973), which was based on an outdated and limited scientific understanding.

Amicus ACLJ is an organization dedicated to the defense of the constitutional liberties secured by law, including the defense of the sanctity of human life. The ACLJ regularly represents parties, and submits *amicus curiae* briefs, in litigation involving abortion and constitutional law. *See, e.g.*, *Dobbs v. Jackson Women's Health Org.*, 142 S. Ct. 2228 (2022); *June Med. Servs. v. Russo*, 140 S. Ct. 2103

[1] The legal name of the 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.

(2020); *Whole Woman's Health v. Hellerstedt*, 579 U.S. 582 (2016); *Gonzales v. Carhart*, 550 U.S. 124 (2007); *Whitmer v. Linderman*, 973 N.W.2d 618 (Mich. 2022); *Oklahoma Call for Reprod. Just. v. O'Connor*, No. 120543 (Okla. 2022). The ACLJ's important, decades-long role in precedential cases involving abortion is perhaps best illustrated by the *Dobbs* Court's citation to and reliance upon two cases argued by the ACLJ at the United States Supreme Court: *Bray v. Alexandria Women's Health Clinic*, 506 U.S. 263 (1993), and *Hill v. Colorado*, 530 U.S. 703 (2000). The ACLJ submits this brief on behalf of itself and over 208,000 of its supporters (including more than 5,100 in Arizona) who promote the sanctity of life and have an interest in the outcome of this case.

This *amici* brief is filed with the consent of the parties. No persons or entities have provided financial resources for the preparation of this brief.

SUMMARY OF ARGUMENT

Scientific and technological advancements since *Roe* underscore the State's compelling interests in protecting fetal life at all stages, including before viability. For instance, 4D ultrasonography has provided direct and convincing proof of fetal discernment, intentionality, and sociality from as early as 12 weeks of life. Moreover, 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*. Given the wealth of recent scientific evidence establishing

the human fetus's independent, conscious experience and actual suffering, this Court should reverse the judgment below, lift the injunction, and uphold § 13-3603.

ARGUMENT

Arizona has a long history of protecting innocent preborn human life. It enacted its first statutes prohibiting abortion in 1901, before the adoption of its current constitution and before its admission to the Union.[2] Thus, preborn children were recognized as human beings worthy of protection at the time that the Arizona Constitution was adopted, lending all the more credence to the fact that they should be protected today. It is only the abortion precedents of the United States Supreme Court that have prevented Arizona's original abortion statutes from being enforced and created the need for Arizona to pass new legislation to reiterate the State's regard for and desire to protect preborn human life while navigating the arbitrary prohibitions placed on it by the United States Supreme Court's case law.

As the Arizona court of appeals noted in the opinion at issue, it was only "[a]fter the Supreme Court decided *Roe v. Wade*, 410 U.S. 113 (1973)," that the lower court found the State's abortion "statutes in question . . . unconstitutional as to all." *Planned Parenthood Ariz., Inc., v. Brnovich*, 524 P.3d 262 (Ariz. Ct. App. 2022) (citing *Nelson v. Planned Parenthood Ctr. of Tucson, Inc.*, 505 P.2d 580

[2] Ariz. Rev. Stat. para. 243-44 (1901), *available at* https://babel.hathitrust.org/cgi/pt?id=nyp.33433009076062&view=1up&seq=9&q1=abortion.

(1973) (post-*Roe* decision dated Jan. 30, 1973)). Indeed, immediately prior to *Roe*, the court of appeals had issued a robust defense of both the sanctity of innocent human life and the State's interest in protecting that life through statutes;[3] it was only the United States Supreme Court that rendered the abortion statutes of Arizona "unconstitutional."

Roe was decided based on an outdated and limited scientific understanding. Scientific understanding of human fetal life has expanded exponentially over the past decades. While this Court should lift the injunction against § 13-3603 because *Dobbs* overturned *Roe*, which is no longer the law of the land and was the exclusive inhibiter against the law, *amici* believe that it is beneficial for this Court to fully understand the compelling State interests undergirding § 13-3603 that have existed since before *Roe*, and that have only been enhanced by current scientific knowledge about pre-viability fetal life. The court of appeals, in its vacated 1973 opinion concerning the constitutionality of Arizona's abortion statutes, accurately recognized and upheld this State interest. This Court should reverse the judgment below, lift the injunction, and uphold § 13-3603, which prohibits abortion, in most circumstances, and protects innocent human life. The State has a compelling interest in protecting fetal life.

[3] *Nelson v. Planned Parenthood Ctr. of Tucson, Inc.*, 505 P.2d 580 (Ariz. Ct. App. 1973) (pre-*Roe* decision dated Jan. 3, 1973).

I. Since *Roe*, 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.[4] In particular, 4D ultrasonography created an unprecedented new tool for studying fetal behavior and opened entirely new fields of research including "fetal neurology," "fetal psychology," and "fetal neurobehavior."[5] These tools have given us a far better understanding of fetal consciousness and pain than was available during the times of *Roe*.

A. Recent Scientific Advances Demonstrate Fetal Consciousness from Early in the Second Trimester

Modern technological advancements have allowed researchers to confirm fetal consciousness by directly observing fetal behavior, including reactions to

[4] 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).

[5] Susan Raatz Stephenson, *3D and 4D Sonography: History and Theory*, 21 J. Diagnostic Med. Sonography 392 (2005); Mihaela Grigore, *et al*., *The Role of 4D US in Evaluation of Fetal Movements and Facial Expressions and Their Relationship with Fetal Neurobehaviour*, 20 Med. Ultrasonography 88, 88 (2018).

external stimuli, and then comparing that objective behavior to comparable behavior exhibited in human infants, adults, and animals having a conscious experience.[6] There is now clear evidence that fetuses as early as 12 weeks[7] exhibit conscious, intentional behavior, and that they actively discriminate among similar sensory experiences. For example, use of ultrasonography on fetal twins not only shows intentional fetal movements, but also shows a social dimension at an early stage of gestation. Such analysis shows that fetuses as young as 12 weeks 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. Also, 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.[8]

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[6] *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").

[7] Herein, unless otherwise noted, references to the developmental age of the fetus are given in weeks since sperm-egg fusion (post-fertilization age). For gestational age based on the last menstrual period (LMP), add two weeks.

[8] 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.

These studies suggest that fetal behavior—as early as 12 weeks—is neither accidental nor merely reflexive. Instead, they demonstrate a pre-viability fetus's conscious awareness of his or her environment, active discrimination among similar sensory experiences, and intentional—even social—planning of physical actions.

B. Recent Scientific Evidence Demonstrates That Fetal Capacity for Suffering Arises Early in the Second Trimester

Scientific advances since *Roe* 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. Indeed, pain receptors (nociceptors) begin forming at 7 weeks' gestation.[9]

There is longstanding and 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.[10] In the past,

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[9] L.B. Myers, *et al*., *Fetal Endoscopic Surgery: Indications and Anaesthetic Management*, 18 *Best Practice & Research Clinical Anaesthesiology* 231 (2004); K.J.S. Anand, *et al*. *Pain and Its Effects in the Human Neonate and Fetus*, 317 *New England J. of Med. 1321* (1987).

[10] *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).

however, many espoused the unproven theory that conscious fetal suffering was impossible before the development of thalamocortical 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,[11] was until recently considered "a leading voice against the likelihood of fetal pain,"[12] based chiefly on the assumption that the cortex was necessary for such pain.[13] 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[14] 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."[15]

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[11] *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/.

[12] *See* 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.

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

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

[15] *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

And yet, in 2020, when faced with mounting scientific evidence to the contrary, Dr. Derbyshire abandoned his position on the cortex's necessity. 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."[16]

Indeed, a fair view of the current evidence shows that claims denying fetal pain without the cortex rest on an unsupported assertion,[17] while an enormous body of data—representing multiple, independent lines of scientific evidence—all point

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citation to any evidence or authority, that "the psychological nature of pain presupposes the presence of functional thalamocortical circuitry required for conscious perception").

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

[17] *See*, *e.g.*, Lee, *supra* note 15, at 949 (asserting, without citation to any evidence or authority, that "pain perception requires cortical recognition of the stimulus as unpleasant").

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 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:

1). 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.[18]

2). 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.[19]

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[18] 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; Franco Fabbro, *et al*., *Evolutionary Aspects of Self- and World Consciousness in Vertebrates*, Frontiers Hum. Neuroscience, March 26, 2015, at 8. These "subcortical circuits" would include brain structures well developed in a human fetus at or before 18 weeks.

[19] Brigitte K. Matthies & Keith 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*

3). Similarly, human children born without the cortex ("decorticate" or hydranencephalic 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.[20]

4). 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,[21] demonstrating that late-developing cortical circuitry is unnecessary for a conscious experience of

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Selective Prefrontal Decortication on Escape Behavior in the Monkey, 53 Brain Rsch. 161 (1973); Karen J. Berkley & Ronald Parmer, *Somatosensory Cortical Involvement in Responses to Noxious Stimulation in the Cat*, 20 Experimental Brain Research 363 (1974).

[20] Also, these studies show that decorticate or hydranencephalic patients are capable of conscious behaviors, including 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).

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

suffering.[22]

5). 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.[23] And experts in the study of consciousness have elsewhere concluded that consciousness clearly persists even without "vast regions of the cortex."[24]

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

1). An authoritative review of the neural basis for human consciousness and emotion concludes that "the available evidence indicates that" later-developing

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[22] *See, e.g.*, Ulrike Bingel & Irene Tracey, *Imaging CNS Modulation of Pain in Humans*, 23 Physiology 371 (2008); 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).

[23] Evan S. Lutkenhoff, *et al*., *Thalamic and Extrathalamic Mechanisms of Consciousness after Severe Brain Injury*, 78 Annals of Neurology 68, 68 (2015).

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

"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."[25]

2). In the last decade, studies using high-resolution brain imaging in both animals[26] and humans[27] 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 by suppression of cortical activity in response to reduced thalamic function.

3). 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*

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

[26] 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).

[27] 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).

involved in producing a conscious experience of pain; that is, in humans, the conscious experience of suffering depends almost entirely on subcortical brain regions that develop very early in the life of the fetus.[28]

4). Finally, a large body of direct experimental and medical evidence contradicts the assertion that suffering requires cortical circuitry. Interventions such as ablation[29] or stimulation[30] of the cortex do not affect pain perception, while altering the function of subcortical structures[31] does, and is a highly effective treatment for patients with chronic pain.[32]

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[28] The most scientifically accurate way of determining the neural structures *sufficient* for a conscious experience of suffering is to stimulate a specific brain region in an alert patient and observe whether a pain response is elicited. A study of over 4,000 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.

[29] *See* sources cited *supra* note 19.

[30] 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 28.

[31] 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).

[32] For example, so-called "Deep Brain Stimulation" of the thalamus, periaqueductal grey matter, and internal capsule—all early-developing, subcortical

Taken together, the above-stated nine lines of evidence—representing an extensive and diverse body of data generated almost entirely in the last two decades (that is, *after* Roe)—indicate that consciousness and feeling, including conscious suffering, do not depend on cortical circuitry and are instead mediated by subcortical brain networks.[33] 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 and 18 weeks.

Third and finally, observations of fetal and newborn responses to stimuli, including 4D ultrasonographic studies of fetal behavior, provide direct, compelling evidence of the fetus's awareness of, and sensitivity to, painful stimuli:

1). 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

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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).

[33] *See also* Derbyshire & Bockmann, *supra* note 16, at 4 nn. 23, 26-32 (reviewing numerous recent studies undermining the necessity of the cortex for pain experience).

"necessary to apply adequate analgesia to prevent [fetal] suffering."[34] 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.[35]

2). Fetuses delivered prematurely (as early as 21 weeks) show clear pain-related behaviors.[36] But even more tellingly, the earlier the infants are delivered, the stronger their response to pain,[37] suggesting that later-developing cortical circuits, rather than enabling pain perception, moderate or even inhibit conscious suffering.[38]

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

[35] 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 (2021).

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

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

[38] Michael H. Ossipov, *et al*., *Descending Pain Modulation and Chronification of Pain*, 8 Current Op. Supportive & Palliative Care 143 (2014); Mikwang Kwon, *et*

3). 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 instance, a well-controlled study published in January 2021[39] 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.)[40] 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.

Because of the small size of the fetus before the third trimester, *in utero* surgery at earlier ages was rare until fairly recently.[41] Yet, a June 2021 case study[42] has confirmed previous results and extended them into pre-viability, observing that

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al., *The Role of Descending Inhibitory Pathways on Chronic Pain Modulation and Clinical Implications*, 14 Pain Prac. 656 (2014).

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

[40] *Id.* at 5 (Figure 4, showing ultrasound images of pain expressions), 8 (links to ultrasound videos showing: (a) reaction to painful stimulus (https://links.lww.com/PR9/A91), (b) control group at rest (https://links.lww.com/PR9/A92), and (c) control group reacting to acoustic startle (https://links.lww.com/PR9/A93)).

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

[42] Lisandra S. Bernardes, *et al*., *Facial Expressions of Acute Pain in 23-week Fetus*, 59 Ultrasound in Obstetrics & Gynecology 394, 394 (2021).

a fetus undergoing heart surgery at 23 weeks' post-fertilization also reacted with facial expressions showing a conscious experience of pain upon injection of anesthetic into the thigh.[43]

This last category of studies—involving fetal facial expressions—is 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, 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."[44] Specific behavioral measures have been developed for neonates, infants, patients with dementia and comatose patients with minimal levels of consciousness.[45] In contrast, facial expression of pain does not

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

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

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

consistently occur in unconscious individuals,[46] 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 sum, the above-stated 12 lines of evidence 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 *unnecessary* 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.[47]

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[46] 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).

[47] *See* Charlotte Lozier Inst., *Science of Fetal Pain* (Sept. 13, 2022), https://lozierinstitute.org/fact-sheet-science-of-fetal-pain/ (documenting that fetuses can feel pain at least by 15 weeks' gestation and possibly earlier, that the standard of medical care now calls for direct fetal analgesia and anesthesia during fetal surgery, beginning at least by 15 weeks, and that babies are surviving and thriving at ever younger pre-term ages when given appropriate care and treatment).

II. These Scientific Advances Support the State's Compelling Interest to Prevent Harm to a Fetus

This large and growing body of evidence of fetal consciousness and suffering, developed in the decades since *Roe* and its progeny, 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.[48] 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.

Because of the growing body of cutting-edge studies demonstrating fetal consciousness and suffering, 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.

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

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. This consciousness and suffering combine to furnish one reason that the State has an interest in fetal life.

Throughout history, there has been a recurring debate over the controversial position that the extent to which a living human being should be entitled to legal protection and basic dignity is dependent upon his or her medical conditions, expected quality of life, potential to contribute to society, etc. *See, e.g.*, *Washington v. Glucksberg*, 521 U.S. 702, 729 (1997). It is well established, however, that "a State may properly decline to make judgments about the 'quality' of life that a particular individual may enjoy, and simply assert an unqualified interest in the preservation of human life." *Cruzan v. Dir., Mo. Dep't of Health*, 497 U.S. 261, 282 (1990); *Glucksberg*, 521 U.S. at 729 ("[The State] . . . insists that all persons' lives, from beginning to end, regardless of physical or mental condition, are under the full protection of the law."). For instance, a State Legislature has substantial leeway to

ensure that the lives of human beings that have a disability or terminal condition are no less valued than the lives of others. *Glucksberg*, 521 U.S. at 731-32. The task of weighing the "unquestionably important and legitimate" interests at play when the lives of these individuals are at risk is a quintessentially legislative task. *Id.* at 735. The State has, and may pursue through legislation, "a legitimate and substantial interest in preserving and promoting fetal life." *Gonzales*, 550 U.S. at 145; *see also Dobbs*, 142 S. Ct. at 2284 (the State's "legitimate interests include respect for and preservation of prenatal life at all stages of development; the protection of maternal health and safety; . . . [and] the mitigation of fetal pain. . . .") (citations omitted). Indeed, as the court of appeals noted in its January 1973 opinion issued just weeks before *Roe* rendered it invalid:

> We do not find the Arizona statute overbroad because it does not make exceptions for cases of rape or a defective fetus. Admitting that ***the subject of abortion is within the police power of the state and finding that there is no fundamental right to destroy life, the test of validity in this case is whether or not the ends sought to be attained are appropriate and the regulations presented are reasonable.*** *Edwards v. State Board of Barber Examiners*, 72 Ariz. 108, 231 P.2d 450 (1951). **The measure of reasonableness is what is fairly appropriate to its purpose under all circumstances** and not necessarily what is best. *State v. Borah*, *supra*.

Nelson v. Planned Parenthood Ctr. of Tucson, Inc., 505 P.2d 580, 587 (1973) (pre-*Roe* decision) (emphasis added).

> We realize that pregnancy is a crisis in the life of a woman, bringing about a special interaction of mind, body, self and society. ***The legislature has balanced the interest of the mother against the interest***

> ***of the fetus and has opted in favor of the fetus.*** **We are unable to say that the legislature's decision is unreasonable.** As for the defective fetus we ask, how "defective" is "defective"? Is the defect capable of being corrected? The argument in favor of aborting the defective fetus assumes that handicapped life is not worth living. **We believe the legislature can legitimately decide that the primary consideration is the protection of life, even abnormal**.

Id. (emphasis added).

Thus, the Arizona Legislature has exercised its legitimate interest in pre-born human life, and has determined that abortion should be prohibited, under most circumstances, and at all stages of development. That determination should be upheld as it is within the State's compelling interest.

CONCLUSION

This Court should reverse the judgment below, lift the injunction, and uphold § 13-3603.

RESPECTFULLY SUBMITTED this 22 day of May, 2023.

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